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- d. Articles on current issues in business education

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EXAMINING THE IMPACT OF RESOURCE MANAGEMENT, SELF-EFFICACY, AND MOTIVATION ON DEEP LEARNING IN A VIRTUAL LEARNING ENVIRONMENT: A PLS-SEM APPROACH

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Abstract

This study explores the impact of resource management and motivation on deep learning outcomes within virtual learning environments among students from Technical and Vocational Education and Training (TVET) institutions in Kenya. Effective resource management and motivation are crucial factors that influence educational success, and understanding their effects on deep learning can enhance educational practices. Data was collected from 487 students through a structured survey administered via Survey Monkey, with a preliminary pilot test conducted to ensure the survey's clarity. The analysis involved exploratory factor analysis and Partial Least Squares structural equation modeling (PLS-SEM). The findings indicate that effective resource management has a significant positive impact on deep learning outcomes and student motivation. Specifically, motivation and resource management were both found to significantly affect deep learning, with motivation exhibiting the strongest direct influence. Resource management also positively impacts self-efficacy, which subsequently enhances deep learning. The model explained a substantial portion of the variance in deep learning, highlighting the complex interplay between these factors. Based on these results, it is recommended that educators focus on improving resource management by providing diverse and accessible learning tools and support systems. Additionally, motivational strategies should be implemented to engage students and foster their intrinsic interest in learning. Also, by integrating these findings into virtual learning frameworks, educational institutions can create environments that better support deep learning and improve student performance. Future research should consider exploring additional factors that influence deep learning and evaluating the effectiveness of specific resource management practices in various educational contexts.

Keywords: Resource Management, Motivation, Deep Learning, VLE

Introduction

Virtual learning environments (VLEs) have evolved dramatically, integrating deep learning methodologies that extend beyond traditional rote memorization (Segooa & Kalema, 2015; Sølviik & Glenna, 2021). These digital platforms incorporate multimedia, interactive simulations, and online assessments to enhance student engagement and personalized learning. Despite these advancements, the mechanisms through which strategic resource management in VLEs impacts deep learning remain underexplored. This approach encourages students to explore topics in-depth, connect concepts, and synthesize information (Ramsden, 1979). It fosters inquiry-based learning, critical thinking, and problem-solving by integrating knowledge from multiple disciplines (Richardson & Newby, 2006). Collaborative learning in VLEs further enriches this process by promoting diverse perspectives and group problem-solving (Bharathi & Pande, 2024), ultimately preparing students for both academic and professional challenges (Biggs, 1988).

Effective resource management is pivotal for optimizing deep learning in VLEs. Key elements include time management, study environment management, and effort regulation. Time management involves structuring study schedules to meet deadlines and reduce



procrastination, enhancing engagement and productivity (Wu, 2023). A well-managed study environment—quiet, well-lit, and free from distractions—supports sustained attention and motivation (Rashid & Asghar, 2016). Effort regulation, including goal-setting and persistence, boosts self-efficacy and learning outcomes (Prifti, 2020).

Motivation and self-efficacy are crucial for deep learning outcomes in VLEs (Chasetareh et al., 2022). Motivation drives active participation and perseverance, while self-efficacy enhances students' confidence in tackling complex problems and engaging deeply in learning activities (Hatlevik et al., 2018; Macalisang & Bonghawan, 2024). Therefore, these factors create a positive feedback loop that fosters critical thinking and lifelong learning.

This research aims to investigate how resource management (time, study environment, effort), motivation, and self-efficacy predict deep learning in VLEs. It will also explore how motivation mediates the relationship between resource management and deep learning, offering insights for improving educational strategies in virtual settings.

Literature Review

Deep Learning

Deep learning has revolutionized education by shifting from basic knowledge acquisition to transformative learning experiences (Esteban-Guitart & Gee, 2020). Unlike traditional surface learning, which emphasizes rote memorization and basic comprehension, deep learning encourages students to critically analyze, synthesize, and apply knowledge meaningfully (Wang & Zhang, 2018; Richardson et al., 2012). This approach enhances academic performance and cultivates essential skills for success in today's world (Duff, 2004; Richardson et al., 2012; Wilding & Andrews, 2006).

Deep learning promotes cognitive engagement that goes beyond mere factual understanding. Students are encouraged to delve deeply into subjects, exploring fundamental concepts and their implications. This profound engagement helps build robust mental models that integrate new information with existing knowledge (Aharony, 2006). Additionally, tackling complex ideas fosters flexible thinking and adaptive problem-solving (Jiang, 2022).

One of the key benefits of deep learning is its focus on critical thinking and problem-solving (Jiang, 2022). Students learn to question assumptions, evaluate evidence, and construct reasoned arguments (Wang & Zhang, 2018). In today's rapidly changing world, these skills are crucial for making informed decisions and driving innovation (Núñez & León, 2016). Deep learning also fosters creativity and innovation by encouraging students to explore diverse perspectives and experiment with solutions (Núñez & León, 2016; Zhao & Qin, 2021; Sølvi& Glenna, 2021).

In virtual learning environments, where physical separation can limit interaction, deep learning is essential for effective communication and collaboration (Lindblom-Ylänne & Lonka, 1998). Collaborative projects and online discussions help students refine their interpersonal skills, articulate ideas clearly, and work towards shared goals, preparing them for teamwork in diverse global contexts.

Resource Management and Deep Learning in Virtual Learning Environments

Resource management in virtual learning environments is crucial for facilitating deep learning. It involves the strategic allocation and optimization of educational resources to support engagement, critical thinking, and comprehensive understanding. Effective planning and organization of study schedules help students engage deeply with course materials without feeling overwhelmed (Claessens et al., 2007; List & Nadasen, 2016). Setting clear timelines and breaking tasks into manageable chunks aids in prioritizing work, meeting deadlines, and allocating time for reflection (Zhu et al., 2020). Creating an optimal physical and psychological



learning space enhances concentration and focus. A well-organized environment, free from distractions, supports active participation in virtual learning activities (Rashid & Asghar, 2016). This involves setting realistic goals, monitoring progress, and maintaining motivation despite challenges. Effective effort regulation encourages persistence and fosters a deeper understanding of the subject matter (Prifti, 2020).

Technological tools such as learning management systems, multimedia content, and virtual collaboration platforms are integral to virtual learning environments (Marshall & Sankey, 2023; Bradley, 2020). Effective resource management ensures these tools are selected and integrated thoughtfully. Interactive simulations and virtual labs, for example, enable students to engage actively with complex concepts (Pannekoek & Ally, 2008).

Resource management also includes selecting diverse instructional materials tailored to students' needs. Digital textbooks, video lectures, and open educational resources (OERs) offer flexibility and accessibility, supporting deep learning by catering to various learning styles (Orr et al., 2015; Pramesworo et al., 2023). Human support systems, such as instructor guidance and academic advising, further enhance deep learning by providing personalized feedback and fostering a supportive learning community (Coll et al., 2014; McGill et al., 2020). Given these findings, it is reasonable to hypothesize:

Hypothesis 1: Resource management positively predicts deep learning in virtual learning environments.

Motivation

Motivation is crucial for academic success in virtual learning environments. It drives learners to pursue goals and shapes attitudes and behaviors toward learning (Hsiao, 2021). Motivation can be intrinsic or extrinsic, this involves personal interest and satisfaction in learning. Intrinsically motivated students engage deeply with the material, exhibit perseverance, and show higher cognitive engagement (Legault, 2016; Oudeyer & Kaplan, 2007; Rojo, 2015). Driven by external rewards and recognition, extrinsic motivation includes achieving high scores or receiving praise (Bear et al., 2017). While effective for initial engagement, extrinsic motivation must be aligned with intrinsic motivators to sustain deep learning (Bear et al., 2017; Firat et al., 2017). In virtual learning environments, where students manage their learning independently, fostering both intrinsic and extrinsic motivation is crucial (Hartnett, 2016; Everaert et al., 2017). Designing engaging content, providing opportunities for autonomous learning, and incorporating elements of extrinsic motivation like clear expectations and feedback can enhance motivation (Zou et al., 2023). Research shows a positive link between motivation and deep learning, characterized by cognitive comprehension and application (An et al., 2023; Aguilar et al., 2021; Vansteenkiste et al., 2020). Effective resource management also supports motivation by reducing feelings of overwhelm and enhancing the use of learning materials (Rani et al., 2023; Harackiewicz et al., 2016). Therefore, based on these insights, the following hypotheses are formulated:

Hypothesis 2: Resource management positively predicts motivation in virtual learning environments.

Hypothesis 3: Motivation positively predicts deep learning in virtual learning environments.

Self-Efficacy

Self-efficacy, representing the determination to pursue and complete educational goals, is vital for academic success, especially in virtual learning environments (Hartnett, 2016). It influences students' engagement, resilience, and commitment to learning (Shen et al., 2013).

High self-efficacy is strongly correlated with deep learning, as it drives students to invest time and effort in mastering complex material (Kim et al., 2022; Cheng, 2021). Self-efficacy is also linked to



motivation and resource management. Motivated students are more likely to persevere and seek help (Firat et al., 2018), while effective resource management enhances self-efficacy by helping students handle challenges and stay engaged (Dabbagh & Kitsantas, 2012). Moreover, the relationship between learning persistence and deep learning is bidirectional. Engaging deeply with material enhances self-efficacy by providing a sense of accomplishment (Chen et al., 2020). Given these insights, the following hypotheses are formulated:

Hypothesis 4: Resource management positively predicts self-efficacy in virtual learning environments.

Hypothesis 5: Self-efficacy positively predicts deep learning in virtual learning environments.

Hypothesis 6: Motivation positively predicts self-efficacy in virtual learning environments.

The Mediated Effect of Self-Efficacy and Motivation

In virtual learning environments, the interplay between resource management, self-efficacy, motivation, and deep learning is complex. Effective resource management enhances self-efficacy by providing control and confidence, leading to increased engagement in deep learning (Zimmerman, 1990; Shen et al., 2013). Self-efficacy also boosts motivation, leading to deeper engagement and critical thinking (Chen et al., 2020). Motivation supports the relationship between resource management and deep learning. Efficient resource management supports intrinsic motivation and aligns with students' goals, while extrinsic motivators provide additional incentives (Legault, 2016; Bear et al., 2017). Self-efficacy and motivation together create a feedback loop where resource management enhances both, driving deep learning (Firat et al., 2018). Based on these insights, the following hypothesis is formulated

Hypothesis 7: Self-efficacy mediates the relationship between resource management and deep learning in virtual learning environments.

Research Methodology

Participants

The study involved 487 students enrolled in virtual learning programs across seven TVET institutions in Kenya. The gender distribution of the sample comprised 275 male students (56.5%) and 212 female students (43.5%). In terms of program enrollment, 289 students (59.3%) were enrolled in diploma programs, while 198 students (40.7%) were pursuing certificate programs. The academic level of the participants included 162 first-year students (33.3%), 175 second-year students (36.0%), and 150 third-year students (30.8%). The inclusion criteria ensured that participants had experience with virtual learning environments, making them well-suited to provide insights into the impact of resource management, self-efficacy, and motivation on deep learning.

Instruments

The data for this study was collected using a structured survey designed to measure the key constructs of resource management, self-efficacy, motivation, and deep learning. The survey comprised multiple sections, each targeting a specific construct relevant to the study. The resource management construct included items adapted from validated scales on resource management in educational contexts, particularly the Motivated Strategies for Learning Questionnaire (Lee et al., 2020). This instrument assessed students' ability to manage their study time, utilize learning materials effectively, seek help when needed, organize their study environment, set clear goals, and adapt study strategies based on learning progress.

Self-Efficacy Items were adapted from Zhao and Liu (2022) and originally based on Sherer et al. (1982) scale. These items were tailored to measure students' confidence in managing learning tasks, overcoming challenges in virtual learning environments, performing well on assignments,



managing time effectively, and learning independently. The motivation instrument incorporated items adapted from the revised two-factor Study Process Questionnaire (Biggs et al., 2001). It included items to capture intrinsic motivation (personal interest and satisfaction in learning) and extrinsic motivation (desire for good grades and satisfaction from mastering challenging tasks). Finally, the deep learning section included items from a five-item Deep Learning Scale designed by Zhao and Liu (2022). This scale was formulated to assess students' engagement with course material, critical thinking skills, application of knowledge to new contexts, exploration of different perspectives, and depth of understanding in the course content.

Data Collection

The data collection for this study was executed via SurveyMonkey, an online survey tool that enabled efficient distribution and response gathering. Participants were emailed a survey link along with detailed instructions for completion. The survey was designed to be user-friendly and accessible, which led to a high response rate and reliable data. Participants were given a two-week window in August 2023 to complete the survey, with periodic reminders sent to enhance participation. The initial target population comprised 870 students enrolled in virtual learning programs across seven TVET institutions in Kenya, with 487 responses ultimately collected.

Prior to the main data collection, an initial pilot test was conducted with 42 students to verify the quality and suitability of the survey. This pilot test aimed to assess the clarity, comprehensibility, and relevance of the questionnaire for the target population. Pilot participants provided feedback on the clarity of instructions, the relevance of the items, and any difficulties they faced while responding. Based on this feedback, necessary revisions and adjustments were made to improve the questionnaire. The reliability analysis of the pilot test data showed favorable results for all measured constructs in the study. Specifically, the internal consistency was high for motivation (Cronbach's $\alpha = 0.754$), self-efficacy (Cronbach's $\alpha = 0.813$), resource management (Cronbach's $\alpha = 0.745$), and deep learning (Cronbach's $\alpha = 0.854$). These results indicated that the survey items were reliable and appropriate for measuring the intended constructs.

In addition, before administering the questionnaires, participants were informed about the research objectives and assured that their responses would remain confidential. They were also told they could withdraw from the study at any time without any repercussions. All participants provided voluntary consent to participate in the study. Throughout the data collection process, the researchers strictly adhered to ethical standards to maintain the integrity and confidentiality of the data. This rigorous approach to data collection ensured the study's findings would be both reliable and valid.

Data Analysis

Prior to conducting statistical analyses, extensive preprocessing procedures were conducted. These included checks for outliers and missing values, as well as assessments for normality and common method bias using Harman's single-factor test (Aguirre-Urreta & Hu, 2019). Exploratory factor analysis was employed to determine whether any single dominant factor influenced the variance in the dataset. Initial assessments confirmed the sample's adequacy with a Kaiser-Meyer-Olkin Measure of Sampling Adequacy of 0.895, further supported by Bartlett's Test of Sphericity ($\chi^2 = 4193.448$, $df = 190$, $p < 0.001$), indicating strong inter-item correlations suitable for factor analysis. Principal Axis Factoring was then utilized to explore the variance explained by the extracted factors (Baumgartner & Homburg, 2023). The first four factors collectively accounted for 63.074% of the variance. Factor 1 had an initial eigenvalue of 6.053, explaining 30.264% of the variance (28.040% after extraction and 3.954% after rotation). Factor 2 explained 12.567% initially (10.271% after extraction and 3.841% after rotation) with an

eigenvalue of 2.513. Factor 3 explained 11.112% initially (8.913% after extraction and 3.692% after rotation) with an eigenvalue of 2.222, while Factor 4 explained 9.130% initially (6.964% after extraction and 3.430% after rotation) with an eigenvalue of 1.826. These findings collectively indicated that no single factor dominated, thereby alleviating concerns regarding common method bias (See Figure 1).

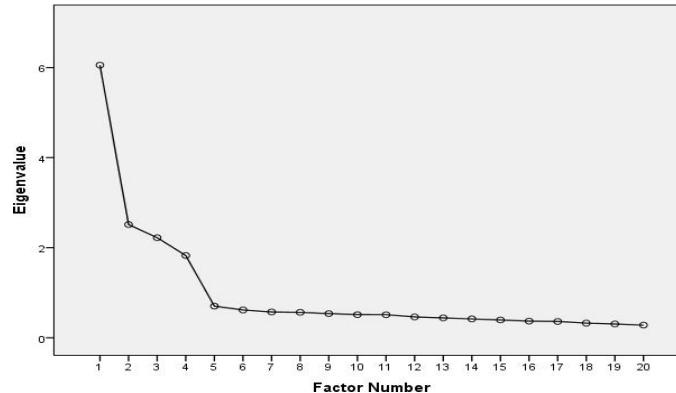


Figure1: Scree plot showing the eigenvalues of factors extracted from Principal Axis Factoring. Further, to assess the reliability and validity of the questionnaires, Cronbach's alpha, composite reliability (rho_a and rho_c), and average variance extracted (AVE) were calculated (Hair et al., 2014). Discriminant validity was confirmed using the Fornell-Larcker criterion (Henseler et al., 2014). Collinearity among predictors was evaluated using Variance Inflation Factors (VIF) (Vörösmarty & Dobos, 2020). Subsequently, Structural Equation Modeling (SEM) was performed using Partial Least Squares in SMARTPLS version 4.0 to test the hypothesized model (Sarstedt et al., 2021; Hair et al., 2014). Additionally, fsQCA version 4.1 facilitated Qualitative Comparative Analysis (QCA) to explore different configurations influencing the outcomes (Kumar et al., 2022).

Results Analysis

Measurement Model Analysis

The measurement model underwent symmetrical analysis to assess the reliability and validity of its constructs. The reliability and validity of each construct were rigorously evaluated (See Table 1). Deep Learning exhibited strong internal consistency with a Cronbach's alpha ($\alpha=0.845$), supported by high composite reliability measures (rho_a = 0.850, rho_c = 0.890) and an average variance extracted (AVE) of 0.618, indicating reliable and convergent measurement. Similarly, Motivation showed robust reliability with a Cronbach's alpha ($\alpha=0.827$), complemented by strong composite reliability (rho_a = 0.849, rho_c = 0.885) and an AVE of 0.659. Resource Management demonstrated excellent internal consistency (Cronbach's alpha $\alpha=0.863$), with high composite reliability (rho_a = 0.872, rho_c = 0.898) and an AVE of 0.594, confirming reliability and convergent validity. Self-Efficacy also exhibited strong internal consistency (Cronbach's alpha $\alpha=0.866$), supported by high composite reliability (rho_a = 0.871, rho_c = 0.903) and an AVE of 0.651, indicating reliable and convergent measurement.

In addition, Outer loadings were examined to assess the strength of relationships between observed indicators and their respective latent constructs in the measurement model. For Deep Learning, indicators DPL1 to DPL5 exhibited strong loadings ranging from 0.725 to 0.852, indicating robust measurement of this construct. Motivation indicators (MOT1 to MOT4) showed substantial loadings ranging from 0.738 to 0.893, confirming reliable measurement of motivational



factors. Resource Management indicators (RMT1 to RMT6) demonstrated consistent loadings ranging from 0.707 to 0.841, reflecting solid measurement of resource management behaviors. Self-Efficacy indicators (SE1 to SE5) displayed strong loadings ranging from 0.780 to 0.854, indicating reliable measurement of self-efficacy beliefs.

Table 1
Reliability and Validity Measures of Constructs in the Measurement Model

		Outer loadings	Cronbach alpha (α)	CR (rho_a)	CR (rho_c)	AVE
Deep Learning	DPL1	0.779	0.845	0.850	0.890	0.618
	DPL2	0.799				
	DPL3	0.771				
	DPL4	0.852				
	DPL5	0.725				
Motivation	MOT1	0.893	0.827	0.849	0.885	0.659
	MOT2	0.738				
	MOT3	0.799				
	MOT4	0.811				
Resource management	RMT1	0.707	0.863	0.872	0.898	0.594
	RMT2	0.736				
	RMT3	0.735				
	RMT4	0.817				
	RMT5	0.841				
	RMT6	0.780				
Self-efficacy	SE1	0.819	0.866	0.871	0.903	0.651
	SE2	0.788				
	SE3	0.854				
	SE4	0.791				
	SE5	0.780				

Table 2
Assessment of Discriminant Validity using the Fornell-Larcker Criterion

	Deep Learning	Motivation	Resource Management	Self-Efficacy
Deep Learning	0.786			
Motivation	0.352	0.812		
Resource Management	0.280	0.294	0.771	
Self-Efficacy	0.311	0.327	0.299	0.807

Note: "Values highlighted in bold on the diagonal represent the square root of the Average Variance Extracted (AVE)

Discriminant validity was established through the Fornell-Larcker criterion. Deep Learning, Motivation, Resource Management, and Self-Efficacy all demonstrated higher AVE values compared to their correlations with other constructs, confirming their distinctiveness in the measurement model (See Table 2). Assessment of collinearity using VIF indicated no issues of multicollinearity among predictor variables, with all VIF values below 2.5 (see Table 3).



Table 3
Collinearity Statistics for Indicators in the Measurement Model

Items	VIF
DPL-1: I critically analyze the information presented in this course.	1.753
DPL-2: I reflect on how the course material connects to real-world situations.	1.864
DPL-3: I explore different perspectives on topics covered in this course.	1.686
DPL-4: I apply what I learn to solve problems beyond what is covered in the course.	2.179
DPL-5: I engage deeply with the course content to understand its underlying principles.	1.548
MOT-1: I am genuinely interested in the topics covered in this course.	2.349
MOT-2: I enjoy the process of learning new information and skills.	1.525
MOT-3: Getting good grades in this course is important to me.	1.693
MOT-4: I find satisfaction in mastering challenging tasks and assignments.	1.877
RMT-1: I manage my study time effectively.	1.529
RMT-2: I use learning materials efficiently to support my studies.	1.660
RMT-3: I seek help from instructors or peers when I encounter difficulties.	1.676
RMT-4: I organize my study environment to minimize distractions.	2.056
RMT-5: I set clear goals for my study sessions.	2.212
RMT-6: I adapt my study strategies based on my learning progress	1.846
SE-1: I am confident in my ability to understand complex concepts in this course.	1.908
SE-2: I believe I can overcome challenges that arise in my virtual learning environment.	1.833
SE-3: I am sure I can perform well on tasks and assignments in this course.	2.329
SE-4: I can effectively manage my time to meet the demands of this course.	1.863
SE-5: I feel capable of learning independently in this virtual learning environment.	1.775

Structural Analysis

The overall model fit was evaluated using multiple indices, revealing how well the model represented the data. The Standardized Root Mean Square Residual (SRMR) values were 0.045 for the saturated model and 0.060 for the estimated model, indicating a good fit. The Unweighted Least Squares Discrepancy (d_ULS) values were 0.061 for the saturated model and 0.001 for the estimated model, showing that the estimated model had an exceptionally good fit. The Geodesic Discrepancy (d_G) values were 0.062 for the saturated model and 0.018 for the estimated model. The chi-square (χ^2) values were 461.541 for the saturated model and 485.729 for the estimated model. The Normed Fit Index (NFI) values were 0.994 for the saturated model and 0.989 for the estimated model, both demonstrating a good fit to the data. The R^2 values were used to indicate the proportion of variance explained by the model for each endogenous construct. For Deep Learning, the model explained 19.2% of the variance ($R^2 = 0.192$), indicating a substantial portion of variance accounted for by the predictors. Motivation had an R^2 of 0.107, suggesting that the predictors explained approximately 10.7% of the variance in this construct. Self-Efficacy had an R^2 of 0.090, indicating that the model explained 9% of the variance in Self-Efficacy, which reflects moderate explanatory power.



Table 4
Path Analysis Results Including Direct and Indirect Effects

Path relationship	Path coefficients	T-values	P values	Confidence interval	
				2.5%	97.5%
Age → Deep Learning	0.000	0.001	0.999	-0.084	0.082
Course → Deep Learning	0.058	1.414	0.157	-0.023	0.139
Gender → Deep Learning	0.093	1.113	0.266	-0.073	0.251
Motivation → Deep Learning	0.240	5.666	0.000	0.158	0.323
Resource Management → Deep Learning	0.142	2.991	0.003	0.051	0.235
Resource Management → Self Efficacy	0.299	6.991	0.000	0.214	0.385
Self-Efficacy → Deep Learning	0.183	3.941	0.000	0.093	0.274
Self-Efficacy → Motivation	0.327	7.707	0.000	0.243	0.409
Resource Management → Self Efficacy → Deep Learning	0.055	3.294	0.001	0.026	0.091
Resource Management → Self Efficacy → Motivation → Deep Learning	0.023	3.413	0.001	0.013	0.040
Resource Management → Self Efficacy → Motivation	0.098	4.453	0.000	0.059	0.145
Self-Efficacy → Motivation → Deep Learning	0.078	4.511	0.000	0.048	0.116

The structural model analysis revealed several significant relationships among the constructs, as illustrated in Table 4 and Figure 2. The analysis showed that age and gender did not significantly impact deep learning. However, Motivation had a significant positive effect on Deep Learning (path coefficient = 0.240, $t = 5.666$, $p < 0.001$, 95% CI: 0.158 to 0.323), indicating a strong influence. Resource Management also had a positive impact on Deep Learning (path coefficient = 0.142, $t = 2.991$, $p = 0.01$, 95% CI: 0.051 to 0.235). Additionally, Resource Management significantly influenced Self-Efficacy (path coefficient = 0.299, $t = 6.991$, $p < 0.001$, 95% CI: 0.214 to 0.385). Self-Efficacy significantly predicted Deep Learning (path coefficient = 0.183, $t = 3.941$, $p < 0.001$, 95% CI: 0.093 to 0.274). Moreover, Self-Efficacy had a substantial positive effect on Motivation (path coefficient = 0.327, $t = 7.707$, $p < 0.001$, 95% CI: 0.243 to 0.409). Indirect effects were also observed. The indirect effect of Resource Management on Deep Learning through Self-Efficacy was significant (path coefficient = 0.055, $t = 3.294$, $p < 0.01$, 95% CI: 0.026 to 0.091). Additionally, the sequential mediation of Resource Management to Deep Learning via Self-Efficacy and Motivation was significant (path coefficient = 0.023, $t = 3.413$, $p < 0.01$, 95% CI: 0.013 to 0.040). The path from Resource Management to Motivation through Self-Efficacy was significant (path coefficient = 0.098, $t = 4.453$, $p < 0.001$, 95% CI: 0.059 to 0.145). Lastly, the indirect effect of Self-Efficacy on Deep Learning through Motivation was also significant (path coefficient = 0.078, $t = 4.511$, $p < 0.001$, 95% CI: 0.048 to 0.116).

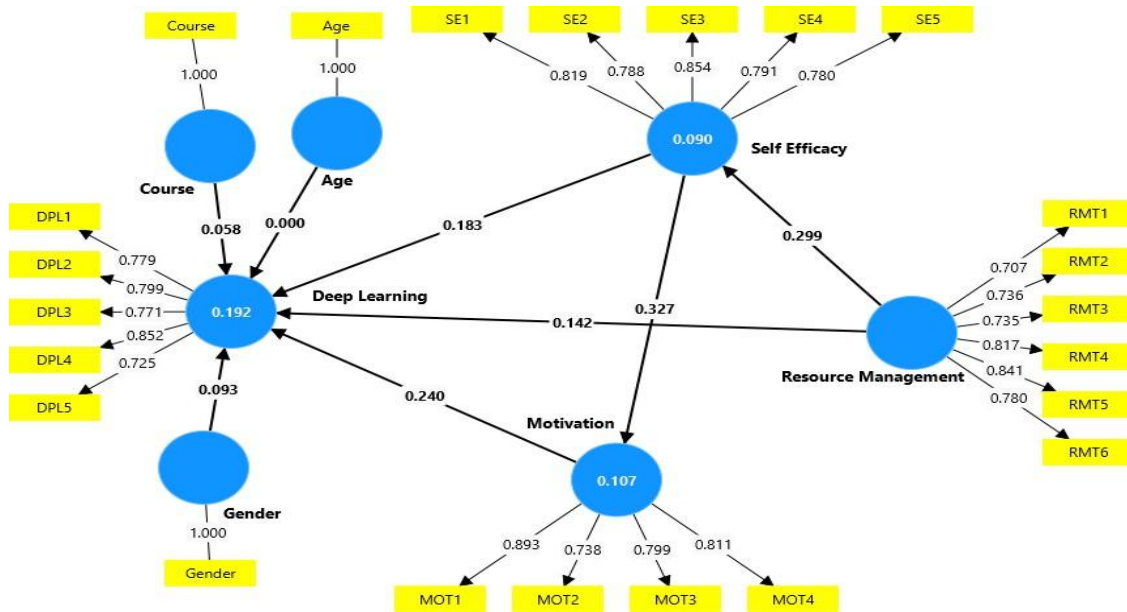


Figure 2: Structural Model Analysis

Study Discussion

This study highlights the significant role of effective resource management in enhancing deep learning outcomes within virtual learning environments (VLEs). Our findings support Hypothesis 1, indicating that strategic allocation and utilization of educational resources, such as multimedia tools and collaborative platforms, positively influence deep learning engagement. By providing diverse learning tools, educators facilitate students' ability to explore topics comprehensively, synthesize information, and apply knowledge creatively (Esteban-Guitart & Gee, 2020; Wang & Zhang, 2018). Moreover, our results validate Hypothesis 2, demonstrating that effective resource management also positively impacts students' motivation. Ensuring accessibility, usability, and support systems creates a conducive learning environment where students are empowered to engage actively with course materials and pursue their learning goals autonomously (Hsiao, 2021; Firat et al., 2018). This alignment between resource availability and motivational factors enhances students' persistence and enthusiasm, which contributes to deeper learning experiences (Chasetareh et al., 2022).

In addition, Hypothesis 3 is confirmed, showing that motivation significantly predicts deep learning. Motivated students exhibit higher cognitive engagement, connecting ideas and applying knowledge critically (An et al., 2023; Aguilar et al., 2021). This intrinsic motivation fosters an environment where students actively seek to understand complex concepts and solve problems creatively, essential for both academic and professional success (Ito & Umemoto, 2023; Tang et al., 2023). Our study also supports Hypothesis 4, indicating that effective resource management positively influences students' self-efficacy in VLEs. Structured learning experiences and clear expectations empower students to navigate academic challenges independently and develop confidence in their abilities (Shen et al., 2013; Dabbagh & Kitsantas, 2012). This self-efficacy is crucial for sustaining engagement and persistence in deep learning activities (Chen et al., 2020). Furthermore, Hypothesis 5 is validated, as our findings demonstrate that students' self-efficacy positively predicts their engagement in deep learning processes. Students who believe in their



ability to master challenging tasks are more likely to invest time and effort in understanding complex concepts, thereby improving their learning outcomes (Kim et al., 2022; Cheng, 2021). Our study also confirms Hypothesis 6, highlighting the reciprocal relationship between motivation and self-efficacy. Motivated students set ambitious goals, persist through challenges, and actively seek growth opportunities, which enhances their overall self-efficacy (Everaert et al., 2017; Zou et al., 2023). Conversely, higher self-efficacy helps students maintain motivation by viewing academic challenges as opportunities for learning and personal development (Shroff et al., 2007). Additionally, Hypothesis 7 is supported by evidence that self-efficacy mediates the relationship between resource management and deep learning. Effective resource management provides students with comprehensive learning tools and supportive environments, essential for fostering deep engagement and knowledge integration. Self-efficacy acts as a crucial catalyst in translating these resources into meaningful learning outcomes (Lee & Choi, 2013; Hartnett, 2016).

Our findings also underscore the role of motivation as a mediator in the relationship between resource management and deep learning outcomes, supporting Hypothesis 9. Effective resource management strategies not only ensure resource availability but also create a motivating learning environment. Motivation drives persistence and cognitive engagement, and our study reveals that it influences deep learning outcomes both directly and indirectly through self-efficacy (Hsiao, 2021; Firat et al., 2018).

Conclusion

Theoretical Contributions

This study contributes to the theoretical understanding of deep learning outcomes in virtual learning environments by elucidating the intricate relationships among resource management, motivation, self-efficacy, and student engagement. The findings highlight the significance of effective resource allocation and utilization in fostering deep learning engagement. By establishing resource management as a foundational predictor, this research enriches theoretical frameworks that explore the educational pathways leading to enhanced cognitive and critical thinking skills. Moreover, the identification of motivation and self-efficacy as mediators expands existing theoretical perspectives on the motivational factors influencing academic success in digital learning contexts.

Practical Implications

Practically, this study offers valuable insights for educators and educational policymakers aiming to optimize VLEs. By emphasizing the role of resource management, educators can enhance student access to diverse learning tools and supportive environments, thereby promoting deep learning experiences. Implementing structured support systems and fostering a motivating atmosphere can cultivate students' intrinsic motivation and self-efficacy, crucial for sustained engagement and academic achievement. These insights can guide the design of curriculum interventions and instructional strategies that prioritize resource accessibility and student empowerment in digital learning environments.

Recommendations

This paper recommends that educators focus on improving resource management by providing diverse and accessible learning tools and support systems. Additionally, motivational strategies should be implemented to engage students and foster their intrinsic interest in learning. Also, by integrating these findings into virtual learning frameworks, educational institutions can create environments that better support deep learning and improve student performance. Future research should consider exploring additional factors that influence deep learning and evaluating the effectiveness of specific resource management practices in various educational contexts.



References

- Aguilar, S. J., Karabenick, S. A., Teasley, S. D., & Baek, C. (2021). Associations between learning analyticsdashboard exposure and motivation and self-regulated learning. *Computers and Education/Computers & Education*, 162, 104085. <https://doi.org/10.1016/j.compedu.2020.104085>
- Aguirre-Urreta, M. I., & Hu, J. (2019). Detecting Common Method Bias. *Data Base*, 50(2), 45-70. <https://doi.org/10.1145/3330472.3330477>
- Aharony, N. (2006). The use of deep and surface learning strategies among students learning English as a foreign language in an Internet environment. *British Journal of Educational Psychology*, 76(4), 851-866. <https://doi.org/10.1348/000709905x79158>
- Alqurashi, E. (2016). Self-Efficacy In Online Learning Environments: A Literature Review. *Contemporary Issues in Education Research*, 9(1), 45-52. <https://doi.org/10.19030/cier.v9i1.9549>
- Alaymi, A., Abdulwahed, A., Azhar, A., Binsaddik, A., & Bafaraj, S. M. (2021). Impact of Time-Management on the Student's Academic Performance: A Cross-Sectional Study. *Creative Education*, 12(03), 471-485. <https://doi.org/10.4236/ce.2021.123033>
- An, F., Xi, L., & Yu, J. (2023). The relationship between technology acceptance and self-regulated learning: the mediation roles of intrinsic motivation and learning engagement. *Education and Information Technologies*, 29(3), 2605-2623. <https://doi.org/10.1007/s10639-023-11959-3>
- Bandura, A. (2011). On the Functional Properties of Perceived Self-Efficacy Revisited. *Journal of Management*, 38(1), 9-44. <https://doi.org/10.1177/0149206311410606>
- Baumgartner, H., & Homburg, C. (2023). Factor Analysis. In Springer eBooks (pp. 1-35). https://doi.org/10.1007/978-3-319-05542-8_13-1
- Bear, G. G., Slaughter, J. C., Mantz, L. S., & Farley-Ripple, E. (2017). Rewards, praise, and punitive consequences: Relations with intrinsic and extrinsic motivation. *Teaching and Teacher Education*, 65, 10-20. <https://doi.org/10.1016/j.tate.2017.03.001>
- Bharathi, S. V., & Pande, M. B. (2024). Does constructivism learning approach lead to developing creative thinking skills? The mediating role of online collaborative learning environments. *Journal of Computers in Education*. <https://doi.org/10.1007/s40692-024-00321-2>
- Biggs, J. B. (1988). Assessing student approaches to learning. *Australian Psychologist*, 23(2), 197-206. <https://doi.org/10.1080/00050068808255604>
- Bradley, V. M. (2020). Learning Management System (LMS) Use with Online Instruction. *International Journal of Technology in Education*, 4(1), 68. <https://doi.org/10.46328/ijte.36>
- Chang, C. Y., Panjaburee, P., Lin, H. C., Lai, C. L., & Hwang, G. H. (2022). Effects of online strategies on students' learning performance, self-efficacy, self-regulation and critical thinking in university online courses. *Educational Technology Research and Development*, 70(1), 185-204. <https://doi.org/10.1007/s11423-021-10071-y>
- Chasetareh, F., Barabadi, E., Khajavy, G. H., & Flett, G. L. (2022). Perfectionism and L2 Achievement: The Mediating Roles of Motivation and Self-Regulated Learning Among Iranian High School Students. *Journal of Psychoeducational Assessment*, 41(1), 3-21. <https://doi.org/10.1177/07342829221096916>
- Claessens, B. J., Van Eerde, W., Rutte, C. G., & Roe, R. A. (2007). A review of the time management literature. *Personnel Review*, 36(2), 255-276. <https://doi.org/10.1108/00483480710726136>



- Coll, C., Rochera, M. J., & De Gispert, I. (2014). Supporting online collaborative learning in small groups: Teacher feedback on learning content, academic task and social participation. *Computers and Education/Computers & Education*, 75, 53-64. <https://doi.org/10.1016/j.compedu.2014.01.015>
- Cronin-Golomb, L. M., & Bauer, P. J. (2023). Self-motivated and directed learning across the lifespan. *Acta Psychologica*, 232, 103816. <https://doi.org/10.1016/j.actpsy.2022.103816>
- Duff, A. (2004). Understanding academic performance and progression of first-year accounting and business economics undergraduates: the role of approaches to learning and prior academic achievement. *Accounting Education*, 13(4), 409-430. <https://doi.org/10.1080/0963928042000306800>
- Eden, N. C. A., Chisom, N. O. N., & Adeniyi, N. I. S. (2024). Harnessing technology integration in education: Strategies for enhancing learning outcomes and equity. *World Journal of Advanced Engineering Technology and Sciences*, 11(2), 001-008. <https://doi.org/10.30574/wjaets.2024.11.2.0071>
- Emiru, E. K., & Gedifew, M. T. (2024). The effect of teacher self-efficacy on learning engagement of secondary school students. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186x.2024.2308432>
- Esteban-Guitart, M., & Gee, J. (2020). Inside the Head and Out in the World. An Approach to Deep Teaching and Learning. *Multidisciplinary Journal of Educational Research*, 10(1), 1. <https://doi.org/10.17583/remie.2020.4868>
- Everaert, P., Opdecam, E., & Maussen, S. (2017). The relationship between motivation, learning approaches, academic performance and time spent. *Accounting Education*, 26(1), 78-107. <https://doi.org/10.1080/09639284.2016.1274911>
- Firat, M., Kılınç, H., & Yüzer, T. V. (2017). Level of intrinsic motivation of distance education students in e-learning environments. *Journal of Computer Assisted Learning*, 34(1), 63-70. <https://doi.org/10.1111/jcal.12214>
- Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM). *European Business Review*, 26(2), 106-121. <https://doi.org/10.1108/eb-10-2013-0128>
- Harackiewicz, J. M., Smith, J. L., & Priniski, S. J. (2016). Interest Matters. *Policy Insights from the Behavioral and Brain Sciences*, 3(2), 220-227. <https://doi.org/10.1177/2372732216655542>
- Hartnett, M. (2016). The Importance of Motivation in Online Learning. In Springer eBooks (pp. 5-32). https://doi.org/10.1007/978-981-10-0700-2_2
- Hatlevik, O. E., & Bjarnø, V. (2021). Examining the relationship between resilience to digital distractions, ICT self-efficacy, motivation, approaches to studying, and time spent on individual studies. *Teaching and Teacher Education*, 102, 103326. <https://doi.org/10.1016/j.tate.2021.103326>
- Hatlevik, O. E., Throndsen, I., Loi, M., & Gudmundsdottir, G. B. (2018). Students' ICT self-efficacy and computer and information literacy: Determinants and relationships. *Computers and Education/Computers & Education*, 118, 107-119. <https://doi.org/10.1016/j.compedu.2017.11.011>
- Hatlevik, O. E., Throndsen, I., Loi, M., & Gudmundsdottir, G. B. (2018b). Students' ICT self-efficacy and computer and information literacy: Determinants and relationships. *Computers and Education/Computers & Education*, 118, 107-119. <https://doi.org/10.1016/j.compedu.2017.11.011>



- Henseler, J., Ringle, C. M., & Sarstedt, M. (2014). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135. <https://doi.org/10.1007/s11747-014-0403-8>
- Hsiao, S. C. (2021). Effects of the Application of Virtual Reality to Experiential Education on Self-Efficacy and Learning Motivation of Social Workers. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.770481>
- Ilishkina, D. I., De Bruin, A., Podolskiy, A. I., Volk, M. I., & Van Merriënboer, J. J. (2022). Understanding self-regulated learning through the lens of motivation: Motivational regulation strategies vary with students' motives. *International Journal of Educational Research*, 113, 101956. <https://doi.org/10.1016/j.ijer.2022.101956>
- Ito, T., & Umemoto, T. (2023). Examining the causal model between socially shared regulation of motivation, engagement, and creative performance. *Thinking Skills and Creativity*, 48, 101288. <https://doi.org/10.1016/j.tsc.2023.101288>
- Jiang, R. (2022). Understanding, Investigating, and promoting deep learning in language education: A survey on chinese college students' deep learning in the online EFL teaching context. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.955565>
- Khamparia, A., & Pandey, B. (2017). Impact of Interactive Multimedia in E-Learning Technologies. In *Advances in higher education and professional development book series* (pp. 171-199). <https://doi.org/10.4018/978-1-5225-2489-2.ch007>
- Kumar, S., Sahoo, S., Lim, W. M., Kraus, S., & Bamel, U. (2022). Fuzzy-set qualitative comparative analysis (fsQCA) in business and management research: A contemporary overview. *Technological Forecasting & Social Change/Technological Forecasting and Social Change*, 178, 121599. <https://doi.org/10.1016/j.techfore.2022.121599>
- Lee, D., Watson, S. L., & Watson, W. R. (2020). The Relationships Between Self-Efficacy, Task Value, and Self-Regulated Learning Strategies in Massive Open Online Courses. *International Review of Research in Open and Distance Learning*, 21(1), 23-39. <https://doi.org/10.19173/irrodl.v20i5.4389>
- Legault, L. (2016). Intrinsic and Extrinsic Motivation. In *Springer eBooks* (pp. 1-4). https://doi.org/10.1007/978-3-319-28099-8_1139-1
- Li, S., & Zheng, J. (2018). The Relationship Between Self-efficacy and Self-regulated Learning in One-to-One Computing Environment: The Mediated Role of Task Values. *the Asia-Pacific Education Researcher*, 27(6), 455-463. <https://doi.org/10.1007/s40299-018-0405-2>
- Lindblom-Ylänne, S., & Lonka, K. (1998). Individual ways of interacting with the learning environment — are they related to study success? *Learning and Instruction*, 9(1), 1-18. [https://doi.org/10.1016/s0959-4752\(98\)00025-5](https://doi.org/10.1016/s0959-4752(98)00025-5)
- List, A., & Nadasen, D. (2016). Motivation and Self-regulation in Community College Transfer Students at a Four-year Online University. *Community College Journal of Research and Practice*, 41(12), 842-866. <https://doi.org/10.1080/10668926.2016.1242096>
- Liu, H., Yao, M., Li, R., & Zhang, L. (2019). The relationship between regulatory focus and learning engagement among Chinese adolescents. *Educational Psychology*, 40(4), 430-447. <https://doi.org/10.1080/01443410.2019.1618441>



- Lu, N. Q., & Rameli, N. M. R. M. (2023). How Academic Self-Efficacy Influences Online Learning Engagement: The Mediating Role of Boredom. *International Journal of Interactive Mobile Technologies*, 17(24), 115-135. <https://doi.org/10.3991/ijim.v17i24.44759>
- Macalisang, D. S., & Bonghawan, R. G. G. (2024). Teachers' Learning Reinforcement: Effects on Students' Motivation, Self Efficacy and Academic Performance. *International Journal of Scientific Research and Management*, 12(02), 3218-3228. <https://doi.org/10.18535/ijstrm/v12i02.el08>
- Marshall, S., & Sankey, M. D. (2023). The Future of the Learning Management System in the Virtual University. In *University development and administration* (pp. 283-304). https://doi.org/10.1007/978-981-99-4170-4_16
- McGill, C. M., Ali, M., & Barton, D. (2020). Skills and Competencies for Effective Academic Advising and Personal Tutoring. *Frontiers in Education*, 5. <https://doi.org/10.3389/educ.2020.00135>
- Nieminen, J. H., Asikainen, H., & Rämö, J. (2019). Promoting deep approach to learning and self-efficacy by changing the purpose of self-assessment: a comparison of summative and formative models. *Studies in Higher Education*, 46(7), 1296-1311. <https://doi.org/10.1080/03075079.2019.1688282>
- Núñez, J. L., & León, J. (2016). The Mediating Effect of Intrinsic Motivation to Learn on the Relationship between Student's Autonomy Support and Vitality and Deep Learning. *the Spanish Journal of Psychology*, 19. <https://doi.org/10.1017/sjp.2016.43>
- Orr, D., Rimini, M., & Van Damme, D. (2015). Open Educational Resources. In *Educational research and innovation*. <https://doi.org/10.1787/9789264247543-en>
- Oudeyer, P. Y., & Kaplan, F. (2007). What is intrinsic motivation? A typology of computational approaches. *Frontiers in Neuroinformatics*, 1. <https://doi.org/10.3389/neuro.12.006.2007>
- Pan, X. (2023). Online Learning Environments, Learners' Empowerment, and Learning Behavioral Engagement: The Mediating Role of Learning Motivation. *SAGE Open*, 13(4). <https://doi.org/10.1177/21582440231205098>
- Pannekoek, F., & Ally, M. (2008). The Theory and Practice of Online Learning. In Athabasca University Press eBooks. <https://doi.org/10.15215/aupress/9781897425084.01>
- Pramesworo, I. S., Fathurrochman, I., Sembiring, D., Bangkara, B. A., & Sudrajat, D. (2023). Relevance between Blended Learning and Students' Independent Learning Curriculum: An Overview of Digital Age Education, Student and Teacher Engagement, Technological Resources. *Jurnal Kependidikan*, 9(3), 858. <https://doi.org/10.33394/jk.v9i3.8320>
- Prifti, R. (2020). Self-efficacy and student satisfaction in the context of blended learning courses. *Open Learning*, 37(2), 111-125. <https://doi.org/10.1080/02680513.2020.1755642>
- Pumptow, M., & Brahm, T. (2020). Students' Digital Media Self-Efficacy and Its Importance for Higher Education Institutions: Development and Validation of a Survey Instrument. *Technology, Knowledge and Learning*, 26(3), 555-575. <https://doi.org/10.1007/s10758-020-09463-5>
- Quynh, N. H., Hoai, N. T., & Thu, N. (2021). The roles of student engagement motivations in learning and managing. *Deleted Journal*, 9(4), 223-234. <https://doi.org/10.31686/ijer.vol9.iss4.3043>
- Ramsden, P. (1979). Student learning and perceptions of the academic environment. *Higher Education*, 8(4), 411-427. <https://doi.org/10.1007/bf01680529>



- Rani, R., Radhakrishnan, R., Sable, A., Srinivas, V., & Prasad, K. (2023). Development of self-education motivation for students using time management techniques in primary and high school teachers. *GeSec*, 14(9), e2526. <https://doi.org/10.7769/gesec.v14i9.2526>
- Rashid, T., & Asghar, H. M. (2016). Technology use, self-directed learning, student engagement and academic performance: Examining the interrelations. *Computers in Human Behavior*, 63, 604-612. <https://doi.org/10.1016/j.chb.2016.05.084>
- Richardson, J. C., & Newby, T. (2006). The Role of Students' Cognitive Engagement in Online Learning. *the American Journal of Distance Education*, 20(1), 23-37. https://doi.org/10.1207/s15389286ajde2001_3
- Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin*, 138(2), 353-387. <https://doi.org/10.1037/a0026838>
- Rajo, A. (2015). Translation meets cognitive science: The imprint of translation on cognitive processing. *Multilingua*, 34(6). <https://doi.org/10.1515/multi-2014-0066>
- Rotar, O. (2022). Online student support: a framework for embedding support interventions into the online learning cycle. *Research and Practice in Technology Enhanced Learning/Research and Practice in Technology Enhanced Learning*, 17(1). <https://doi.org/10.1186/s41039-021-00178-4>
- Sarstedt, M., Ringle, C. M., & Hair, J. F. (2021). Partial Least Squares Structural Equation Modeling. In Springer eBooks (pp. 1-47). https://doi.org/10.1007/978-3-319-05542-8_15-2
- Segooa, M. A., & Kalema, B. M. (2015). Virtual Learning Environments for Higher Learning Institutions in Developing Countries. <https://doi.org/10.1109/econf.2015.67>
- Sherer, M., Maddux, J. E., Mercandante, B., Prentice-Dunn, S., Jacobs, B., & Rogers, R. W. (1982). The Self-Efficacy Scale: Construction and Validation. *Psychological Reports*, 51(2), 663-671. <https://doi.org/10.2466/pr0.1982.51.2.663>
- Shroff, R. H., Vogel, D. R., Coombes, J., & Lee, F. (2007). Student E-Learning Intrinsic Motivation: A Qualitative Analysis. *Communications of the Association for Information Systems*, 19. <https://doi.org/10.17705/1cais.01912>
- Sølvik, R. M., & Glenna, A. E. H. (2021). Teachers' potential to promote students' deeper learning in whole-class teaching: An observation study in Norwegian classrooms. *Journal of Educational Change*, 23(3), 343-369. <https://doi.org/10.1007/s10833-021-09420-8>
- Stanikzai, M. I. (2023). Critical Thinking, Collaboration, Creativity and Communication Skills among School Students: A Review Paper. *European Journal of Theoretical and Applied Sciences*, 1(5), 441-453. [https://doi.org/10.59324/ejtas.2023.1\(5\).34](https://doi.org/10.59324/ejtas.2023.1(5).34)
- Suan, A. F. (2023). Self-Regulation as an Antecedent of Academic Achievement: A Mixed Method Study. *British Journal of Multidisciplinary and Advanced Studies*, 4(4), 20-43. <https://doi.org/10.37745/bjmas.2022.0246>
- Tang, H., Dai, M., Du, X., Hung, J. L., & Li, H. (2023). Understanding college students' cognitive engagement in online collaborative problem-solving: A multimodal data analysis. *Distance Education*, 44(2), 306-323. <https://doi.org/10.1080/01587919.2023.2209025>
- Tualaulelei, E., Burke, K., Fanshawe, M., & Cameron, C. (2021). Mapping pedagogical touchpoints: Exploring online student engagement and course design. *Active Learning in Higher Education*, 23(3), 189-203. <https://doi.org/10.1177/1469787421990847>
- Van Geel, M., Keuning, T., Meutstege, K., De Vries, J., Visscher, A., Wolterinck, C., Schildkamp, K., & Poortman, C. (2023). Adapting Teaching to Students' Needs: What Does It Require



- from Teachers? In Springer eBooks (pp. 723-736). https://doi.org/10.1007/978-3-031-31678-4_33
- Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. *Motivation and Emotion*, 44(1), 1-31. <https://doi.org/10.1007/s11031-019-09818-1>
- Vörösmarty, G., & Dobos, I. (2020). Green purchasing frameworks considering firm size: a multicollinearity analysis using variance inflation factor. *Supply Chain Forum*, 21(4), 290-301. <https://doi.org/10.1080/16258312.2020.1776090>
- Wang, S., & Zhang, D. (2018). Student-centred teaching, deep learning and self-reported ability improvement in higher education: Evidence from Mainland China. *Innovations in Education and Teaching International*, 56(5), 581-593. <https://doi.org/10.1080/14703297.2018.1490662>
- Weng, C., Chen, C., & Ai, X. (2022). A pedagogical study on promoting students' deep learning through design-based learning. *International Journal of Technology and Design Education*, 33(4), 1653-1674. <https://doi.org/10.1007/s10798-022-09789-4>
- Wilding, J., & Andrews, B. (2006). Life goals, approaches to study and performance in an undergraduate cohort. *British Journal of Educational Psychology*, 76(1), 171-182. <https://doi.org/10.1348/000709904x24726>
- Wu, X. Y. (2023). Exploring the effects of digital technology on deep learning: a meta-analysis. *Education and Information Technologies*, 29(1), 425-458. <https://doi.org/10.1007/s10639-023-12307-1>
- Zhan, Y., Jiang, Y., Wan, Z. H., & Guo, J. J. (2020). Is There an "Expectancy $\times$ Value" Effect? Investigating the Impact of Self-Efficacy and Learning Motives on Chinese Undergraduates' Use of Deep Language Learning Strategies. *The Asia-Pacific Education Researcher*, 30(1), 83-94. <https://doi.org/10.1007/s40299-020-00516-y>
- Zhao, J., & Qin, Y. (2021). Perceived Teacher Autonomy Support and Students' Deep Learning: The Mediating Role of Self-Efficacy and the Moderating Role of Perceived Peer Support. *Frontiers in Psychology*, 12. <https://doi.org/10.3389/fpsyg.2021.652796>
- Zhu, M., Bonk, C. J., & Doo, M. Y. (2020). Self-directed learning in MOOCs: exploring the relationships among motivation, self-monitoring, and self-management. *Educational Technology Research and Development*, 68(5), 2073-2093. <https://doi.org/10.1007/s11423-020-09747-8>
- Zitha, I., Mokganya, G., & Sinthumule, O. (2023). Innovative Strategies for Fostering Student Engagement and Collaborative Learning among Extended Curriculum Programme Students. *Education Sciences*, 13(12), 1196. <https://doi.org/10.3390/educsci13121196>
- Zou, H., Yao, J., Zhang, Y., & Huang, X. (2023). The influence of teachers' intrinsic motivation on students' intrinsic motivation: The mediating role of teachers' motivating style and teacher-student relationships. *Psychology in the Schools*, 61(1), 272-286. <https://doi.org/10.1002/pits.23050>



LIMITED KNOWLEDGE RELATED-CHALLENGES OF ARTIFICIAL INTELLIGENCE IN BUSINESS AND ENTREPRENEURSHIP EDUCATION RESEARCH

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Abstract

This paper studied limited knowledge related-challenges of artificial intelligence in business and entrepreneurship education research. Three research questions and three null hypotheses guided the study. The study adopted a descriptive survey design. The population of the study comprised 41 business educators in tertiary institutions in Ebonyi State, Nigeria. Census survey sampling technique was used. A structured questionnaire was used. The questionnaire was validated by three experts, two from Business Education Department and one from Measurement and Evaluation, all from Ebonyi State University, Abakaliki. Cronbach Alpha reliability procedure was used. The instrument yielded a reliability coefficient of 0.82. Forty one (41) copies of the instrument were administered to the respondents and retrieved. Data collected was analyzed using mean and standard deviation for research questions while the hypotheses were tested at 0.05 level of significance using t-test. The findings of the study found that the respondents accepted limited Knowledge related-challenge of paraphrasing AI, citation management AI and data analytic AI in business and entrepreneurship education research. The test of the hypotheses proved that there is no significant difference in the opinion of male and female respondents regarding the limited knowledge-related challenge of paraphrasing AI, citation management AI and data analytic AI in Business and Entrepreneurship Education Research. In conclusion, business and entrepreneurship education researchers in the study area had limited knowledge of Artificial Intelligence (AI) for research. The recommendation among others was that awareness programmes should be organized to business and entrepreneurship education researchers to ensure comprehension of AI concept, use cases and potential effects.

Keywords: Artificial Intelligence (AI), Business and Entrepreneurship Education, Research, Limited Knowledge, Related-Challenges

Introduction

In today's academic landscape, Artificial Intelligence (AI) is already commonplace in all endeavour and is no longer the only purview of futurologist. The term Artificial Intelligence (AI) is often used as an umbrella term for multiple technologies; business analytic and data science; natural language processing, speech recognition and text-to-speech; machine learning, deep learning, and neural networks, machine reasoning, decision, and algorithms; computer vision; robots and sensors (Yaroshenko, & Yaroshenko, 2023; Williams & Lowendahl, 2018). The above definition shows that AI technology can perform tasks that would otherwise required human intelligence or intervention. Russel, Norvig, Popineau, Miclet, and Cadet, (2021) defined AI to describe systems that mimic cognitive functions generally associated with human attributes such as learning, speech, and problem-solving. AI technology enables computers and machines to stimulate human intelligence and problem solving capabilities. In this study, paraphrasing AI, Citation management AI and data analytic AI were examined.

Paraphrasing AI is technology that helps users or writers rephrase their ideas, text, sentences, or paragraphs into exciting and engaging content without losing its original content. Martin (2024),



Mahajan (2023), Begum (2024) and Birett (2022) listed the following as the paraphrasing AI to include: QuillBot, Jasper AI, Rytr, Scalenut, Content Shake, Word AI, Copy AI, CopySmith, Hypotenuse AI, Hix.AI, Wordtune, Grammarly, Paraphraser.01, SpinBot, Writesonic, Semrush, Spinnerchief, PrepostSED, AISED and Editpad. Mahajan (2023) stated that paraphrasing AI offers a wide range of synonyms and alternative phrases, helping users diversify their vocabulary and enhance the overall quality of their writing. This improves the readability and engagement of content and helps evade plagiarism detection tools. Martin (2024) added that, paraphrasing AI saves researchers a significant amount of time compared to manually recording of sentences or paragraphs. He added that in a matter of seconds, these tools can generate alternative versions of the original text, eliminating the need for manual editing and proofreading. Begum (2024) stated that paraphrasing AI technology makes an invaluable resource for individuals and professionals aiming to produce high-quality and original written content. Furthermore, Birrett (2022) included that those technologies utilize advanced algorithms and machine learning techniques to provide efficient and accurate paraphrasing services.

Citation management AI refers to technology that can automate the citation process, making it easier and faster to format references correctly. It is used to find sources, identify the correct citation style, and ensure that citations are accurate. There are numerous technologies that can be used for citation. Some of the most popular technology according to Somasundaram (2023) and Tsai (2024), includes: Trinka AI, Scholarcy, Semantic Scholar, Paper Digest, Scite AI, Samwell AI, ChatGPT, Iris AI, Citationcy, Sci AI, Citesmart, Kudos, Docear4Word, Qiqqa, Cite This For Me, COMBOT, EndNote and Check. It is more important than ever to be able to cite source correctly. This is because plagiarism is a serious offense, and it can have serious consequences for researchers. Tsai (2024) stated that proper citation management plays a crucial role in academic writing as it acknowledges the contribution of other researchers and allows researchers to access the sources referenced. Accurate citation also helps avoid plagiarism which is a serious ethical offense in scholarly work. Tsai added that manually formatting and organizing citations can be a time-consuming task. He stated that this is where AI citation management technologies come to rescue.

Somasundaram (2023) noted that the consequences of inadequate reference and citation management are far-reaching. He added that researchers may inadvertently misattribute ideas or fail to give proper credit to the original authors, leading to issues of plagiarism or intellectual dishonesty. Moreover, lack of structural reference management system can result in a loss of productivity, as valuable time is wasted on manually sorting through citations and formatting according to different citation styles. This not only hampers the researcher's efficiency but also affects the quality and reliability of their work. Therefore, in the fast-paced world of academic and research, proper citation management is essential for maintaining the integrity and credibility of scholarly work.

Data analytic AI on the other hand, refers to applying technology, techniques and algorithms to process, interpret, and derive meaningful insight from large and complex datasets. The following as listed by Owens (2024), Sharma (2024), and Alvarado (2024), are the data analytic AI includes: Polymer, Tableau, MonkeyLearn, Micropower BI, Sisense, Microsoft Excel, Ch, DataRobot, Talent, H2O.ai, Akkio, Qlik, Looker, SAP Business Objects, Answer Rocket, KNIME, Rapidminer, Pytorch, IBM Watson Analytics, Microsoft Azure Machine Learning, Coefficient, and Bardeen.ai. Sharma (2024) these AI uses machine learning, deep learning, and other AI technologies to automate analysis, identify patterns, and make predictions or classifications. Owen (2024) highlighted that AI data analysis enables researchers to extract valuable information from vast data more efficiently and accurately. Alvarado (2024) opined that by leveraging AI



capabilities, such as natural language processing, image recognition, and anomaly detection, researchers can gain a deeper understanding, make data-driven decisions, and unlock hidden opportunities for growth of research. Therefore, by utilizing the best AI, researchers can focus more on their research and contribution of knowledge in business and entrepreneurship education

Business and Entrepreneurship Education which is synonymous to business education according to Anyigor-Ogah (2024) is an educational programme that embraces basic education for teaching career, entrepreneurship, business understanding, office environment and vocational practices. Business and entrepreneurship education is a programme of studies, which comprises four parts: creating awareness in occupation; preparing youth for work in business occupation, preparing people to become better citizens and consumers of goods and services; preparing business and entrepreneurship teachers (Azuka and Nwosu in Anyigor-Ogah & Okoli, 2022; Anyigor-Ogah 2023a). Business and Entrepreneurship Education is that aspect of general education that prepares students for employment and advancement in a broad range of office occupations, accounting occupations, and entrepreneurship venture (Onukpanu in Anyigor-Ogah 2024). The above definition of business and entrepreneurship education depicts that the discipline is robust which required numerous research activities by both male and female researchers.

Therefore, business and entrepreneurship education research presents opportunities to undertake some considerable piece of investigation regarding the discipline. Although, there are numerous opportunities in business and entrepreneurship education research where AI technology can serve as a superior alternative to traditional systems, limited knowledge related-challenge of AI remains a significant barriers to its widespread adoption. The real problem lies in the general understanding and knowledge of AI. Limited knowledge among the the general population is one of the critical issues imparting informed decision, adoption, and regulation, misconceptions and interpretations of AI's abilities and constraint multiply, holding back its responsible use and promotion. Therefore, this study, examined the limited knowledge related-challenge of paraphrasing, citation management and data analytic AI in business and entrepreneurship education research.

Research Questions

1. What is limited knowledge-related challenge of paraphrasing AI in Business and Entrepreneurship Education Research?
2. What is limited knowledge-related challenge of citation management AI in Business and Entrepreneurship Education Research?
3. What is limited knowledge-related challenge of data analytic AI in Business and Entrepreneurship Education Research?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

- H0₁:** There is no significant difference in the mean responses of the male and female business educators on the limited knowledge-related challenge of paraphrasing AI in Business and Entrepreneurship Education Research
- H0₂:** There is no significant difference in the mean responses of the male and female business educators on the limited knowledge-related challenge of citation management AI in Business and Entrepreneurship Education Research.
- H0₃:** There is no significant difference in the mean responses of the male and female business educators on the limited knowledge-related challenge of data analytic AI in Business and Entrepreneurship Education Research



Methodology

Descriptive survey design was adopted for the study. The area of the study was Ebonyi State comprising three tertiary institutions offering business education namely: Ebonyi State University Abakaliki, Ebonyi State College of Education, Alex Ekwueme Federal University, Ndufu-Alike Ikwo. The population of the study comprised 41 business educators which was made up of 24 male and 17 female in the three institutions: Ebonyi State University 14, Ebonyi State College of Education 14, and Alex Ekwueme Federal University, Ndufu-Alike Ikwo 13. The data for the study was collected using a structured questionnaire. The questionnaire consisted of 53 items. The instrument was validated by three experts; two from business education and one from Measurement and Evaluation, all from Ebonyi State University, (EBSU) Abakaliki. The instrument was also subjected to a reliability test, and yielded reliability co-efficient of 0.82. Forty one (41) duly completed copies of the instrument were administered, retrieved and used for the study. Mean and standard deviation were used to answer the research questions, while the hypotheses were tested using t- test. Decisions on the research questions were based on the grand mean. Therefore, items with mean ratings of below 2.50 were rated not accepted, while those with 2.50 and above were rated accepted. For hypotheses, if the calculated t-value is equal to or greater than the critical t-value, it will be rejected. If otherwise, it will be accepted.

Results

Research Question 1

What is limited knowledge-related challenge of paraphrasing AI in Business and Entrepreneurship Education Research?

Data collected to answer the above research question are presented in Table 1

Table 1 shows that the mean scores on all the 20 items on limited knowledge related-challenge of

Table 1: Respondents Mean Ratings on the Limited Knowledge Related-challenge of Paraphrasing AI in Business and Entrepreneurship Education Research

S/N	Related-Challenges of Paraphrasing AI:	X	SD	Remark
1	Limited knowledge of Jasper AI	3.20	0.64	Accept
2	Limited knowledge ofHytr	3.60	0.43	Accept
3	Limited knowledge ofScalenut	3.70	0.42	Accept
4	Limited knowledge ofContentshake	3.54	0.48	Accept
5	Limited knowledge ofWord AI	3.24	0.56	Accept
6	Limited knowledge ofCopysmith	3.50	0.50	Accept
7	Limited knowledge ofHypotenuse	3.36	0.54	Accept
8	Limited knowledge ofCopy.ai	3.20	0.47	Accept
9	Limited knowledge ofHix.AI	3.14	0.76	Accept
10	Limited knowledge ofQuillBot	3.25	0.73	Accept
11	Limited knowledge ofWordtune	3.08	0.68	Accept
12	Limited knowledge ofGrammarly	2.49	0.68	Accept
13	Limited knowledge ofParagraph.ai	3.22	0.70	Accept
14	Limited knowledge ofSpinBot	3.15	0.62	Accept
15	Limited knowledge ofWritesonic	3.44	0.65	Accept
16	Limited knowledge ofSemrush	3.07	0.78	Accept
17	Limited knowledge ofSpinner Chief	3.45	0.60	Accept
18	Limited knowledge ofPre post SED	3.48	0.50	Accept
19	Limited knowledge ofAISED	3.13	0.72	Accept
20	Limited knowledge of Edithpad	3.37	0.77	Accept
Grand Mean		2.78		Accept



paraphrasing AI ranged between 2.69 – 3.70 which indicate that the respondents accepted those items as limited Knowledge related-challenge of paraphrasing AI in business and entrepreneurship education research. The cluster had a grand mean score of 2.78 which confirms the results. The standard deviations for all items are within the same range showing that there is homogeneity amongst responses indicating a greater consensus of opinion.

Research Question 2

What are limited knowledge-related challenge of citation management AI in Business and Entrepreneurship Education Research

Data collected to answer the above research question are presented in Table 2

Table 2: Respondents Mean Ratings on the Limited Knowledge Related-Challenge ofCitation Management AI in Business and Entrepreneurial Education Research

S/N	Related-Challengesof Citation Management AI:	X	SD	Remark
21	Limited knowledge ofTrinka AI	3.77	0.51	Accept
22	Limited knowledge ofScholarcy	2.94	0.84	Accept
23	Limited knowledge ofSemantic scholar	3.48	0.64	Accept
24	Limited knowledge ofPaper Digest	3.97	0.56	Accept
25	Limited knowledge ofScite AI	3.52	0.59	Accept
26	Limited knowledge ofSamwell.ai	3.40	0.77	Accept
27	Limited knowledge ofChatGPT	3.35	0.83	Accept
28	Limited knowledge ofConnected Paper	3.42	0.72	Accept
29	Limited knowledge ofEnago Read	3.29	0.84	Accept
30	Limited knowledge ofMendeley	2.55	0.77	Accept
Grand Mean		3.36		Accept

Table 2 shows that the mean scores on items21 - 30 on limited knowledge related-challenge of citation management AI ranged between 2.55 – 3.77 which indicate that the respondents accepted those items as limited knowledge related-challenge of citation management AI in business and entrepreneurship education research. The cluster had a grand mean score of 3.36 which confirms the results. The standard deviations for all items are within the same range showing that there is homogeneity amongst responses indicating a greater consensus of opinion.

Research Question 3

What are limited knowledge-related challenge of data analytic AI in Business and Entrepreneurship Education Research

Data collected to answer the above research question are presented in Table 3



Table 3: Respondents Mean Ratings on the Limited Knowledge Related-Challenge of Data Analytic AI in Business and Entrepreneurship Education Research

S/N	Related-Challenges of Data Analytic AI:	X	SD	Remark
31	Limited knowledge ofJasperPolymer	3.05	0.76	Accept
32	Limited knowledge ofTableau	3.20	0.62	Accept
33	Limited knowledge ofMicrosoft Power BI	2.85	0.96	Accept
34	Limited knowledge ofMonkyLearn	3.08	0.56	Accept
35	Limited knowledge ofSisense	3.56	0.62	Accept
36	Limited knowledge ofMicrosoft Excell	3.60	0.72	Accept
37	Limited knowledge ofAkkio	3.30	0.90	Accept
38	Limited knowledge ofQlik	3.70	0.46	Accept
39	Limited knowledge ofLookers	3.85	0.67	Accept
40	Limited knowledge of SAP Business Object	3.64	0.56	Accept
41	Limited knowledge ofAnswer Rocket	3.15	0.86	Accept
42	Limited knowledge ofKNIME	3.11	0.92	Accept
33	Limited knowledge ofRipidminar	3.26	0.88	Accept
44	Limited knowledge ofMicrosoft Azure Machine Learning	3.42	0.86	Accept
45	Limited knowledge ofGoogle Cloud AutoML	3.48	0.65	Accept
46	Limited knowledge ofPyTorch	3.19	0.99	Accept
47	Limited knowledge ofData Robot	3.04	0.90	Accept
48	Limited knowledge ofTalent	3.60	0.75	Accept
49	Limited knowledge ofH2O.ai	3.44	0.72	Accept
50	Limited knowledge ofIBM Waston Analytics	2.67	0.86	Accept
51	Limited knowledge ofCoefficient	3.88	0.97	Accept
52	Limited knowledge ofBardeen.ai	3.86	0.98	Accept
53	Limited knowledge ofIBM Cognos Analysis	3.75	0.98	Accept
Grand Mean		3.377		Accept

Table 3 shows that the mean scores on items 31 - 53 on limited knowledge related-challenge of data analytic AI ranged between 2.67 – 3.88 which indicate that the respondents accepted those items as limited Knowledge related-challenge of data analytic AI in business and entrepreneurship education research. The cluster had a grand mean score of 2.78 which confirms the results. The standard deviations for all items are within the same range showing that there is homogeneity amongst responses indicating a greater consensus of opinion.

Test of Hypotheses

HO₁: There is no significant difference in the mean responses of the male and female business educators on the limited knowledge-related challenge of paraphrasing AI in Business and Entrepreneurship Education Research

Data collected to test hypothesis 1 are presented in Table 4.

**Table 4: Summary of t-test Analysis of the Mean Responses of the Respondents on the Limited Knowledge Related-Challenge of Paraphrasing AI**

Variables	N	X	SD	DF	<u>t-cal</u>	t-crit	Decision	Remark
Male	24	3.35	0.64	39	0.44	2.04	Accept HO	NSD
Female	17	3.32	0.65					

Table 4 above reveals t-calculated value of 0.44 and t-critical of 2.04 at 39 degree of freedom. From the table, since the t-calculated is less than the critical t-value, the researcher upholds the null hypothesis and concludes that there is no significant difference in the opinion of the male and female respondents regarding the limited knowledge-related challenge of paraphrasing AI in Business and Entrepreneurship Education Research.

HO₂: There is no significant difference in the mean responses of the male and female business educators on the limited knowledge-related challenge of citation management AI in Business and Entrepreneurship Education Research.

Data collected to test hypothesis 1 are presented in Table 5.

Table 5: Summary of t-test Analysis of the Mean Responses of the Respondents on the Limited Knowledge Related-Challenge of Citation Management AI

Variables	N	X	SD	DF	<u>t-cal</u>	t-crit	Decision	Remark
Male	24	3.20	0.74	39	0.16	2.04	Accept HO	NSD
Female	17	3.19	0.76					

Table 5 above reveals t-calculated value of 0.16 and t-critical of 2.04 at 39 degree of freedom. From the table, since the t-calculated is less than the critical t-value, the researcher upholds the null hypothesis and concludes that there is no significant difference in the opinion of the respondents regarding the limited knowledge-related challenge of citation management AI in Business and Entrepreneurship Education Research.

HO₃: There is no significant difference in the mean responses of the male and female business educators on the limited knowledge-related challenge of data analytic AI in Business and Entrepreneurship Education Research



Data collected to test hypothesis 1 are presented in Table 6.

Table 6: Summary of t-test Analysis of the Mean Responses of the Respondents on the Limited Knowledge Related-Challenge of Data Analytic AI

Variables	N	X	SD	DF	t-cal	t-crit	Decision	Remark
Male	24	3.31	0.77	39	0.61	2.04	Accept HO	NSD
Female	17	3.25	0.61					

Table 6 above reveals t-calculated value of 0.61 and t-critical of 2.04 at 39 degree of freedom. From the table, since the t-calculated is less than the critical t-value, the researcher upholds the null hypothesis and concludes that there is no significant difference in the opinion of the respondents regarding the limited knowledge-related challenge of data management AI in Business and Entrepreneurship Education Research.

Discussion of Findings

The finding of research question one disclosed that the respondents accepted limited knowledge related-challenges of paraphrasing AI in business and entrepreneurship education research. The finding of the study corroborates the finding of Anyigor-Ogah (2024) who stated that business educators utilized digital technology to a low extent. The findings that the respondents accepted limited Knowledge related-challenges of paraphrasing AI in business and entrepreneurship education research is not surprising to the researcher considering the fact that there are lack of capacity building programmes as well as ICT skills training and re-training for researchers in the study area to update their ICT skills to enhance their professional practice. This, the researcher believed might have contributed to respondents' limited knowledge in paraphrasing AI in business and entrepreneurship education research. The test of hypothesis (H_{O1}) in Table 3 proved that there no significant differences in the mean responses of the male and female respondents on the limited knowledge related-challenges of paraphrasing AI in business and entrepreneurship education research. The finding is in agreement with Igboke and Anyigor-Ogah (2021); and Anyigor-Ogah, (2023c) who found that there was no significant difference in the opinion of male and female respondents on the usage of technology in Business Education.

The result in Table 2 indicate that the respondents accepted limited Knowledge related-challenge of citation management AI in business and entrepreneurship education research. The finding is in line with Somasundaram (2023) who noted that the consequences of inadequate reference and citation management are far-reaching. He added that researchers may inadvertently misattribute ideas or fail to give proper credit to the original authors, leading to issues of plagiarism or intellectual dishonesty. More so, lack of structural reference management system can result in a loss of productivity, as valuable time is wasted on manually sorting through citations and formatting according to different citations styles. This not only hampers the researcher's efficiency but also affects the quality and reliability of their work. Therefore, in the fast-paced world of academic and research, proper citation management is essential for maintaining the integrity and credibility of scholarly work. Also, the test of hypothesis (H_{O2}) in Table 5 proves that there is no



significant difference in the opinion of male and female respondents regarding the limited knowledge-related challenge of citation management AI in Business and Entrepreneurship Education Research. The findings are in agreement with Anyigor-Ogah (2023d) and Anyigor-Ogah & Okoli, (2024) who found that there is no significant difference in the opinion of male and female respondents on the knowledge of digital technologies in Business education.

The result in Table 3 indicate that the respondents accepted limited Knowledge related-challenge of data analytic AI in business and entrepreneurship education research. The findings is in line with Owen (2024) who stated that limited knowledge related-challenge of AI remains a significant barriers to its widespread adoption. Also, the test of hypothesis (H_{O3}) in Table 6 proves that there is no significant difference in the opinion of male and female respondents regarding the limited knowledge-related challenge of data analytic AI in Business and Entrepreneurship Education Research. The finding is in agreement with Anyigor-Ogah (2023b); and Egba, Oko, Egba, Achimugu and Achimugu (2018) who found that there were no significant difference in the opinion of male and female respondents on technology awareness in business education.

Conclusions

Based on the findings of the study, it was concluded that limited knowledge related-challenges of paraphrasing, citation management and data analytic artificial intelligence in business and entrepreneurship education research was accepted. This implies that business and entrepreneurship education researchers in the study area had limited knowledge of Artificial Intelligence (AI) for research. Also, it was concluded that gender does not significantly affect respondents' mean ratings on the limited knowledge related-challenges of paraphrasing AI, citation management AI, and data analytic AI in business and entrepreneurship education research.

Recommendations

Based on the findings of the study, it was recommended:

1. Training opportunities should be provided for researchers to ensure comprehension of paraphrasing AI concept, use cases and potential effects by business and entrepreneurship education researchers.
2. Enabling accessible resources on citation management AI should be provided to business and entrepreneurship education researchers to empower the researcher to use AI technology more effectively.
3. Business and entrepreneurship education researchers should bridge the knowledge gap through interdisciplinary collaboration to help them overcome the limited knowledge related challenge of data analytic AI in research.

References

- Alvarado, J. (2024). Top 6 AI tools for data analytics. *www. Coefficient.io*
- Anyigor-Ogah, A. C.(2023b),Facilitating Strategies for Gaining Entrepreneurship Skills through Business Education Programme of Public Universities in Ebonyi State of Nigeria for Self-employment. *International Journal of Innovative Education Research*, 11(2), 65-73
- Anyigor-Ogah, A. C.(2023d). Students' perception of the usefulness of podcast-based flipped instructional model in enhancing Microsoft word application skills in business education.*Nigerian Journal of Business Education*, 10(1), 1-8.



- Anyigor-Ogah, A. C. & Okoli, B. E. (2022). The effect of the flipped instructional model on business education students' interest and achievement in Word Processing. *Asian Journal of Research in Education and Social Sciences*. 4(2), 151-161.
- Anyigor-Ogah, A. C. (2016). Assessment of appropriateness of project reports of graduating business education students in tertiary institutions in Ebonyi State. *Journal of Applied Science and Technology*, 2(4), 62-67.
- Anyigor-Ogah, A. C. (2023a). Pedagogical and classroom management competencies required for effective implementation of the new business subjects curriculum in secondary schools in Nigeria. *European Journal of Education Studies*, 10(6), 71-84
- Anyigor-Ogah, A. C. (2023c). Perception of business educators on the relevance of integrating globalized employability skills in the business education curriculum in tertiary institutions in Nigeria. *Nigerian Journal of Business Education*, 10(2), 46-54
- Anyigor-Ogah, A.C. (2024). Extent of usage of document inspection and protection technology by business educators in ensuring the security of digital documents in business education. *Nigerian Journal of Business Education*. (In Print).
- Anyigor-Ogah, A.C. and Okoli, B. E. (2024). Track changes nexus of creativity and relevance for digital research work collaboration and reviewing in business education. *Nigerian Journal of Business Education*. (In Print).
- Begum, S. (2024). 8 best AI paraphrasing tools in 2024 testes and reviewed. www.dorik.com
- Birret, A. (2022). the seven best AI paraphrasing tool in 2024. www.alaxbirret.com
- Egba, A. C., Oko, M. C., Egba, E. I., Achimugu, P., & Achimugu, O. (2018). Relevance of information and communication technology in effective teaching and learning of business subjects in Ebonyi State, Nigeria. *Advance Science Letters*. 24(5), 3622 – 3525.
- Igboke, S. A. & Anyigor-Ogah, A. C. (2021). Technical competencies needed by secondary school teachers in Nigeria for effective instructional delivery in business subjects. *International Journal of Research in Social Sciences*, 11(3), 41-50.
- Mahajan, V. (2023). best 16 AI paraphrasing tools in 2024 free and paid. www.natt.ai
- Martin, A. (2024). the best AI paraphrasing tools compared for 2024. www.techpedia.com
- Owens, R. (2024). the 12 best AI data analysis tool in 2024. www.Polymersearch.com
- Rusell, S. J., Norvig, P., Popineau, F., Miclet, L., & Cadet, C. (2021). *Intelligence Artificielle: Une Approche Moderne* (4e ed) Pearson France (In french).
- Sharma, N. (2024). top 10 must use AI tools for data analysis 2024 edition. www.analyticsvidhya.com
- Somasundaram, R. (2023). top 5 AI tools for citation management. www.ilovepdh.com
- Tsai, S. J. (2024). 10 best references and citation management tools for researchers. www.scijournal.org
- Williams, K. C. & Lowendahl, T. M. (2018). 5 best practices for artificial intelligence in higher education. <https://www.gartner.com/en/documents/389592/389523>
- Yaroshenko, T. S & Yaroshenko, O. I. (2023) Artificial intelligence (AI) for research lifecycle: Challenges and opportunities. *University Library at a New Stage of Social Communication Development. Conference Proceedings*, 8.



TRAINING USING ARTIFICIAL INTELLIGENCE (AI) AND UPSKILLING OF BUSINESS EDUCATION FRESH GRADUATES FOR THE WORLD OF WORK

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Abstract

This study determined the up-skilling level of pre-training skills and post-training skills possessed by fresh graduates of business education for the future of jobs using AI tools. The study answered one research question -What is the up-skilling level of pre- and post-training skills possessed by fresh graduates of business education for the future of jobs using AI tools? The study also tested one null hypothesis, "There is no significant influence of pre- and post-training skills possessed by fresh graduates of business education on up-skilling for the future of jobs using AI tools". The ex post facto designs were adopted. This study was undertaken in Nigeria, and delimited to Cross River State, using graduates from the two public universities, the University of Cross River State (UNICROS), and the University of Calabar, Calabar (UNICAL). The population of the study was 205 fresh graduates, and 120 respondents were selected using an accessible sampling technique. Pre- and post-training competency (skills) analysis generated data analysed using item-by-item analysis graded in percentages for answers to research questions and Simple Linear Regression for the test of the null hypothesis. Findings reveal a high up-skilling level of pre-and post-training skills possessed by fresh graduates of business education for the world of work for the answer to the only research question; and significant influence of pre- and post-training skills possessed by fresh graduates of business education on up-skilling for the future of jobs using AI tools. Based on the findings made, it is concluded that training will continue to be meaningful and address the skill needs of fresh graduates with the potency to reposition them for the present and future of jobs. Again, the delivery of business education holds bright prospects for graduates with the use of AI and other modern tools. Based on the conclusion drawn, it is recommended that stakeholders in business education, especially lecturers, government training agencies, and industries should expose undergraduates to training with the use of AI tools. This would, therefore, prepare fresh graduates for the future of work with, or without training after graduation. This is necessary because not all organisations may engage graduates with the hope of training before the commencement of job schedules.

Keywords: Business education, fresh graduates, artificial intelligence, training, skills, future jobs

Introduction

Most recently, the global environment has witnessed yet another technological breakthrough as the search for better and more accurate approach to productive outcomes in virtually all facets of human endeavours continues. This most recent technological breakthrough



is Artificial Intelligence (AI). Notably, universities globally are gradually introducing AI in the area of teaching/learning, research, and other activities for the development of skills to remain globally relevant. Significantly, AI is timely emerging amidst the worries of future jobs. Future jobs here describe technologically-based, software-driven, block-chained, creativity-bound, ethically-coded hacking/cyber security-directed, big data-controlled and virtual reality-based and human skilled-guided jobs. This is happening when certain skills seem to be facing extinction with automation of the work environment. A report by UNESCO/UNEVOC (2021) noted that the era of artificial intelligence is young in years but advanced in impact with intermediate skill jobs fast disappearing as their tasks are automatically automated and individuals are increasingly likely to encounter AI technology in their everyday lives. UNESCO/UNEVOC further reported that 50 per cent of organisation worldwide report using some forms of AI in their operations.

Fresh graduates need up-skilling to adequately prepare and show readiness to face life outside the classroom. Ferreira, Coetzee and Potgieter (2024) in a study reported that it is crucial for individuals to cultivate a deep understanding of the constantly changing nature of the job market. With jobs and career paths becoming increasingly indistinct and unpredictable, developing awareness of the digital work world is more important than ever. The study by Ferreira *et al* empirically investigated the degree to which the world of work readiness and competency of distance learning students could serve as predictors for their digital work world awareness using 486 full-time employed undergraduate students at a comprehensive South African distance learning institution. Data was analysed using regression analysis and structural equation modelling was used in the cross-sectional, quantitative study. The study emphasised the significance of developing job certitude, business ingenuity and socio-digital agility as part of students' career development learning to improve their awareness of the digital work environment. The study enhanced comprehension of the implicit function of students' work readiness and competency in relation to significant digital-era awareness.

The description of future jobs may not be conclusively discussed without the potentials inherent in AI and other highly automated machines. Donald *et al* (2024) in a study focusing on framework of sustainable career and career ecosystem acknowledged the relationship between AI and the future of labour market. Here, Donald *et al* described career ecosystem as a complexity of players comprising individuals, enterprises and other establishment within the private and public sectors, among others with interrelationship as determinants of employment, growing along career paths. Donald *et al* established a link between career ecosystem and sustainable career development, noting that the later aims to infuse career theory for a seamless movement along career matrix. Meanwhile, the reality with uncertainty of the future jobs can be addressed by modelling future of education, especially higher education that trains for career transitions. Wadhwa *et al* (2024) observed the emergence of virtual mobility as an emerging instrument that supports internationalisation of higher education using information obtained from 398 teachers from 73 Russian universities under internship programmes numbering 15 during COVID-19 pandemic in the year 2020. Findings were that participation in the internship was driven by external factors, and some internal justification relating to pedagogical strategies. The implied relationship with the current study is that the future of jobs can be made within the reach of graduates by exposing them to emerging tools that will be relevant in the future in the performance of tasks.

Exposure of potential graduates in the classroom and other avenues such as practical experience outside the classroom through the use of these emerging tools as well as sound pedagogical methods can be useful. Another way of preparing graduates for the future job is in enhancing information competence of the teacher through the application of modern technology



(Abdualiyeva&Seitova). Laine and Lee (2024) in a study on how suitable collaborative virtual reality (CVR) has been applied in higher education using nine CVR cases involving 41 undergraduates with average age of 24. Findings indicated challenges, affordances and ideas for CVR usage. The findings here imply that new and workable approaches should be adopted in the teaching and learning at the higher education level.

Other concerns that can shape the future of jobs in the labour market include globalisation, external, and internal labour market-related factors. D'Amours et al (2024) explained how globalisation has brought about inter-relationships among organisations with analysis of the mechanisms that promote such inter-relationships and further highlighted significantly-related theoretical approaches to inter-firm relationships as Global Value Chains (GVC) and Global Production Networks (GPN). Bertron et al (2024) called for the analysis of workers' experiences and professional trajectories. MacKenzie et al (2023) reported the case of steel firms in UK experiencing restructuring that has led to frequent redeployment of workers as analogous to churning in and out of jobs on the external labour markets as against redeployment in the internal labour markets. In view of addressing uncertainties in the future of jobs, nations are reviewing policies and undertaking reforms of their labour markets, employment, job creations, among others in line with emerging global demands. Alvarez et al (2023) reforms in Southern European labour markets in the neoliberal direction with Spain and Portugal. The study concluded that institutional trajectories resulting from the labour market reforms can bring about profound change with significant resilience.

The uncertainty that characterize the future of jobs can equally be attributable to mixed stance in gender roles, misleading information in social media, among others. Another area of uncertainty in jobs of the future is the conflicts of role demarcation in gender. Heilman et al (2024) in a study reported gender-based discrimination as continually hindering women's career progress. It is therefore necessary to think of future jobs without gender-bias whatsoever. Beyond this, the outburst of social media and the misleading information by activities such as spyware, job scamming are on the increase, thus threatening the future of jobs. Pareek and Goncalves (2024) observed the manner in which social media is used to misinform people on job offer and found that peers' awareness has a high potency than trustworthiness in utilising such platforms for job search. A study by Rieth, Onnasch and Hagemann (2024) focused on the effect of adaptive automation in delegating tasks and its effect on human perception in terms of perceived autonomy and competence, satisfaction, and human role. The online study using the same dual-task paradigm made use of a novice sample of 93 and another sample of 126 participants supported by static information automation, static decision automation, or an adaptable solution that availed them of switching between the two automation stages. Findings revealed that adaptive automation could increase even when humans rarely switch.

In today's evolving job and business landscape, there is growing concern over the apparent skill gap between what graduates possess and what the labour market demands, particularly in the context of business education. The inability of fresh graduates, including those from business education programmes, to effectively meet workplace and entrepreneurial expectations is increasingly attributed to the absence of relevant, contemporary skills. This mismatch is especially evident when graduates seek employment or attempt to operate within the highly dynamic and globalised business environment of the 21st century. Despite completing academic programmes, many of these graduates still require additional training to function competently in their fields. The widening gap between graduate skills and labour market demands in business education calls for innovative solutions. Integrating AI-driven learning, as explored by Okon, Ewuru, and Undie (2024), offers a strategic pathway to bridge this gap by enhancing



learners' practical competencies through adaptive, technology-enabled instruction. Bridging the skill gap in business education requires a dual approach that combines AI-enhanced learning for competency development with institution-industry resourcefulness, where industry experts actively contribute to curriculum innovation, digital exposure, and real-world training (Okon & Ewuru, 2024)

This persistent gap highlights institutional shortcomings, as universities and colleges are partly blamed for failing to align their curricula and training methods with the realities of the modern world of work. Of particular concern is the limited exposure of undergraduates to digital tools and technologies that are integral to current and future job functions. As a result, business education graduates often enter the job market with inadequate technological proficiency, making them vulnerable to being screened out during recruitment or unable to retain employment in technology-driven environments.

This issue is even more troubling when considered against the backdrop of Nigeria's rising unemployment rate and the projected dominance of artificial intelligence and other digital technologies in future jobs. The fear that a large segment of the workforce may become redundant due to their inability to adapt to such changes underscores the urgency for up-skilling. The critical questions that arise, therefore, include whether the skills acquired by fresh graduates are in any way sufficient for the demands of today's and tomorrow's workplaces, and whether targeted training can significantly bridge this skill gap.

In response to these concerns, this study examined the up-skilling levels of fresh graduates of business education through the use of AI tools. It specifically addressed the research question: *What is the up-skilling level of pre- and post-training skills possessed by fresh graduates of business education for the future of jobs using AI tools?* The study also tested the null hypothesis: *There is no significant influence of pre- and post-training skills possessed by fresh graduates of business education on up-skilling for the future of jobs using AI tools.* By doing so, the study sought to provide empirical evidence on whether focused training using modern technological tools can enhance graduates' readiness for future employment and entrepreneurship. Therefore, the study determine the up-skilling level of pre-training skills and post-training skills possessed by fresh graduates of business education for the future of jobs using AI tools; answers the research question, What is the up-skilling level of pre- and post-training skills possessed by fresh graduates of business education for the future of jobs using AI tools? The study also tested the null hypothesis - There is no significant influence of pre- and post-training skills possessed by fresh graduates of business education on up-skilling for the future of jobs using AI tools

Research Methods

This study adopted the ex post facto designs, which availed the researcher the opportunity of adopting the pre and post-skills training. This study was undertaken in Cross River State, using graduates from the two public universities, namely: University of Cross River State (UNICROS), and University of Calabar, Calabar (UNICAL). Population was 205 fresh graduates. Accessible sampling technique was used to obtain a sample size of 120 respondents who are fresh graduates of business education, spanning through 2023 and 2024. Accessible sampling technique, also known as convenience sampling (commonly accepted term in research methodology) was adopted for the study since the researchers had to select participants who were easily available, and reachable to the researcher.

Accessible sampling technique is a non-probability sampling method in which respondents are selected based on their availability and willingness to participate in the study. It involves choosing individuals who are easily reachable at the time of data collection, without



using a sampling frame or randomisation process. In this study, the technique was applied by selecting university-based bank customers who were present and accessible in the banking halls of UNICAL Microfinance Bank and UNICROSS Microfinance Bank during the period of questionnaire administration. The technique was used after the population and area of study were defined and before the research instrument was administered. It was considered appropriate because it allowed the researcher to reach participants within a limited timeframe and ensured efficient data collection despite not being able to access the entire population.

This technique became necessary due to the nature of the population, which was undefined in terms of a fixed list or register of all customers. Since no comprehensive record of the total population of university-based bank customers was publicly available, and access to customer data was restricted, it was not possible to apply random or probability sampling methods. Accessible sampling thus provided a practical means of collecting data from a relevant portion of the population who could be reached in real-time and were willing to participate.

Pre-Training Skills competent Levels (Pre-TSCL) was administered to determine the skill competence of business education fresh graduates and another, Post-Training Skill Competent Level (Post-TSCL) after facilitating training, where these fresh graduates were guided to use AI tools in upgrading their understanding and skills in different aspects of business education. Data generated was analysed using percentage-graded item-by-item analysis for answer to research question and Simple Linear Regression for test of null hypothesis. The decision rule for answering the research question was based on the interpretation of percentage scores obtained from respondents on both the pre-training and post-training skill assessments. A higher average percentage score in the post-training phase compared to the pre-training phase indicates a higher level of up-skilling. Therefore, if the post-training average percentage is substantially higher than the pre-training average percentage, it is interpreted that the training had a positive effect on skill development, and the up-skilling level is considered high.

The decision rule for testing the null hypothesis using simple linear regression was based on the comparison of the calculated F-ratio with the critical F-ratio at the 0.05 level of significance and by observing the associated p-value. If the calculated F-ratio is greater than the critical F-ratio, or if the p-value is less than 0.05, the null hypothesis is rejected, indicating that there is a statistically significant influence of the independent variable on the dependent variable. Conversely, if the calculated F-ratio is less than the critical F-ratio or the p-value is greater than 0.05, the null hypothesis is not rejected, indicating no statistically significant influence.

Results

What is the up-skilling level of pre- and post-training skills possessed by fresh graduates of business education for the future of jobs using AI tools?



Table 1

Pre-training skills competency levels (Pre-TSCL) and post-training skill competency level (Post-TSCL) and up-skilling

		Pre-TSCL (%)	Post-TSCL (%)	Up-skilling Level (High/Low)
1	Business initiative skills	21.4	56.4	High
2	Business proposal development skills	22.2	56.9	High
3	Business plan development skills	26.3	58.1	High
4	Fund sources skills	19.3	58.8	High
5	Profit analysis skills	22.0	61.1	High
6	Information sourcing skills	26.8	60.7	High
7	Digital development skills	26.9	56.8	High
8	Sale force development skills	26.8	58.1	High
9	Digital marketing skills	25.6	57.9	High
10	Online payment skills	25.2	68.6	High
11	Digital information exchange skills	23.6	66.2	High
12	Online business registration skills	25.0	63.5	High
13	Online management meeting schedule skills	24.9	71.1	High
14	Board meetings' minutes taking skills	28.2	62.1	High
15	Software accounting development skills	25.6	60.7	High
16	Costing skills	33.6	64.4	High
17	Stock valuation skills	32.0	63.4	High
18	Cross-border business development skills	28.2	64.7	High
19	Cross-border job sourcing skills	26.9	62.3	High
20	Reporting skills	22.3	63.5	High
21	Product research skills	23.7	67.1	High
22	Product development skills	21.9	66.4	High
23	Forensic analysis skills	23.1	66.4	High
24	Entrepreneurial skills share	24.6	67.5	High
25	Business branding skills	24.6	65.7	High
26	Training providence skills	22.3	63.6	High
27	Multicultural adaptation skills	22.9	72.3	High
28	Online job search skills	25.8	70.5	High
29	Negotiation skills	24.2	64.7	High
30	Pressure absorbent skills	23.9	65.9	High
		25.0	63.5	High

Answer to this research question was based on a 30-item pre- and post-skills graded at percentage levels and administered to 120 respondents. Analysis of responses in percentage showed that the pre-training skills had the highest percentage (score) of 33.6 per cent and a minimum of 19.3 per cent with an average score of 25 per cent. However, after training, the post-training skills yielded a high level of skill in all 30 items drawn. The grading had a maximum score of 56.4 per cent and a maximum of 72.3% with an average of 63.5%. Summary of the result is presented in Table 1. These results show high up-skilling level of pre- and post-training skills possessed by fresh graduates of business education for the future of jobs.



There is no significant influence of pre- and post-training skills possessed by fresh graduates of business education on up-skilling for the future of jobs using AI tools

Table 2

Result of simple linear regression analysis of no significant influence of pre- and post-training skills offresh graduates of business education on up-skilling for the future of jobs using AI tools

Variable	β	SERR	t	Sig. at .05
Up-skilling	.978	86.80831	.989	97872.882
Model Sum of Squaresdf Mean SquareF Significant Level				
Regression	40027680.300	1	40027680.300	5311.753.05
Residual	889210.500	118	7535.682	
Total	40916890.800	119		

Results obtained and presented in Table 2 reveals that the calculated F-ratio of 5311.753 is greater than the critical F-ratio of 3.02 at .05 levels of significance with degrees of freedom being 1, and 119. Based on this revelation, the null hypothesis that there is no significant influence of pre- and post-training skills possessed by fresh graduates of business education on up-skilling for the future of jobs using AI tools is rejected. This further implies there is significant influence of pre- and post-training skills possessed by fresh graduates of business education on up-skilling for the future of jobs using AI tools. Again, the co-efficient of determination of .978 indicates that training of fresh graduates of business education contribute 97.8% to up-skilling of fresh graduates for the future of jobs using AI tools. The significance of t (72.882) indicates that pre- and post-training skills significantly contribute to the regression.

Summary of findings

The findings from the study revealed that the up-skilling level of pre- and post-training skills possessed by fresh graduates of Business Education for the future of jobs using AI tools was considerably high. Analysis of data from 120 respondents across 30 skill items showed that the pre-training skills were generally low, with percentages ranging from 19.3 percent to 33.6 percent and an average of 25.0 percent. However, following the training intervention, the post-training skills increased substantially across all skill areas, with scores ranging from 56.4 percent to 72.3 percent and an average of 63.5 percent. This demonstrates that the training had a significant effect on enhancing the graduates' competencies in AI-related and digital business skills, thereby resulting in a high level of up-skilling.

Further findings based on the test of the null hypothesis indicated that there is a statistically significant influence of pre- and post-training skills on the up-skilling of Business Education graduates for the future of jobs using AI tools. The result of the simple linear regression analysis revealed a calculated F-ratio of 5311.753, which far exceeded the critical F-ratio value of 3.02 at the 0.05 level of significance, with degrees of freedom being 1 and 119. Consequently, the null hypothesis was rejected. The coefficient of determination, R-squared, was 0.978, suggesting that 97.8 percent of the variance in up-skilling could be attributed to the pre- and post-training skills. Additionally, the t-value of 72.882 confirmed the statistical contribution of the independent variable to the regression model. These findings underscore the effectiveness of targeted training in significantly enhancing the skill sets of fresh graduates, thereby positioning them to meet the demands of future jobs in AI-driven environments.



Discussion

Findings arising from data analysis reveal high up-skilling level of pre- and post-training skills possessed by fresh graduates of business education for the future of jobs for answer to the only research question; and significant influence of pre- and post-training skills possessed by fresh graduates of business education on up-skilling for the future of jobs using AI tools. This result is surprising owing to the fact areas of training were not different from the provisions of the curriculum for business education undergraduates. Again, the reality of the 21st Century job demands place much mandate on universities to train graduates for the future of jobs. The deployment of AI tools in providing training to fresh graduates is not a surprise owing to the power of AI tools in the search for knowledge and skills. The findings of this study further strengthen earlier findings on the potency of training, more so, with the use of AI tools. A study by Donald et al (2024) had earlier established a relationship between AI and the future of labour market. Again, Wadhwa et al (2024) reported the emergence of virtual mobility in higher education in internship for career preparation and readiness. Studies earlier reviewed were not directly focussing on business education fresh graduates, it hoped that this study addresses such gap and adds to existing body of knowledge, hence the conclusion and recommendations further deciphered.

Conclusion

Based on the findings made, it is concluded that training will continue to be meaningful and addressing the skill needs of fresh graduates with the potency to reposition them for the present and future of jobs. Again, the delivery of business education holds bright prospects for graduates with the use of AI and other modern tools.

Recommendation

Based on the conclusion drawn, it is recommended that stakeholders in business education, especially lecturers, government training agencies and industries should expose undergraduates to training with the use of AI tools. This would therefore, prepare fresh graduates for the future of work with, or without training after graduation. This is necessary because, not all organisations may engage graduates with the hope of training them before commencement of job schedules.

References

- Abdualiyeva, R. & Seitova, S. The use of case technology for the formation of information competence for the future teachers of Mathematics. *Higher Education for the Future*, 11: 32-46 (2024).
- Álvarez, I., Cruces, J., & Trillo, F. Radical change and institutional resilience: The Case of labour market reforms in Southern Europe. *Work, Employment and Society*, 37: 1517-1543 (2023). <https://doi.org/10.1177/09500170221090166>
- Bertron, C., Vêlu, A.-E., Buisson-Fenet, H., & Dumay, X. The dualisation of teacher labour markets, employment trajectories and the State in France. *Work, Employment and Society*, 38: 318-338 (2024). <https://doi.org/10.1177/09500170221128681>
- Donald, W. E. et al. Introducing a sustainable career ecosystem: Theoretical perspectives, conceptualisation, and future research agenda. *Journal of Vocational Behaviour*, 151: 1 - 14 (2024). <https://doi.org/10.1016/j.jvb.2024.103989>.
- D'Amours, M., Pogliaghi, L., Bellemare, G., Briand, L., & Hanin, F. Reconceptualising work and employment in complex productive configurations. *Work, Employment and Society*, 38: 63-82 (2024). <https://doi.org/10.1177/09500170221103131>
- Ferreira, N.; Coetzee, M. and Potgieter, I. L. Predicting students' work world awareness through their readiness and competency for the digital world. *Journal of Teaching and Learning*



- for Graduates" *Employability*, 15: 53 - 65 (2024).
<https://doi.org/10.21153/jtlge2024vol15no1art1788>
- Heilman, M. E., Caleo, S. & Manzi, F. Women at work: Pathways from gender stereotypes to gender bias and discrimination. *Annual Review of Organisational Psychology and Organisational Behaviour*, 11: 65 – 92 (2024)
- Laine, T. H. & Lee, W. Collaborative Virtual Reality in Higher Education: Students' perceptions on presence, challenges, affordances, and potential. *IEEE Transitions on Learning Technologies*, 17: 280 - 293 (2024). doi.10.1109/TLT.2023.3319628.
- MacKenzie, R., & McLachlan, C. J. Restructuring, redeployment and job churning within internal labour markets. *Work, Employment and Society*, 37: 1480-1496 (2023).
<https://doi.org/10.1177/09500170221080389>
- Marwecki, C. (2021). *Understanding the impact of artificial intelligence on skill development*. Germany: UNESCO/UNEVOC Publications.
- Okon, E. E., & Ewuru, A. A. (2024). Institution-industry resourcefulness and innovation in business education curriculum. *Nigerian Journal of Business Education (NIGJBED)*, 11(1), 1-10
- Okon, E. E., Ewuru, A. A., & Undie, S. B. (2024). Artificial intelligence and learning abilities of business education undergraduates in universities. *International Journal of Developmental Research in Education (IJDRE)*, 4(1), 1-10. University of Uyo. ISSN Online: 2971-5482
- Pareek, S. & Goncalves, J. Peer-supplied credibility labels as an online misinformation intervention. *International Journal of Human-Computer Studies*, 188, 1 - 17 (2024):
<https://doi.org/10.1016/j.ijhcs.2024.103276>.
- Rieth, M., Onnasch L. & Hagemann, V. Adaptable automation for a more human-centred work design? Effects on human perception and behaviour. *International Journal of Human-Computer Studies*, 186: (2024). <https://doi.org/10.1016/j.ijhcs.2024.103246>.
- Wadhwa, R., Shcheglova, D., Opfer, E., & Garmonova, A. Teachers on the Move: Understanding the New Model of Virtual Mobility Through the Case Study of a Russian University. *Higher Education for the Future*, 11: 90-108 (2024).
<https://doi.org/10.1177/23476311231222965>



INTEGRATION OF ARTIFICIAL INTELLIGENCE IN TEACHING AND LEARNING OF OFFICE TECHNOLOGY AND MANAGEMENT (OTM) PROGRAMME IN POLYTECHNICS IN SOUTH EAST, NIGERIA

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Abstract

The study assessed the integration of Artificial Intelligence in teaching and learning of Office Technology and Management (OTM) programme in polytechnics in South East, Nigeria. It adopts the descriptive survey design. Two research questions and two hypotheses guided the study. Population consisted of 89 Office Technology and Management (OTM) lecturers in public polytechnics in South-East, Nigeria. No sample was used because the population is manageable. The instrument was validated by experts in Office Technology and Management, measurement and evaluation from Akanulbiam Federal Polytechnic, Unwana and Michael Okpara University of Agriculture, Umudike. Cronbach alpha was used to ascertain the reliability of the instrument with coefficient of 0.75. Mean was used to answer the research questions and standard deviation to ascertain the closeness and homogeneity of the responses while t-test was used to test the hypotheses. Findings of the study revealed that there is a positive influence of chatbots and simulations in teaching and learning of Office Technology and Management (OTM) programme in Polytechnics in South East, Nigeria. The findings further showed no significant difference in the mean ratings of male and female Office Technology and Management (OTM) lecturers on the integration of Artificial Intelligence in teaching and learning of Office Technology and Management in public polytechnics in South-East, Nigeria. It was concluded that Office Technology and Management lecturers agreed that Artificial Intelligence chatbots and simulation have positive influence on teaching and learning of OTM programme in polytechnics in South East, Nigeria. Artificial Intelligence fosters critical thinking, problem solving skills and deeper understanding of complex business system which cater for individual learning styles and needs, optimizing learning outcomes and maximizing students' potentials. It was recommended among others that polytechnic stakeholders should train and support programmes that will equip Office Technology and Management (OTM) lecturers with the skills to effectively design, integrate and utilize various AI tools in their instructional delivery. Government should provide adequate technological infrastructure and technical support to facilitate integration and utilization of Artificial Intelligent tools in Nigerian polytechnics.

Keywords: Integration, Artificial Intelligence, Teaching and Learning, Office Technology and Management, Polytechnics.



Introduction

The use of technology, particularly Artificial Intelligence, significantly impacts the global economy, business and society. Artificial Intelligence (AI) has resulted to a transformation force of advancements and innovations that have impacted many facets of human life including education. AI has the potential to revolutionize conventional methods of teaching and learning, streamline administrative tasks and enhance the quality of student experiences in higher education (Smith et al, 2020). Its integration in education systems is changing the instructional delivery in many institutions. Artificial Intelligence is revolutionizing the educational landscape, bridging gaps and encouraging a more inclusive and effective learning environment. Aina et al (2023) explained that Artificial Intelligence is an innovative technical framework that encompasses the creation of computer systems with the ability to execute activities that usually need human intellect. These activities involve problem-solving, acquiring knowledge, comprehending language and seeing visual information. AI has become increasingly prominent in recent years, brought about a revolutionary transformation in the methods through which jobs are completed in numerous businesses. Within the realm of education, artificial intelligence (AI) offers a multitude of possibilities to augment the learning process. Intelligent systems provide the ability to adjust to the specific requirements of each learning, deliver tailored learning experiences and provide immediate feedback (Aina et al., 2023). AI applications in education encompass adaptive learning platforms, intelligent tutoring systems, and virtual simulations. Through the use of artificial intelligence, educators have the ability to construct dynamic and interactive learning environments that accommodate the various learning styles and capabilities of students.

Similarly, Verma (2018) Artificial intelligence is the combination of two words artificial + intelligence. Where artificial means 'not real' or 'natural' and by intelligence means 'the ability to reason, to trigger new thoughts, to perceive and learn'. Artificial intelligence is that area of computer science that mainly focus in the making of intelligent machines that work and give reactions same like human beings. It is a combination of many activities which includes for designing the artificial in computers that are like-recognizing the speech, learning, planning and solving the problem. When any system adapts itself according to situation in any environment is called intelligent. In other words, it is a programming such machines which can think and act with some level of human intelligence is known as artificial intelligence. It is also divided into two parts one is to solving complex problems by the machine and second is same like human beings. Vanichvasin (2022) noted that AI involves creating algorithms that can process data, make decisions often without explicit human intervention. Artificial Intelligence seeks to mimic the cognitive functions of the human brain, enable machines to perceive their environment, reason about the information they receive and take appropriate actions to achieve specific goals. Furthermore, Artificial Intelligence is the development of computer systems capable of performing tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making and language translation. It is designed to learn from data, recognize patterns and make decisions with minimal human intervention (Ufondu & Obi, 2023).

In the same vein, Brynjolfsson and McAfee (2014) noted that the educational landscape in Nigeria is always changing, so it is important to understand how integrating AI into tertiary institutions would influence things, with its creative solutions that meet the many needs of both educators and students. In envisioning future jobs and human resources specialists' requirements, teachers must equip students with a proficiency that makes them adaptable to challenges. Teachers contribute to the society by educating generations of upcoming students that will become future entrepreneurs. The students should be able to move on with trends and not just stay current with events and environment (Elhajjar, Karam & Borna, 2021). Hence, the demand



for innovative teachers embracing change, integrating new materials and enable student-artificial intelligence interactions in education. In the context of teaching and learning, Shabna (2024) noted that Artificial Intelligence is the application of advanced computation algorithms and technologies to stimulate human like intelligence, learning, decision making within educational systems, addressing cognitive, physical, academic, social and emotional factors that impacts learning. It encompasses a wide range of applications, including intelligent tutoring systems, adaptive learning platforms, virtual reality simulations, and data analytical tools to enhance accessibility, effectiveness and efficiency in teaching and learning. To effectively integrate AI in teaching, teachers should update their educational practices and embrace the challenges of technology in teaching. Teachers can integrate into their pedagogical approach aspects related to learners' behavior, such as emotions, attention, gestures and movement with the support of AI technologies (Crescenzi-Lanna, 2023).

Furthermore, Brynjolfsson and McAfee (2014) averred that the use of chatbots, simulations and adaptive learning are just a few AI applications that have become popular in universities which have changed the way classrooms are set up, improved accessibility, fostered student engagement and accommodate different learning preferences. A chatbot is defined as a software program, which acts like a human when interacted with via message or voice over the internet to simulate a conversation in a scripted way, understand human languages and reply to a conversation automatically (Benotti et al, 2014). The requirements of chatbot design include accurate knowledge representation, strategy for answering and predefined responses to reply when user input is not understood or not in a system (Augello, Gentile & Dignum, 2018). Two types of chatbots are mostly used in education. Firstly, a chatbot with pre-programmed answers is called a rule-based chatbot as it is responsible for matching pre-programmed answers with text messages or speeches inputted. It chooses the system response from pre-programmed answers, based on the input text without creating new texts. The responses from the chatbot are coded, organized and presented in the format of conversational patterns. Secondly, a chatbot generating suitable responses drawn from user input via natural language processing and deep machine learning. Therefore, it can generate answers better than the first type, based on user messages because it acts like human by using algorithms of machine learning and techniques of deep learning (Hien et al, 2018). Chatbots in education has the ability to provide personalized recommendation for learning, suggest areas for improvement, handle routine tasks such as scheduling, grading and answering frequently asked questions, saving teachers time and enabling them to focus on more high-value tasks of teaching and monitoring.

In educational settings, chatbots can be categorized into those with educational intentionality and those without. Chatbots without educational intentionality are used in administrative tasks such as student guidance and assistance (Fernoagă, 2018). Chatbots with educational intentionality are used in fostering teaching and learning. Within this category, there are chatbots, which provide the framework of the learning process, that is, select and arrange contents to fit the students' needs and speed, and help in reflection and learning motivation. These bots act as a learning companion which provides dialogue, collaboration and reflection (Molnár & Szűts, 2018).

Artificial intelligence (AI) simulations are computer-generated environments that mimic real-world scenarios or processes (Liu, Cheng & Huang, 2019). They allow learners to interact with these simulated environments, gaining knowledge and developing skills in a safe, controlled setting. It involves creating computer-based models that mimic real-world scenarios and interactions to analyze, predict or optimize outcomes. The concept of AI simulation is based on the idea of using computational models to simulate the behavior of systems or phenomena that



may be too costly, dangerous or impractical to study in the real world. The integration of computer simulations and artificial intelligence has significant potential for enhancing the learning process and improving educational outcomes (Wang et al, 2020). Simulations enable students to participate in educational activities that are challenging to organize or ethically complicated by replicating real-life scenarios. Platforms such as Labster and PhET interactive simulations provide students with virtual laboratories, enable them to perform experiments, manipulate variable and observe outcomes in a secure and controlled setting. This approach enhances traditional laboratory work and promotes equal access to high – quality educational resources, enabling all students to engage in experiential learning regardless of their geographical or institutional limitations (Murshidi, 2019). AI technology can make education system smarter in Nigeria. This can be done by introducing self-teaching classrooms at every level of the education institution. In this classroom, machines can be used to properly teach and answer on the spot questions in a universally accepted manner. Indeed, the 21st century classrooms can be equipped with emerging technological solutions to deliver the best learning environment to students. It can also collaborate with virtual networks to make a perfect learning environment for students as well as teachers (Robinson, 2018). It is the act of stimulating the behavior of a situation or a process using a suitably analogous phenomenon. Simulation is a teaching technique in which the behavior is not controlled and participants can bring their own experience, knowledge, and skills to the situation and consequently enrich the learning process, change the academic setting to a real life situation, and provide an effective and efficient language learning experience. Simulation can also be considered as a problem-solving activity to which learners bring their own distinct opinions, feelings, and personalities. Simulation gives educators the opportunity to create controlled circumstances that imitate life without some of the real penalties to create more tangible learning experience for young students (Spurgeon in Jones & Barrett, 2017).

According to Oyinloye and Oluwalola (2014), Office Technology and Management (OTM) is an aspect of educational programme offered in the Polytechnics meant for acquisition of knowledge, skill, office ethics, work habits and competencies needed to prepare the individual to have employment after graduation, open a business and also have a good office occupation. Office technology and management according to Okoro and Amagoh in Eze and Ononye (2021) is an efficient, effective, productive and functional educational programme which leads itself to self-employment, self-reliance and consequently self-actualization. It is expected that OTM students upon graduation have acquired relevant skills that could enable them employable in various small-scale enterprises that operates in the country. The graduates are trained properly to fit into the office of any organization, attending meetings and providing information as may be required, make accurate records of proceedings, filling and retrieving information, taking appropriate action independently when faced with challenging secretarial office problems, showing personal qualities and attributes conducive to tolerance and co-existence with the work group (Eze and Ononye, 2021).

Polytechnic education, which is part of technical education programme in tertiary education level leads to the acquisition of practical and applied skills as well as fundamental scientific knowledge. It is a type of education resulting in the acquisition of practical and useful skills. This type of education, according to the Federal Republic of Nigeria (FRN), is given after the second six years of formal schooling, (it is the education at the tertiary level represented by 4 in the 6:3:3:4 system of education as stated in the National Policy on Education (NPE). In Nigeria, there are Federal, State and Private polytechnics. Federal Polytechnics are owned and sponsored by Federal Government, State polytechnics are owned and sponsored by State Government while private polytechnics are owned and sponsored by faith-based organisations or



individuals. Adamma (2016) identifies the objective of OTM programme as follows: equipping the students with knowledge, skill, attitude and competencies needed to prepare the students for employment after graduation; develop in the students an occupational intelligence that will make them versatile and adaptable to the changing situation in the world of work; prepare students to be self – employed after graduation; develop the students potentials for further academic and professional pursuit; to equip the students with skills and knowledge to meet the manpower needs of the society; to give the students background of training that would contribute to rapid advancement on job; to make students to develop good working habit and attitude needed in the development of personality traits such as punctuality, responsibility that helps in efficient work; to help develop the high attitude towards work and prepare students for entrepreneurship competencies. The integration of Artificial Intelligence in teaching and learning of OTM programme will go a long way in developing the students' technological application skills for entrepreneurship development. There is no gender bias in the teaching and learning of the course in the polytechnics in south east. The researchers are limiting the research work to public polytechnics in south eastern region of Nigeria. There is need for OTM programmes to sustain its relevance in providing the needs of its recipients and the society at large. In order to achieve this, it must embrace current trends of AI integration in the teaching and learning of OTM in polytechnics. Educators need to be trained and retrained to be competent, knowledgeable and skillful in the use of AI tools for instructional delivery. The learning environment needs to be conducive for the integration of AI in instructional delivery. The curriculum of OTM programme needs to be tailored towards this innovation. In the light of this, the researchers seek to investigate how AI should be integrated in teaching and learning of OTM in polytechnics in south east Nigeria.

Statement of the Problem

Artificial Intelligence (AI) is the ability of a digital computer, computer-controlled machine or robot to perform tasks commonly associated with intelligent beings like humans. Artificial intelligence (AI) makes it possible for machines to learn from experience, adjust to new inputs and perform human-like tasks. Office Technology and Management (OTM) on the other hand is designed to equip its graduates with the skills and knowledge needed to succeed in the digital economy. They should be knowledgeable with emerging technologies and its usage and application in the world of work. However, despite the emergence of digitalized technology, most students graduate without having the knowledge of artificial intelligence tools, benefits and challenges associated with it. It is unclear if students exposed to AI based learning demonstrates improved knowledge, skills and critical thinking abilities compared to traditional teaching methods. It is imperative to bring innovations in the teaching and learning of Office Technology and Management (OTM) by integrating artificial intelligence in its programme due to constant advancement in technologies. Hence the study on the influence of integration of Artificial Intelligence in the teaching and learning of Office Technology and Management programme in Polytechnics in southeast, Nigeria.

Research Questions

The following research questions guided the study:

1. What is the influence of chatbots integration in teaching and learning of Office Technology and Management (OTM) in polytechnics in South East, Nigeria?
2. What is the influence of Artificial Intelligence simulation integration in teaching and learning of Office Technology and Management (OTM) in polytechnics in South East, Nigeria?



Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

- Ho₁ A significant difference does not exist between the mean ratings of male and female lecturers on the influence of chatbots integration in teaching and learning of Office Technology and Management (OTM) in polytechnics in South East, Nigeria
- Ho₂ There is no significant difference between the mean ratings of male and female lecturers on the influence of Artificial Intelligence simulation integration in teaching and learning of Office Technology and Management (OTM) in polytechnics in South East, Nigeria

Method

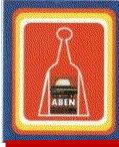
Descriptive survey research design was used for the study. The population for the study consisted of 85 Office Technology and Management (OTM) lecturers in polytechnics in South East Nigeria. The entire population of 85 OT lecturers (27 males and 58 females) in polytechnics in South East Nigeria will be used as sample for this study. Therefore, there is no sampling for the study since the population is of a manageable number. A validated structured questionnaire titled "Questionnaire on Integration of Artificial Intelligence in teaching and learning of OTM programme" (QIAITLOTMP) was developed by the researcher with insight for the literature will be used for the study. The instrument contains 20 items according to the research questions.; 10 items on AI chatbots Integration and 10 items on AI simulation integration The instrument is a four-point rating scale of: Strongly Agree (SA); Agree (A); Disagree (D); Strongly Disagree (SD) with values of 4,3, 2 and 1 respectively. Cronbach Alpha Coefficient was used to measure the internal consistency of the instrument and co-efficient of 0.81 and 0.79 were obtained respectively. Mean was used to answer the research questions, standard deviation was used to ascertain the closeness and homogeneity of the responses while t-test of independence was used to test the null hypotheses at 0.05 alpha level. The decision was based on the cluster mean score in relation to the boundary mean score of 2.50. A cluster with mean score equal to or above 2.50 was agreed while the one with mean score less than 2.50 was disagreed. The null hypothesis was not rejected where the calculated value is less than the significant level of 0.05 and rejected if the calculated value is equal to or greater than the significant level of 0.05.

Results

Research Question 1: What is the influence of Artificial Intelligence chatbots integration in teaching and learning of Office Technology and Management (OTM) lecturers in Polytechnics in South East, Nigeria?

Table 1: Respondents' Mean and Standard Deviation Scores on AI chatbots integration in teaching and learning of Office Technology and Management

S/N	The following are the influence of AI chatbots integration in teaching and learning of OTM programme are as follows:	X ₁	SD ₁	Rmks	X ₂	SD ₂	Rmks
1	AI chatbots in OTM courses provide a helpful and engaging way to learn key concepts.	3.68	0.81	SA	3.75	0.89	SA
2	Enables interaction lecturers-students interaction through text or voice interface.	2.75	0.88	A	3.07	0.68	SA
3	Chatbots handles routine tasks such as scheduling, grading, saving time and answering frequently asked questions.	3.11	0.75	A	2.84	0.50	A
4	Chatbots provide immediate feedback and support to students during their learning process in OTM.	2.80	0.69	A	2.57	0.55	A



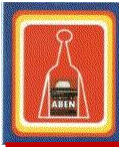
5	AI chatbot contribute in improving students' understanding of complex concepts and topics in OTM programme.	2.75	0.66	A	2.83	0.55	A
6	Using AI chatbots in OTM programme allows students to learn at their own pace and revisit topics as needed.	2.75	0.68	A	2.80	0.80	A
7	The integration of AI chatbots in OTM programme has made learning more interactive and enjoyable.	2.80	0.75	A	2.82	0.67	A
8	Students feel comfortable asking questions and seeking clarification from AI chatbots in OTM.	3.36	0.95	SA	3.83	0.65	SA
9	Chatbots are good learning resource for best practices in OTM programme.	2.75	0.88	A	3.07	0.68	SA
10	Chatbots provides responses without wasting time.	3.11	0.75	SA	2.84	0.50	A
	Cluster mean	3.00	0.77	A	3.06	0.66	A

Data in Table 1 reveal the item by item analysis on AI chatbots integration in teaching and learning of OTM programme in polytechnics in South East. The analysis revealed that items 1, and 8 with mean scores 3.72 and 3.60 were rated strongly agreed while items 2, 3, 4, 5, 6, 7, 9 and 10 were rated agreed. However, the cluster mean of 3.03 summarized that OTM lecturers agreed that chatbots integration influences the teaching and learning of OTM programme in polytechnics in South East, Nigeria. The standard deviation scores ranging from 0.50 – 0.89 show that OTM lecturers do not vary too much in their ratings on AI chatbots integration in teaching and learning of OTM programme in polytechnics in South East, Nigeria.

Research Question 2: What is the influence of Artificial Intelligence simulation integration in teaching and learning of Office Technology and Management (OTM) in polytechnics in South East, Nigeria?

Table 1: Respondents' Mean and Standard Deviation Scores on AI simulations integration in teaching and learning of OTM Programme

S/N	The following are the influence of AI simulation integration in teaching and learning of OTM programme are as follows:	X ₁	SD ₁	Rmks	X ₂	SD ₂	Rmks
1	AI simulations in OTM programme allow students to apply concepts in a more realistic and engaging way	2.58	0.81	A	2.68	0.89	A
2	AI simulations in OTM programme improve critical thinking and decision making skills in business scenarios	2.85	0.88	A	2.68	0.68	A
3	Feedback provided by AI simulations help OTM students to identify and address their weaknesses in understanding key concepts.	2.80	0.75	A	2.84	0.50	A
4	AI simulation makes learning more interactive and stimulating	2.80	0.69	A	2.57	0.55	A
5	The integration of AI simulations increases overall satisfaction with the teaching and learning experience in OTM.	3.45	0.66	SA	3.83	0.55	SA



6	AI simulations are valuable tool for improving the effectiveness of teaching and learning of OTM.	2.55	0.68	A	2.60	0.80	A
7	Simulations make it possible to explore real-life learning that is occurring in online environments.	2.55	0.68	A	2.60	0.80	A
8	Simulation uses multimedia and virtual reality software which allows teachers to create (or select) cases that have the feel of reality.	2.55	0.88	A	2.96	0.68	A
9	Simulation gives educators the opportunity to create controlled circumstances that imitate life.	3.45	0.66	SA	3.83	0.55	SA
10	Simulation can also be considered as a problem-solving activity to which learners bring their own distinct opinions, feelings, and personalities.	2.80	0.75	A	2.84	0.50	A
		2.75	0.76		2.88	0.66	

Data in Table 2 reveal the item by item analysis on AI simulation integration in teaching and learning of OTM programme in polytechnics in South East. The analysis revealed that items 5, and 9 with mean scores 3.72 and 3.60 were rated strongly agreed while items 2, 3, 4, 6, 7, 8 and 10 were rated agreed. However, the cluster mean of 2.82 summarized that OTM lecturers agreed that simulation integration influences the teaching and learning of OTM programme in polytechnics in South East, Nigeria. The standard deviation scores ranging from 0.50 – 0.89 show that OTM lecturers do not vary too much in their ratings on AI simulation integration in teaching and learning of OTM programme in polytechnics in South East, Nigeria.

Hypotheses 1: A significant difference does not exist between the mean ratings of male and female OTM lecturers on the influence of Artificial Intelligence chatbots integration in teaching and learning of OTM courses in polytechnics in South East, Nigeria

Table 3: t-test analysis of significant difference in the mean ratings of male and female OTM lecturers on the influence of Artificial Intelligence chatbots integration in teaching and learning of OTM lecturers in polytechnics in South East, Nigeria.

Groups	Number	Mean	S.D	D.F	T.Cal	T.tab	Level of Sig.	Decision
Male	28	3.00	0.77	83	1.22	2.000	0.05	Not significant
Female	57	3.06	0.66					

The t-test analysis presented in Table 3 revealed that the t-calculated (t-cal) value of 1.22 is less than the t-table (t-tab) value of 2.000 at $P \leq 0.05$ levels of significance and at 83 degree of freedom (df). This showed that, there is no significant difference between the mean ratings of male and female OTM lecturers on the influence of Artificial Intelligence chatbots integration in teaching and learning of OTM lecturers in polytechnics in South East, Nigeria. Therefore, the null hypothesis of no significant difference is accepted.

Hypotheses 2: There is no significant difference between the mean ratings of male and female OTM lecturers on the influence of Artificial Intelligence simulation integration in teaching and learning of OTM courses in polytechnics in South East, Nigeria

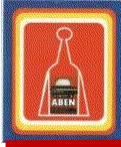


Table 4: t-test analysis of significant difference in the mean ratings of male and female OTM lecturers on the influence of Artificial Intelligence simulation integration in teaching and learning of OTM courses in polytechnics in South East, Nigeria

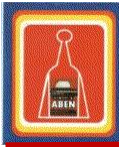
Groups	Number	Mean	S.D	D.F	T.Cal	T.tab	Level of Sig.	Decision
Male	28	2.75	0.76	83	0.62	2.000	0.05	Not Significant
Female	57	2.88	0.66					

The t-test analysis presented in Table 4 revealed that the t-calculated (t-cal) value of 0.62 is less than the t-table (t-tab) value of 2.000 at $P \leq 0.05$ levels of significance and at 83 degree of freedom (df). This showed that, there is no significant difference between the mean ratings of male and female OTM lecturers on the influence of Artificial Intelligence simulation integration in teaching and learning of OTM lecturers in polytechnics in South East, Nigeria. Therefore, the null hypothesis of no significant difference is accepted.

Discussion of Findings

The findings in research question one revealed that Office Technology and Management lecturers agreed that chatbots influence the teaching and learning of OTM programme of polytechnics in South East, Nigeria. This means that AI chatbots provide a helpful and engaging way to learn key concepts, enables interaction between lecturers and students through text or voice interface, handles routine tasks effectively, provides immediate feedback and support students learning process in OTM, contribute in improving students understanding of complex concepts and topics, allows students to learn at their own pace and revisit topics, makes learning more interactive and enjoyable, act as good learning resource for best practices and provide response without wasting time. The result is in line with the findings of Vanichavasin (2021) which stated that the application of chatbots technology in education context promote student knowledge of research yielded positive views of the chatbots as it created positive learning outcomes and provided better individualized learning experience. In the same vein, Winkler and Sollner (2018) reported that chatbots in education promised to have a significant good impact on learning success and satisfaction of students. The result revealed in hypothesis one showed that there is no significant difference in the mean ratings of male and female OTM lecturers on the influence of Artificial Intelligence chatbots integration in teaching and learning of OTM lecturers in polytechnics in South East, Nigeria. This finding agreed with the finding of Ufondu and Obi (2023) that there was no significant difference between teachers on the extent artificial intelligence is integrated on Business Education curriculum.

The findings in research question two revealed that Office Technology and Management (OTM) lecturers agreed that AI simulation influence the teaching and learning of OTM programme of polytechnics in South East, Nigeria. This means that AI simulation allow students to apply concepts in a more realistic and engaging way, improve critical thinking and decision makings skills in business scenarios, feedback helps students to identify and address their weaknesses in understanding key concepts, makes learning more interactive and stimulating, increases overall satisfaction, a valuable tool for improving the effectiveness of teaching and learning of Office Technology and Management. The result is in line with the findings of Jones and Barret (2017) which stated that simulation holds extraordinary potential for a fresh approach to teaching and learning and has the potential to provide deeper, more meaningful learning experiences that inspire, motivate, and prepare students for life. Similarly, Vanlehn (2018) noted that interactive



and dynamic AI simulations can make learning more engaging and motivating for students, lead to deeper participation higher levels of interest and improved knowledge retention. The result revealed in hypothesis two showed that there is no significant difference in the mean ratings of male and female OTM lecturers on the influence of Artificial Intelligence simulation integration in teaching and learning of OTM courses in polytechnics in South East, Nigeria.

Conclusion

Based on the findings of this study, the study concluded that OTM lecturers agreed Artificial Intelligence chatbots and simulation have positive influence on teaching and learning of Office Technology and Management courses in polytechnics in South East, Nigeria. They foster critical thinking, problem solving skills and deeper understanding of complex business system which caters for individual learning styles and needs, optimizing learning outcomes and maximizing students' potential.

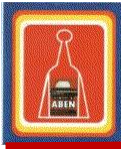
Recommendations

The following recommendations are made for the study.

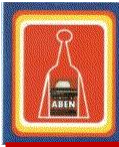
1. Polytechnics stakeholders should train and support programmes that will equip OTM lecturers with the skills to effectively design, integrate and utilize various AI tools in their instructional delivery.
2. Government should encourage the creation of high quality engaging content for chatbots and simulations that are specific to the Nigerian business context and address local entrepreneurial challenges.
3. Government should provide adequate technological infrastructure and technical support to facilitate integration and utilization of AI tools in Nigerian universities.

References

- Adamma, C. F. (2016). Assessing polytechnics students' skills Acquisition for Employability in Ebonyi State. *International Journal for Education, Learning and Development*. 4(1), 509 – 518.
- Aina, M.A., Gbenga-Epebinu, M.A., Olofinbiyi, R.O., Ogidan, O.C. & Ayedun, T.O. (2023). Perception and Acceptance of Medical Chatbot among undergraduates in Ekiti State University, Nigeria. *British Journal of Education*, 11 (11), 1-14.
- Augello, A., Gentile, M., & Dignum, E. (2018). An overview of open-source chatbots social skills. In S. Diplaris, A. Satsiou, A. Folstad, M. Vafopoulos, & T. Vilarinhua (Eds). <https://doi.org/10.1007/978-3-319-77547-0-18>.
- Benotti, L., Martínez, M. C., & Schapachnik, F. (2014). Engaging high school students using chatbots. In Proceedings of the 2014 Innovation and Technology in Computer Science Education Conference. New York, USA. <https://doi.org/10.1145/2591708.2591728>
- Brynjolfsson, E. & McAfee, A. (2014). *The second machine Age: work, progress and prosperity in a time of Brilliant Technologies*. W.W. Norton & company.
- Crescenzi-Lanna, L. (2023). Literature review of the reciprocal value of artificial and human intelligence in early childhood education. *Journal of Research on Technology in Education*, 55(1), 21-33. <https://doi.org/10.1080/15391523.2022.2128480>.
- Elhajjar, C., Karam, S & Borna, S. (2021). Artificial Intelligence in Marketing Education programs. *Marketing Education Review*, 3(1), 2-13. <https://doi.org/10.1080/10528008.2020.1835492>.
- Eze, T.I. & Ononye, A.O. (2021). Employability skills required of Office Technology and Management graduates by managers of small scale enterprises in Anambra State. *NAU Journal of Technology & Vocational Education*, 6(1), 60-68.



- Fernoagă, V., Stelea, G. A., Gavrilă, C., & Sandu, F. (2018). Intelligent Education Assistant Powered by Chatbots. *eLearning & Software for Education*.
- Hien, H. T., Cuong, P.-N., Nam, L. N. H., Nhung, H. L. T. K., & Thang, L. D. (2018). Intelligent assistants in higher-education environments: the FIT-EBot, A chatbot for administrative and learning Support. In *Proceedings of the 9th International Symposium on Information and Communication Technology*. New York, USA.
<https://doi.org/10.1145/3287921.3287937>
- Jones, J.D. & Barret, C.E. (2017). Simulation as a classroom teaching method. *i-manager's Journal on School Educational Technology*, 12(4), 47-51.
- Liu, K., Cheng, D. & Huang, J. (2019). A survey on education virtual reality. *ACM computing surveys*, 52(3), 1-42.
- Marc, S. & Marjorie, M. (2022). Artificial Intelligence and Business Education: What should be taught. *The international Journal of Management Education*.
<http://www.ijme.2022.100720>.
- Molnár, G., & Szűts, Z. (2018). The role of chatbots in formal education. In *2018 IEEE 16th International Symposium on Intelligent Systems and Informatics (SISY)*.
<https://doi.org/10.1109/SISY.2018.8524609>
- Oyinloye, O. T. & Oluwalola, F. K. (2014). Modern office instructional facilities in office technology and management in Polytechnics. A means to insecurity management in Nigeria. *Nigerian Journal of Business Education*. 1(1): 125 – 133.
- Robinson, R.N. (2018). Artificial Intelligence: Its Importance, Challenges and Applications in Nigeria. *Direct Research Journal of Engineering and Information Technology*, 5 (5), 36-41
- Shabna, C. (2024). Use of Artificial Intelligence in Education Management. *Journal of Accountants*, 55, 64-67.
- Smith, E.E., Kahlke, R. & Judd, T. (2020). Not just Digital Natives: Integrating Technologies in Professional Education Contexts. *Australasian Journal of Education Technology*, 36, 1-14. <https://doi.org/10.14742/ajet.5689>
- Ufondu, C.C. & Obi, O.C (2023). Revolutionizing Business Education curriculum: the extent of integrating Artificial Intelligence, Data Analytics and Digital Marketing Innovations. *ABEN Conference Proceedings*, 10(1), 494-501.
- Vanichvasin, P. (2021). Chatbot development as a digital learning tool to increase students' research knowledge. *International Education Studies*, 14(2), 44-53.
<https://doi.org/10.5539/ies.v14n2p44>
- Vanichvasin, P. (2022). Impact of Chatbots on Student Learning and Satisfaction in the Entrepreneurship Education Programme in Higher Education Context. *International Education Studies*, 15(6), 15-26.
- Vanlehn, K. (2018). The emergence of effectiveness research in intelligent tutoring systems. *International Journal of Artificial intelligence in Education*, 29(3), 235-252.
- Verma, M. (2018). Artificial intelligence and its scope in different areas with special reference to the field of education. *International Journal of Advanced Educational Research*, 3(1), 5-10.
- Wang, X., Han, Y., Leung, V.C.M., Niyato, D., Yan, X. & Chen, X. (2020). Convergence of Edge Computing and deep learning: A comprehensive survey. *IEEE communications surveys and tutorials*, 22(2), 869-904. <https://doi.org/10.119/COMST.2020.2970550>.
- Winkler, R., & Söllner, M. (2018). Unleashing the potential of chatbots in education: A state-of-the-art analysis. <https://doi.org/10.5465/AMBPP.2018.15903abstract>



EMPOWERING STUDENTS WITH VALUABLE SKILLS FOR ENTREPRENEURSHIP THROUGH INTEGRATING ARTIFICIAL INTELLIGENCE (AI) INTO WORD PROCESSING ACTIVITIES

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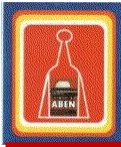
Abstract

This paper explores the intersection of education, entrepreneurship and artificial intelligence (AI) by investigating the integration of AI into wordprocessing activities to empower students with essential skills for entrepreneurship. In today's rapidly evolving world where entrepreneurship is hailed as the cornerstone of economic growth, there is growing need to equip students with the knowledge and skills necessary to thrive in an increasingly automated world of rapid advancement of AI. By integrating AI tools such as natural language processing (NLP), data analysis, automation and machine learning algorithms into wordprocessing activities, students can enhance their problem-solving abilities, develop critical thinking and develop deeper understanding of how technology can be leveraged in real-world scenarios for entrepreneurship success. This paper examines various AI powered tools and techniques that can enhance traditional wordprocessing tasks, such as automated content generation, sentiment analysis and text summarization. Furthermore it discusses the potential benefits and challenges of integrating AI into educational settings and propose strategies for effective implementation. The paper advocates for leveraging AI in education to cultivate an entrepreneurial mindset and empower students with valuable skills for future workplace.

Key words: Empowerment, Artificial Intelligence (AI) Word Processing Activities, Valuable Skills

Introduction

Entrepreneurship education is the structured training that equips individuals, particularly the youth with the knowledge, skills, and mindset necessary to develop, launch and manage their own businesses or initiatives. It goes beyond traditional business education by fostering creativity, innovation, risk taking and problem solving (Babalola, 2022). In today's rapidly evolving technological landscape and increasing competitive global environment equipping students with the skills necessary for entrepreneurship is more crucial than ever. According to Oguniyyi (2019), one of the most promising avenues for fostering these skills lies in the integration of artificial intelligence (AI) into educational tools and practices. This integration has the potential to revolutionize the way students learn and develop critical skills. Babalola (2022) stated that as artificial intelligence (AI) continues to advance, it offers innovative solutions for enhancing educational experiences, fostering creativity, and equipping students with the competencies needed to thrive in entrepreneurial ventures.



The significance of entrepreneurship education has been widely recognized with an emphasis on cultivating problem solving abilities, critical thinking and adaptability. However, many people are of the view that the traditional education approaches often fall short in providing students with hands-on experience and practical skills [Oguuleye (2020), Ajayi (2021) and Adeboye (2023)]. By leveraging AI in word processing activities, educators can create dynamic and interactive learning environment that stimulates real world entrepreneurial challenges. According to Ekekwe (2020), this approach not only engages students but also allowing them to experiment with AI – driven tools that are increasingly prevalent in the business world.

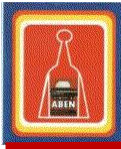
Emphasizing on the benefit of integrating AI into word processing tasks, Ogunleye (2020) stated that integrating AI into word processing tasks such as automated content generation, intelligent editing, and personalized feedback, has the capability of helping students to develop essential skills like effective communication, strategic planning and data analysis. Ajayi (2021) highlighted that by exploring the synergy between AI and entrepreneurship education educators can harness the power of technology to prepare students for the demand of the modern entrepreneurial landscape. Through innovative application of AI in word processing, students can gain a competitive edge, becoming not only proficient in traditional literacy skills but also adapt at leveraging cutting-edge technology to drive their entrepreneurial success. Thompson (2020) stated that the traditional word processing activities in the curriculum lack the integration of advanced tools such as AI. Thompson noted that without the incorporation of AI driven tools in word processing, students miss out on opportunities to develop essential entrepreneurial skills, leaving them underprepared for competitive and innovation driven demands of modern business world.

This paper seeks to explore the potential benefits and methodologies for integrating AI into word processing activities to empower students with competences required for successful entrepreneurship. It explains the concept of empowering students, goal of enabling students with valuable skills, benefits and challenges of integrating AI into educational settings and strategies for effective implementation

Empowering Students

Empowerment, particularly in the educational context, refers to the process of giving individuals (students) the tools, resources, and opportunities necessary to take control of their own lives, makes informed decision, and contribute positively to their communities. According to Adeboye (2023) empowerment is the process of enabling individuals to develop the capacity to influence decisions that affect their lives and to take action to achieve their goals. Adeboye emphasized that in the context of business education, empowerment involves providing students with practical skills, entrepreneurial knowledge, and the confidence to innovate and lead within their communities. Nwazor (2024) defined entrepreneurial knowledge as the understanding and skills necessary to identify opportunities, create and manage new ventures, and navigate the risks and uncertainties of entrepreneurship.

According to Chukwuemeka and Nwafor (2023), empowering students involves providing them with the skills, resources and confidence needed to take initiative and make decisions independently. Olumuyiwa and Ayodele (2023) described empowering student as the process by which individuals gain the ability to take control of their lives, enhancing their confidence and autonomy. Empowerment involves equipping individuals with the necessary tools, knowledge, and skills to actively participate in and influence their personal and community development (Chukwuemeka and Nwafor, 2023). Bababla (2022) stated that empowering students involves creating educational environment where student are given tools and opportunities to take control



of their learning and personal development. Ogulemde (2023) sees empowerment as equipping youth with essential skills and digital access. Ogulende maintained that empowerment is a multi-facet approach that includes enhancing digital literacy, providing job relation skills, and amplifying youth voices to support their transition from learning to earning.

Looking at empowerment from the point of view of different people, one can say that empowerment is very crucial in academic study and training and it involve actively participating in the process of changing oneself and one's environment well-being. This means that empowerment should not create dependency, it should equip individuals with the skills, knowledge and confidence to be self-reliant and make their own decisions, rather than becoming reliant on the person or system that empowered them.

Goals of Enabling Student with Valuable Skills

Empowering students with valuable skills is important for their personal development,, career readiness and overall contribution to society. According to Adesanya (2022) one of the goals of empowering students is to enhance critical thinking and problem-solving skills. Developing students ability to analyze situations, think critically, and solve problems, creativity, empower them with critical thinking skills for their ability to navigate complex societal issues and make informed decisions.

Eze (2023) stated that empowering students foster independent learning and lifelong learning. Empowering students to take charge of their own learning and continue learning throughout their lives is very important. When students are empowered to learn independently, they develop a passion for knowledge that extend beyond the classroom.

According to Oguniyi (2019) promoting technological competence in students is essential to thrive in a digital world. Equipping student with the necessary technological skills is no longer optional. It is a vital skill for students to succeed in the 21st century workforce. Enabling students with valuable skills involves building communication and collaboration skills in students. Developing students' ability to communicate effectively and work collaboratively in diverse teams is one of the goals of entrepreneurship education (Adewale, 2024). Effective communication and collaboration are the cornerstones of successful teamwork and professional relationships. Adewale (2024) stressed that instilling entrepreneurial mindset in student is vital, encouraging students to be innovative, take initiative and understand business, principles empower them to turn their ideas into reality and create opportunities for themselves and others.

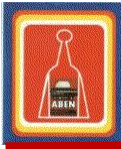
Summaring the goals of equipping students with valuable skills, Ogundele (2023) states that enabling students with valuable skills aims to prepare them for future challenges by enhancing their critical thinking, problem solving abilities, and adaptability. This empowerment fosters self-reliance, independence, and greater capacity for lifelong learning.

Benefits and Challenges of Integrating AI into word Processing Activities in Education

Benefits

According to Udu and Amadi (2013), word processing activities in education involve the use of software programs to create, format and manage digital documents, Udu and Amadi noted that word processing activities help students develop essential skills in document creation, organization and presentation. Udu and Amadi (2013) further explained that in the context of empowering students for entrepreneurship, word processing is importance as follows:

- i. Building communication
- ii. Proposal and report writing
- iii. Creativity and design
- iv. Time management and efficiency
- v. Collaboration



Integrating AI into educational settings particularly in word processing activities, offers numerous benefits in empowering students with essential skills for entrepreneurship. AI can personalize learning experiences, providing tailored content and feedback that cater to individual needs and learning styles of students helping them understand concepts more effectively (Babaola, 2022). Barbalola noticed that by integrating AI into education, especially in word processing activities, students are not only equipped with the tools to enhance their academic performance but also get essential skills for the future. They become more autonomous learners, better writers, and more critical thinkers, which ultimately prepares them for success in both their educational journey and future careers.

According to Ogunleye (2022), AI – driven word processors can also play a significant role in empowering students with valuable skills for self reliance by enhancing their communication, creativity and efficiency which are key traits for any successful entrepreneur. Ogunleye stated that AI driven tools help students develop strong writing and communication skills, which are crucial for drafting business plans, creating compelling pitches, and crafting persuasive marketing materials. AI powered suggestions for improving grammar style and tone ensure that students learn to convey their ideas clearly and professionally, which is essential in business contexts (Ajayi, 2021).

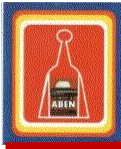
Adewale (2024) stressed that AI – driven word processing fosters creativity by assisting with data generation and content organization. They can suggest alternative phrasing, generate brainstorming prompts and help structure complex ideas, allowing students to explore different approaches to problem solving. This can be particularly useful in the early stages of developing a business concept where innovation is a key factor. Adawale (2024) noted that AI-driven tools can save time by automating repetition tasks such as formatting and proofreading, enabling students to focus on higher level strategic thinking. By mastering AI enhanced writing tools, students not only improve their communication but also learn to work more efficiently and innovatively which are skills that are invaluable in entrepreneurship.

Ekekwe (2020) observed that integrating AI in education familiarizes students with cutting-edge technologies preparing them for the digital economy. Olumuyiwa and Ayodele (2023) stated that understanding how to leverage AI in business processes gives students a competitive edge in entrepreneurship, enabling them to innovate and lead in their ventures. They emphasized that AI powered platforms can facilitate collaboration among students by matching them with peers who have complementary skills or interest. These networking capabilities enable students' relationship and partnerships, which are vital for entrepreneurial success (Ajayi, 2021).

Challenges

Challenges refer to difficult tasks or situations that test a person's abilities or resourcefulness. In entrepreneurship, challenges represent obstacles that one must overcome to achieve success. These challenges could be related to financial constraints, competition innovation or personal limitations (Adawale, 2024). Adewale stated that when it comes to empowering students for entrepreneurship, challenges serve as practical learning opportunities. Adewale identified these challenges and enumerated how these challenges serve as opportunities as follows;

- i. Learning through Experience. Challenges force students to engage in real world problem solving
- ii. Risk Taking and innovation; facing challenges helps students become comfortable with uncertainty and risk
- iii. Building resilience
- iv. Developing leadership and team work
- v. Enhancing adaptability



According to Adefolalu and Okebukola (2020), integrating AI into educational settings, particularly in word processing activities presents several challenges. Adefolalu and Okebukola highlighted that the use of AI raises questions about data privacy, intellectual property and the authenticity of student work as it may be difficult to determine the extent to which a student's work is their own. Adeboye (2023) stressed that there are ethical concerns and the potential for overreliance on AI tools. Adeboye noted that while AI can enhance word processing by offering suggestions, grammar corrections and content generation, there is a risk that students may become too dependent on these technologies. This reliance could undermine the development of critical thinking and creative problem solving skills, which are essential to entrepreneurship.

Uzo (2021) identified the need for teachers and students to develop new competences as a challenge in integrating AI into word processing activities in education. Teachers may not be conversant with AI tools or competent enough to integrate them into the curriculum as required. Again, students need to learn how to use these tools which most times are complex. Without good training the potential benefits of AI in word processing such as improving writing skills and automating repetitive tasks, may not be fully realized, limiting its impact on student empowerment. According to Oguniyi (2019), one of the primary issues in integrating AI into word processing activities in education is the lack of access to necessary technology and infrastructure. In many educational institutions, students may not have adequate access to the required software or reliable internet. This can leave some students at a disadvantage and hindering their ability to acquire essential word processing and entrepreneurial skills.

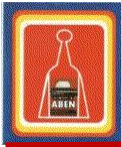
Strategies for Effective Implementation

To effectively integrate AI into word processing activities in education it is essential to start with a comprehensive infrastructure upgrade. Schools and educational institutions need to ensure that they have the necessary technology in place, such as up-to-date computers, reliable internet access and the AI enabled software. Olumuyiwa and Ayodele (2023) suggested that governments and educational bodies can partner with technology companies to provide affordable access to those resources. This is important to ensure all students have opportunity to engage with AI tools, which can significantly enhance the word processing skills and proper them for entrepreneurial ventures.

According to Uzo (2021) professional development for teachers is a critical strategy in integrating AI into education. Educators need to be competent and well-versed in using AI tools in their teaching method. Training programmes should be designed to familiarize, educate and to equip them with the skills to teach students how to use AI technologies effectively.

AI enhanced curricula that incorporate word processing activities to develop entrepreneurial skills, such as writing business plans, creating marketing materials, and managing digital communication is essential is crucial. Continuous opportunities for teachers to share best practices can also enhance the successful integrating of AI into education settings (Ekekwe, 2020).

Thompson (2020) pointed out that students should be taught not only how to use AI tools but also how to use them responsibly. Fostering a balanced and ethical use of AI is important. This includes making students understand the importance of not relying so much on AI for content creation and recognizing the value of human creativity and critical thinking. Students should be taught the importance of data privacy, digital ethics and the limitation of AI. Guiding students in using AI as a supportive tool rather than relying on AI excessively and unnecessarily can empower them



with skills needed for entrepreneurship, where innovation, problem solving and ethical considerations are crucial for success.

Adefolani and Okebukola (2020) outlined the strategies for effective implementation of AI in word processing activities for students empowerment to include the following:

- i. Curriculum design and integration
- ii. Teacher training and support
- iii. Student centered learning approaches
- iv. Practical applications and real world secretaries
- v. Evaluation and continuous improvement
- vi. Ethics and responsible use of AI

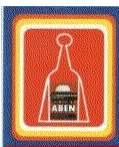
Conclusion

Integrating artificial intelligence (AI) into word processing activities is a strategic approach to empowering student with essential entrepreneurial skills. By merging AI capabilities with traditional word processing tasks such as text entry and editing, formatting text, page layout, spell check and grammar check, tables creation and management and document review etc, students can enhance their creativity, critical thinking and problem solving abilities which are essential attributes for successful entrepreneurship. AI tools can foster a learning environment where students are better equipped to develop business ideas, create compelling proposals, and communicate effectively in the professional world. Integrating AI into word processing prepares students for the digital economy and cultivate a mindset of innovation and adaptability. Students who are equipped with AI enhanced word processing skills will likely be more confident and capable of leveraging these tools to create, innovate and manage business effectively. Integrating AI into word processing activities equips students with advanced technical skills that enhance creativity and efficiency essential for entrepreneurial success. One major challenge is that the reliance on AI in word processing may reduce students' fundamental writing skills and critical thinking if not properly balanced with traditional learning methods. Strategies to effectively implement the integration of AI into word processing activities include providing educators with comprehensive training on AI tools and their application in word processing, encouraging students to work on group projects that involve real world application and ensuring that students regularly engage with these technologies through practical assignments and projects.

Recommendations

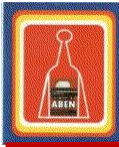
To guarantee that students are effectively empowered with valuable entrepreneurial skills through the integration of artificial intelligence into word processing activities, the following recommendations are drawn;

1. Integrating AI- powered tools into word processing curricula to help students develop critical thinking and problem solving skills.
2. Incorporate real-world AI applications in entrepreneurship projects to provide students with practical experience and market relevant skills.
3. Address potential challenges by providing AI training for educators, ensuring they can effectively teach and guide students.
4. Promotion of collaboration behaviour AI-experts and educators to create customized learning resources that align with entrepreneurial goals.
5. Implementation of continuous assessment and feedback mechanisms to monitor students progress and adapt AI based learning strategies accordingly.



References

- Adeboye, O.A. (2023). Empowering the next generator: Strategies for business education in Nigeria. *Nigerian journal of business education*.
- Adefolalu, F.A., & Okebukola, P.A. (2020). Leveraging technology in entrepreneurship education: A focus on artificial intelligence. *Nigerian journal of educational technology* 8(3), 45-59.
- Adesanya, A. (2022). Critical thinking and education. Lagos: Green Field press.
- Adewalo, K. (2024). Entrepreneurship in education: Cultivating innovation. Kaduna Beacon Press.
- Ajayi, O. (2021). Empowering the Nigerian student strategies for effective learning and development Lagos. Educational press.
- Akudoly, C.A. & Onyeneke, E.N. (2022). Digital skill gap among business education graduates of tertiary institutions in Anambra State: implication for programme re-adjustment. *Nigerian journal of business education*, 9 (1), 231 – 241.
- Babalola, J.B. (2022). Students empowerment in Nigerian education: challenges and opportunities: Ibadan, University press Plc.
- Chukwuemeka, E. & Nwafor, J. (2023). The role of Education in empowering Nigerian women. *Nigeria journal of social sciences*. 22(1) 89 - 102.
- Ekekwe, N. (2020). Harnessing AI for economic empowerment in Africa: Harvard business review Africa, August 2020 Edition.
- Eze, C. (2023). Independent learning in Digital age Aba: Stella publisher.
- Nwazor, J.C. (2014). Business Education Curriculum and new technologies: guidelines for review. *Nigerian Journal of business education* 1 (3). 19-22.
- Nwosu, D. (2024). Technology and Education: Bridging the gap: Enugu. Sunrise Books.
- Obaji, N.O. & Olugu, M.U. (2014). The role of government policy in entrepreneurship development *Science Journal of Business and Management* 2 (4), 109 – 115. Doi:10.11648/j.sj6m.20140204.12.
- Ogulende, M. (2023). The Hon commissioner for the Lagos State Ministry of youth and social development (UNICEF) Nigerian Queries.
- Oguniyi, M.B. (2019). Innovation approaches to integrating ICT into Nigerian schools for skill acquisition. *Journal of educational media and technology in Nigeria*, 23(2), 79 – 95.
- Ogunleye, A. (2020). Building future leaders: empowering students through education Nigeria. Abuja, Harmony Publishers.
- Okonkwo, F. (2023). Communication skills for the modern student. Ibadan: heritage Publications.
- Olumuyiusa, O. & Ayodele, A. (2023). Empowerment strategies for Nigerian youth. *Journal of Nigerian educational research* 15(2), 45-58.
- Thompson, A.B. (2020). Strategies planning and resource allocation in business. *Journal of business strategy*, 12(3), 45-60.
- Udu, A.A. & Amadi, E.E. (2013). Integrating entrepreneurship education in the higher education curriculum: *The Nigeria Experience Journal of Education and Practice*, 4(3), 61-66.
- Uzo, A. (2021). Artificial intelligence in education: strategies for integration and implementation, Nigerian education research and development council (NERDC) special Issue 12-26.



APPLICATION OF ARTIFICIAL INTELLIGENCE IN COURSE DELIVERY BY BUSINESS EDUCATORS IN PUBLIC UNIVERSITIES IN CROSS RIVER STATE, NIGERIA

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Abstract

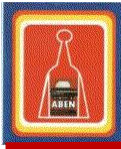
The study determined application of artificial intelligence in service delivery among business educators in public universities in Cross River State, Nigeria. Two research questions and two hypotheses guided the study. The population of the study was 48 business educators drawn from the two public universities in the State namely: University of Calabar and University of Cross River State. The entire population was studied since it was small and manageable. The instrument for data collection was structured questionnaire titled: Application of Artificial Intelligence in Business Education Course Delivery Questionnaire (AAIBECODEQ) which was validated by three experts: two in Business Education and one in Measurement and evaluation, in the Department of Business Education and Department of Educational Foundations, University of Calabar respectively. The Cronbach Alpha reliability index was used to determine the overall reliability coefficient of 0.85. Out of 48 copies of questionnaire administered, 45 copies were successfully retrieved. Mean and standard deviation were used to answer the research questions while independent t-test was used to test the hypotheses at 0.05 level of significance. The findings revealed problems and prospects of effective application of AI in business education course delivery which includes: unavailability of AI-based resources and tools in the universities, inability to develop appropriate pedagogical strategies using AI and provision of cybercrime reduction tools. The following recommendations were made among others: Software package providers should provide AI tools and resources suitable for Nigerian curriculum for easy application in business education service delivery.

Keywords: Business Education, Artificial Intelligence (AI), Business Education Delivery

Introduction

Technology is the solution to many problems in the world ranging from health, social, economic and educational problems. This has necessitated the quest for more sophisticated modern technologies for solution to more complex problems in the world. This led to the discovery of artificial intelligence which has the capacity to act like human intelligent. To keep pace with the development of technology and to solve most educational problems, educationists including business educators have adopted the use of artificial intelligence in service delivery.

Business education is a programme of study which comprises four parts- creating awareness in occupations, preparing youths for work in business occupations, preparing people to become better citizens and consumers of goods and services, and preparing business teachers (Azuka & Nwosu 2018). Also, Otum and Akeke (2023) mathematically summarized the term business education as follows: Business Education (BE) = Vocational Business Education (VBE) + General Business Education (GBE). That is, $BE = VBE + GBE$. Business education is that aspect of Vocational Education which involves the preparation of learner with relevant skills, knowledge, competencies ability values and experience needed to perform effectively in a specific business occupation either as employee or entrepreneur (Otum and Oduma 2022). Business education is an interrelated discipline that connects science (data and word processing, spread sheet, database management), mathematics (business mathematics and statistics), humanities



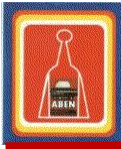
(business communication, comparative management), law (business law), economics (micro and macroeconomics, marketing), and administration (office practice, office administration and management).

Artificial intelligence has been conceptualized by different experts. According to Al-Qasim in Ayad, Abdelghani, Halali, and Muwafak (2021), Artificial Intelligence was introduced by an American scientist known as John McCarthy in 1956 and who also defined it as "the science of intelligent machine engineering, especially smart computer software, or a branch of computer science that aims to create intelligent machines". Artificial Intelligence is a range of new methods and methods of programming accounting systems, which are used to develop systems that mimic certain elements of human intelligence, and allow them to conclude facts and laws that are represented in computer memory (Al-Jabri and Al-Issawi, 2020). Also, Kaplan and Haenlein in Sollosy and McInerney (2022), defined AI as systems to interpret external data and to learn and use those learnings to achieve a specific goal or task through adaption.

Artificial Intelligence is a highly sophisticated technological devices which imitate human intellectual acumen through technology training and imputation such knowledge using algorithms to perform task to ease human efforts and retain the information using computer memory. Artificial intelligence is a technological device that thinks and acts using human intelligence to successfully perform specialized tasks ordinarily done by man. Artificial intelligence is the use of human ingenuity to control technological equipment. AI is interdisciplinary, requiring the integration of data management, database systems, data warehousing, natural language processing, network analysis, social networking, optimization, and statistical analysis.

As a field of study, business education plays a vital key role in forming the future workforce and manpower development by providing students with the fundamental knowledge and skills required for the rapidly changing business world. AI integration has the capacity to be beneficial to business education, including personalized learning, increased engagement, and the growth of critical thinking and problem-solving abilities (Luckin, Holmes, Griffiths & Forcier, 2016). The educational experience can be readily revolutionized by AI-driven systems that offer real-time feedback, adaptable learning pathways, and access to a wide range of resources (Schmidt & Cohen, 2013). According to Elhajjar, Karam and Borna in Surugiu, Grădinar and Surugiu (2024) opined that integrating AI into business education will assist to equip students with skills essential for future jobs and digital society's demands. Cope, Kalantzis and Sears (2021) underline the role of AI in the assessment process, not in the conventional form, but especially related to tracking progress and providing "just-in-time feedback. Huang and Rust (2018) examined potential benefits of AI for fostering the entrepreneurial skills of college students. Their research indicates that AI tools such as machine learning and predictive analytics significantly improved students' ability to identify commercial opportunities and provide innovative solutions. Also, Saheb (2020) study examined the impact of AI on the critical thinking and problem-solving skills of business students. He found that the utilization of artificial intelligence (AI) tools, like virtual reality and simulation software, promoted a more dynamic learning environment that improved students' critical thinking and entrepreneurial skills. Similarly, Zawacki-Richter, Marín, Bond, and Gouverneur (2019) reviewed a comprehensive analysis of AI applications in higher education. The review highlighted the increasing application of AI technology in customized education and stated that these tools have the potential to significantly enhance business education by helping students develop their entrepreneurial skills and by tailoring the curriculum to their individual needs.

Many Universities and Colleges have begun incorporating AI-based tools and approaches into their curricula, ranging from foundational business courses to specialized programs in data



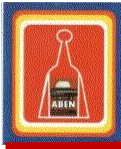
science and machine learning (Davenport & Ronanki, 2018). Several aspects of education have improved as a result of these artificial intelligence (AI) tools and techniques, including: Students' ability to use AI-powered tools to analyze and visualize large datasets (Huang and Rust, 2018), students ability to employ AI algorithms to create realistic business simulations (Nambisan, 2017), Increase in Personalized learning through the use AI-powered adaptive learning systems to modify assignments and assessments to suit the needs of students and improving academic performance (Nambisan, Wright & Feldman, 2019). In addition, application of Artificial Intelligent in business education course delivery has the following benefits: Motivating students learning habit; improving students' performance; increasing productive interactions and relationships among students and lecturers as well as empowering students with diverse online skills and encouraging inveterate learning. The major motive of application of Artificial Intelligence is to refine and erect both students' learning and lecturers' service delivery skills as well as ensuring effective learning and teaching process both in the classroom and outside the classroom environment.

Despite the benefits of incorporating AI into business education, there are a number of challenges that educators must be overcome before AI can be widely implemented and utilized in business education in Cross River State universities. These challenges include: Many business educators' inability to successfully integrate AI into their curriculum (Davenport and Ronanki, 2018). According to Nambisan et al. (2019), it is critical to carefully consider how AI fits with overall learning objectives and outcomes when incorporating it into business school courses. There is high threat of cybercrimes associated with proliferation of internet access and fraudsters hack into people's bank account, email and other sensitive private information (Okute, Enang and Etoma, 2022). This online crime has scared most business educators from the use of AI in work performance.

Other challenges include lack of qualified personnel, resistance to change, financing and inadequate infrastructure (Oladipo, 2018). Furthermore, these difficulties are made worse by the difference in advancement of technology between urban and rural areas, which results in unequal access to high-quality education (Adebayo & Iweala, 2020). Also, Amadi and King (2018) posited that the high cost of acquiring, installing and maintaining Information Communication technology has greatly hindered the acquisition of skills among Business Education students in Nigeria. Similarly, Oduma and Otum (2022) identified infrastructure, finance, students and lecturers as factors that hinder the use of modern technology in educational pedagogy, while Adebayo & Iweala, (2020), identified limited access to dependable internet and contemporary computing facilities. Financial limitations also make these difficulties worse.

Universities' capacity to invest in essential resources and training programs is severely restricted by a widespread problem of inadequate funding for technology breakthroughs including AI integration (Eze, 2019). Furthermore, Otum and Akerele (2019) highlighted the following problems of ICT utilization as: inadequate provision of modern technologies, lecturer's poor skill up-date and irregular power supply mitigate against the effective implementation of the Business Education curriculum.

Notwithstanding the challenges associated with application of AI, it is impossible to discount AI's potential to improve business education. Effective methods and solutions must be explored immediately in order to remove the obstacles preventing the successful integration of AI in the educational sector (Ibrahim, 2021). The ethical and sociological implications of AI must also be considered to guarantee that it is included into higher education in a responsible and inclusive manner (Davenport & Ronanki, 2018). Also, Otum and Akerele (2019) identified some strategies for overcoming challenges of application of AI as adequate provision and installation of emerging



technologies, collaboration between institutions and industries as well as provision of alternative power supply during lectures. Infrastructure Enhancement through free access to relevant AI tools and platforms, modernizing computer facilities, and enhancing internet connectivity. (Nambisan, 2017). Capacity Building, Training and Retraining through collaboration with IT firms and business leaders might yield useful resources and training and retraining chances of personnel handling the AI courses. Financial Support and Resource Allocation through diaspora funding should be encouraged.

Statement of the Problem

The application of artificial intelligence (AI) in business education holds great promise for improving learning outcomes and providing students with the necessary skills to thrive in the constantly evolving corporate landscape. Artificial intelligence is a relief to business educators from strenuous activities of service delivery and as an innovative way of lecture delivery to ensure students acquisition of adequate technological skills needed in the modern offices, industries and businesses. Although promising, the use of AI in Nigerian universities especially in Cross River State has not been feasible. Though, many scholars have emphasized the need for application of AI tools in teaching and learning, yet effective application of Artificial Intelligence in business education service delivery is still unrealistic in Nigeria especially Cross River State. Therefore, this study aimed to methodically pinpoint the main barriers to AI application business education service delivery, and offer calculated strategies to get around them.

Purpose of the Study

This study's main goal is to investigate the factors that militate against the effective application of artificial intelligence (AI) in business education and possible solutions in Universities in Cross River State, Nigeria. Specifically, this study aimed to:

1. Investigate the problems of effective application Artificial Intelligence in business education service delivery by Business Educators in Public Universities in Cross River State.
2. Ascertain the prospects of effective application of AI in business education service delivery by Business Educators in Public Universities in Cross River State.

Research questions

This study addressed the following questions;

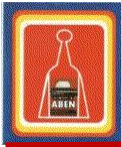
1. What are the Problems of effective application Artificial Intelligence in business education service delivery by Business Educators in Public **Universities** in Cross River State?
2. What are the Prospects of effective application Artificial Intelligence in business education service delivery by Business Educators in Public Universities in Cross River State?

Research Hypotheses

1. There is no significant difference between the responses of respondents on Problems of effective application Artificial Intelligence in business education service delivery **by Business Educators in Public Universities** based on gender (male and female)
2. There is no significant difference between the responses of respondents on the Prospects of effective application Artificial Intelligence in business education service delivery **by Business Educators in Public Universities** based on ownership (Federal or State).

Research Methodology

The study adopted descriptive research design. The area of study was Cross River State which harbours many tertiary institutions including federal, state and private institutions. In the



course of this study, only public universities were considered, namely: University of Calabar (Unical - federal) and Cross River State University (Unicross - State). The two public universities in Cross River State who offer business education namely: University of Calabar and University of Cross River State. The population was forty-eight (48) comprising of Thirty-two (32) and sixteen (16) Business Educators from the two universities respectively. Purposive sampling method was adopted. Purposive sampling is a non-probability sampling technique where the researcher intentionally selects participants based on specific characteristics or criteria relevant to the research question in selecting universities that represent a diverse range of characteristics, such as size (large, medium, small) and ownership (federal or state). This method helps the researcher to gather detailed and valued insights about the topic. This is necessary because within each selected university, participants were business education academic staff who are involved in business education course delivery. Again, since the entire population size is below one hundred (100), the entirety of the population was sampled thereby serving as the sample size. The instrument for data collection was structured questionnaire titled Application of Artificial Intelligence in Business Education Course Delivery Questionnaire (AAIBECDQ). The instrument was structured considering the purposes of the study, the research questions and the research hypothesis. The instrument was made up of two sections namely: A and B. Section A contained information on three demographic variables namely: name of institution, sex, ownership of university (federal and state). Section B was divided into two sub sections. Sub section A consisted of 10 items measuring the: Problems of effective application of Artificial Intelligence in business education course delivery. Sub section B consisted of 10 items measuring the prospects of effective application of Artificial Intelligence in business education course delivery. The items were arranged on a four-point rating scale. The response options for sub section A and B were Strongly Agree (SA) -4 points, Agree (A) - 3 points, Strongly Disagree (SD) -2 points, Disagree (D) - 1 point. The instrument was validated by three experts viz: two business educators and one measurement and evaluation expert whose corrections and suggestions helped to improve the quality of the instrument. The reliability of the instrument was tested using Cronbach Alpha reliability index which gave a reliability coefficient of 0.85. The researchers personally administered the copies of questionnaire to the respondents. Direct delivery and retrieval method were adopted in the administration and retrieval of the questionnaire. However, out of 48 copies of the questionnaire printed, 45 copies were successfully administered and retrieved. Using the data collected, mean and standard deviation were used to answer the research questions while independent t-test was used to test the null hypotheses at 0.5 Level of significance. The degree of agreement or disagreement was determined by finding the mean of the nominal values assigned to each option. Based on the 4-point rating scale, the mean score of the scale was 2.50. **The mean score** was derived by adding the nominal value of the rating scales and divided by the same number of cases. Therefore, 2.50 was used as the benchmark for the decision rule. Any item in the instrument with a mean score of 2.50 and above was seen as a problems and prospects of effective application of Artificial Intelligence in business education service delivery. For testing the hypothesis, the decision rule was to reject H_0 if and only if, the calculated value (t_{cal}) is greater than or equal to ($\geq$) the tabulated value (t_{tab}), otherwise accept.

Results:

Research Question 1: What are the Problems of effective application Artificial Intelligence in business education service delivery in Cross River State? The answer to this research question is presented Table I.

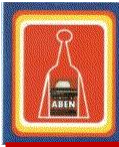


Table1:Mean and standard deviation on problems of effective application Artificial Intelligence in business education service delivery.

S/ N	Problem Statement	MALE			FEMALE		
		Mean	SD	Rmks	Mean	SD	Rmks
1	Poor AI competence among business educators	3.00	0.70	Agree	3.50	0.60	Agree
2	Moral queries of data privacy and algorithmic bias	2.50	0.67	Agree	3.50	0.65	Agree
3	Poor staff development programme strategy	2.80	0.80	Agree	3.00	0.70	Agree
4	unavailability of AI-based resources and tools in the universities	3.10	0.65	Agree	3.40	0.55	Agree
5	Inability to develop appropriate pedagogical strategies using AI	2.70	0.78	Agree	3.10	0.68	Agree
6	Inability to coordinate AI integration with business education objectives	2.60	0.77	Agree	3.00	0.67	Agree
7	Educators are still in the dark on benefits of AI in service delivery	2.67	0.82	Agree	3.10	0.72	Agree
8	Inability of the universities to provide free WIFI in the school	2.80	0.70	Agree	3.50	0.60	Agree
9	Security threat nature of AI	2.50	0.80	Agree	3.20	0.70	Agree
10	Poor supply of electricity in the university.	2.90	0.72	Agree	3.30	0.62	Agree
Grand Mean		2.76	0.74	Agree	3.26	0.65	Agree

Table 1 reveals that all the items have mean scores greater than and equal to 2.50 which means that the respondents agreed to all the items as problems of effective application of AI in business education service delivery.

Research Question 2: What are the prospects of effective application of Artificial Intelligence in business education service delivery in Cross River State? The answer to this research question is presented in Table.

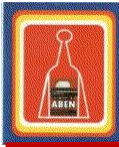


Table2:Mean and standard deviation on prospects of effective application Artificial Intelligence in business education servicedelivery.

S/N	Items	Male Mean	SD	Rmks	Female Mean	SD	Rmks
1.	Business educators should ensure adequate AI competence acquisition among them,	3.50	0.65	Agree	3.80	0.45	Agree
2.	Technologists should software for data privacy and algorithmic bias elimination	3.20	0.70	Agree	3.60	0.50	Agree
3.	University should provide staff development programme on proper integration of AI tools in pedagogy	3.00	0.75	Agree	3.50	0.60	Agree
4.	There should be adequate provision of AI-based resources and tools in the university	3.10	0.65	Agree	3.70	0.45	Agree
5.	Appropriate pedagogical strategies using AI should be developed	3.00	0.70	Agree	3.40	0.55	Agree
6.	There should be a match between AI integration and business education objectives	2.90	0.80	Agree	3.30	0.60	Agree
7.	Educators should conduct research on benefits of AI in service delivery	3.00	0.75	Agree	3.50	0.60	Agree
8.	Management should provide free WIFI in all parts of the university	2.80	0.70	Agree	3.40	0.55	Agree
9.	Software developers should provide cyber-crime reduction tools	3.10	0.65	Agree	3.60	0.50	Agree
10.	University alumni and philanthropists should assist in providing alternate power supply to reduce financial burden of the management	3.20	0.70	Agree	3.70	0.55	Agree
Grand Mean		2.78	0.71	Agree	3.55	0.54	Agree

Table 2 reveals that all the items on the questionnaire have mean scores above 2,50 which means thatboth male and female respondents agreed that all the items are prospects of effective application of AI in business education.

Test of Hypothesis

Hypothesis 1: There is no significant difference between the responses of respondents on Problems of effective application Artificial Intelligence in business education service delivery in Cross River State based on gender (male and female)

Table 3: Summary of T-test result of responses of respondents on Problems of effective application Artificial Intelligence in business education service deliverybased on gender.

Respondents	No.	Mean	SD	Df	T-cal	p-Value	Level sig	of Decision
Male	26	16.38	3.16	43	1.68	0.002	0.05	Not Sig.
Female	19	14.72	2.83					

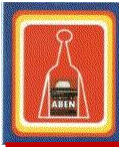


Table shows a t-calculated value of 1.68 (which is less than t-tabulated value of ± 1.98) and a P-value of 0.002 which is less than 0.05 level of significance. Consequently, the null hypothesis was accepted indicating that there is no significant difference between the responses of respondents on Problems of effective application Artificial Intelligence in business education service delivery in Cross River State based on gender in Cross River State.

Hypothesis 2: There is no significant difference between the responses of the lecturers on the Prospects of effective application Artificial Intelligence in business education service delivery in Cross River State based on ownership (Federal or State)

Table 4: Summary of T-test result of responses of respondents on Prospects of effective application Artificial Intelligence in business education service delivery in Cross River State based on ownership (Federal or State).

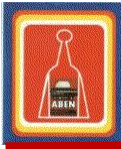
Respondents	No.	Mean	SD	Df	t-cal	Pvalue	Level of sig	decision
Federal	30	15.42	4.32	43	1.33	0.01	0.05	Not Sig.
State	15	16.19	3.05					

The data in the above Table reveals a t-calculated value of 1.33 (which is less than t-tabulated value of ± 1.984) and a P-value of 0.0067 which is less than 0.05 level of significance. Therefore, the null hypothesis was accepted showing that there is no significant difference between the responses of the lecturers on the Prospects of effective application Artificial Intelligence in business education service delivery in Cross River State based on ownership (Federal or State). This shows that all the respondents share similar view irrespective of the ownership of their universities.

Discussion of findings

The result of table1 revealed that there are various problems facing effective application of Alin business educationservice delivery such as poor AI competence among business educators, moral queries of data privacy and algorithmic bias, Poor staff development programme strategy, unavailability of AI-based resources and tools in the universities, Inability to develop appropriate pedagogical strategies using AI, Inability to coordinate AI integration with business education objectives, most business Educators are still in the dark on benefits of AI in service delivery, Inability of the universities to provide free WIFI in the school. Security threat nature of AI and Low level of mathematical competence among educators.This is supported by Okute, Enang and Etoma (2022) who stated there is high threat of cybercrimes associated with proliferation of internet access and fraudsters hack into individuals bank account, email and other sensitive private information. Eze, (2019), who identified inadequate funding for technology as a hinderance to AI integration into business education and Oduma and Otum (2022) who identified infrastructure, finance, students and lecturers as factors that hinder the use of modern technology in educational pedagogy, while Adebayo & Iweala, (2020), identified limited access to dependable internet and contemporary computing facilities.

The findings revealed various prospects of effective application of AI business education service delivery such asadequate AI competence acquisition among them, technologists should develop software for data privacy and algorithmic bias elimination, University shouldprovide staff development programme on proper integration of AI tools in pedagogy, there should be adequate provision of AI-based resources and tools in the university, appropriate pedagogical strategies using AI should be developed, There should be a match between AI integration and business



education objectives, Educators should conduct research on benefits of AI in service delivery, management should provide free WIFI in all parts of the university, educators should conduct research on benefits of AI in service delivery, software developers should provide cyber-crime reduction tools and software and university alumni and philanthropists should assist in providing alternate power supply to reduce financial burden of the management. This is in consonant with the opinion of Zawacki-Richter, Marín, Bond, and Gouverneur (2019) who stated that tools have the potential to significantly enhance business education by helping students develop their entrepreneurial skills and by tailoring the curriculum to their individual needs. Also, the finding is supported by (Huang & Rust, 2018) who mentioned the need for provision of Artificial intelligence (AI)-based tools and techniques.

Conclusion

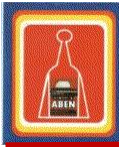
The swift advancement of artificial intelligence (AI) has significantly transformed educational sector as such the problems of application of AI in business education should be given adequate attention, considering the prospects identified in this work. This is to ensure that business education keeps pace with the development of technologies across the globe and improve the technological skills acquisition among its graduates for favourable competition in business and work environment.

Recommendations

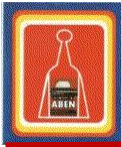
1. There should be adequate provision of AI-based resources and tools in the universities for effective utilization of AI in business education pedagogy.
2. Software developers should provide cyber-crime reduction tools to encourage business educators adoption of AI.

References

- Surugiu, C., Grădinaru, C. & Surugiu, M.R., (2024). Artificial Intelligence in Business Education: Benefits and Tools. *Amfiteatru Economic*, 26(65). 241-258.
- Otun, N. I. & Oduma, C. A. (2022) School Constraints to the Use of Modern Instructional Technologies in Business Education in Public Universities in South-South Geo-Political Zone, Nigeria. *Academic Journal of Current Research*, 9 (9) 19-31.
- Azuka, B. E. & Nwosu, B. O. (2018). *Foundations of business education*. Onitsha: Noben Press Ltd. Journal 26(2), 129-150.
- Okute, A.L., Enang, C. E. & Etoma, M.G. (2022). Framework for Digital Skills Acquisition for Global Competitiveness by Business Education Students of Tertiary Institutions in Nigeria. *Nigeria Journal of Business Education* 9(2) 172-182.
- Ayad, L. Abdelghani, M. Halali, A. & Muwafak, B. M (2021). Applications of Artificial Intelligence in Business, Education and Healthcare, *Studies in Computational Intelligence* 954, https://doi.org/10.1007/978-3-030-72080-3_1
- Adebayo, F. A., & Iweala, E. E. (2020). Technology and education: Bridging the gap in Nigerian education. *Journal of Educational Technology*, 15(3), 45-59.
- Cope, B., Kalantzis, M. and Sears, D., (2021). Artificial intelligence for education: Knowledge and its assessment in AI-enabled learning ecologies. *Educational Philosophy and Theory*. e-journal. 53(12), 1229-1245. Retrieved on 24th July, 2024 from <https://doi.org/10.1080/00131857.2020.1728732>
- Creswell, J. W. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Lagos: Sage Publications. 21, 5-31



- Sollosy, M. & McInerney, M. (2022). Artificial intelligence and business education: What should be taught. *The International Journal of Management Education*. Retrieved from: <https://doi.org/10.1016/j.ijme.2022.100720> on 12th August, 2024.
- Al-Jabri, Z. M. O., & Al-Issawi, I. (2020). Artificial diversity and its role in the Emirati Human Genome Project (Study in the Light of Islamic Jurisprudence) (209).
- Eze, S. C. (2019). Strategies for integrating AI into the Nigerian education system. *African Journal of Educational Management*, 24(2), 112-128.
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence Unleashed: An Argument for AI In Education*. Pearson Education. 12(5) 10-31
- Oladipo, B. (2018). Challenges of implementing AI in Nigerian education. *Journal of Educational Research and Reviews*, 13(4), 210-224.
- Otum, N. I. & Akeke, M. N. G. (2023). Nascent Trends in Education in the Pandemic of Covid- 19 in Nigeria. In C. C. Chukwurah, A. L. Okute, M. N. G. Akeke, S. B. Undie & E. E. Okon (Eds.). *Nascent Trends in Education in the Pandemic of Covid-19 in Nigeria: A Festschrift in Honour of Venerable Professor G.C.E. Duruamaku-Dim*. Calabar: University of Calabar Press.
- Schmidt, E., & Cohen, J. (2013). *The new digital age: Reshaping the future of people, nations, and business*. Random House.
- Amadi, J. O. & King, K. O. (2018). Challenges of Business Education Students in Acquiring Information Communication Technology (ICT) Skills For National Development in River State. *Nigerian Journal of Business Education*, 5(1), 195-202.
- Otum, N. I. & Akerele, B. O. (2019). Challenges and Strategies for Effective Implementation of Business Education Curriculum for Relevant Skills Development among Students of Business Education in Cross River State. *A Journal of Vocational and Technical Educators of Nigeria*. 24(2) 32-38.
- Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, 96(1), 108-116.
- Huang, M. H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of Service Research*, 21(2), 155-172
- Nambisan, S. (2017). *Digital Entrepreneurship: Toward A Digital Technology Perspective Of Entrepreneurship*. *Entrepreneurship Theory and Practice*, 41(6), 1029-1055.
- Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of entrepreneurship: Progress, challenges and key themes. *Research Policy*, 48(8), 103773.
- Saheb, T. (2020). The Impact of Artificial Intelligence on Entrepreneurship Education. *Journal of Entrepreneurship Education*, 23(3), 176-208.
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic Review Of Research On Artificial Intelligence Applications In Higher Education – Where Are The Educators? *International Journal of Educational Technology in Higher Education*, 16(39) 327-335.



ADOPTION AND IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE (AI) TOOLS FOR BUSINESS EDUCATION DELIVERY IN TERTIARY INSTITUTIONS IN BAYELSA STATE

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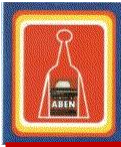
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Abstract

Given the rapidly changing nature of the business industries occasioned by technological advancement, business education delivery method needs to change as well. The traditional business education method as we have it, may not foster the much needed creativity and innovation to adapt to new challenges and opportunities in the business world. It is therefore essential to understand how AI tools can be effectively leveraged in business education to provide students with the skills and knowledge they need to succeed. This study therefore seeks to validate empirically, while investigating the adoption and implementation of artificial intelligence tools in enhancing business education delivery in tertiary institutions in Bayelsa State. The study adopts quantitative research design using a survey method. The population of the study was drawn from all students in the department of business education from the three tertiary institutions in Bayelsa State. Respondents from the various institutions were surveyed through questionnaire administration. The reliability of the instrument was tested using Cronbach Alpha and a reliability coefficient of 0.91 was obtained. Data analysis was done using descriptive statistics such as mean and standard deviation while inferential statistics was done using z-test statistics at 0.05 level of significance. The findings from the analysis result reveal no significant difference in the mean rating of respondents on the adoption and implementation AI-powered chatbots, virtual reality, and content recommendation engine in enhancing business education delivery in tertiary institutions in Bayelsa State. It was concluded that Artificial Intelligent tools when adopted and implemented will enhance business education delivery in tertiary institutions in Bayelsa State to a very high extent. The study therefore recommends that tertiary institutions should integrate AI tools like chatbots, virtual reality into their business education delivery, taking advantage of the personalized, interactive, and effective learning experiences that these tools can provide.

Keywords: Artificial Intelligence, Artificial Intelligence (AI) Tools, Business Education Delivery, Business Graduates, Technological Advancement.



Introduction

The primary goal of business education is to prepare learners with the essential competencies, practical skills, and ethical values required to thrive in the business world and contribute meaningfully to economic development. It covers foundational disciplines like finance, accounting, marketing, management, and information systems. Students are expected to acquire not only theoretical knowledge but also practical capabilities in communication, teamwork, critical thinking, and decision-making. Furthermore, business education encourages the development of ethical standards, a sense of social responsibility, and sustainable practices aimed at creating a positive societal impact. It fosters innovation and creative thinking by equipping students to recognize and seize emerging market opportunities (Darrell & Seifert, 2020).

However, the continuous evolution of the business sector—driven by rapid technological changes—necessitates a transformation in the methods used to deliver business education. Rajaratnam (2024) argues that if business education fails to adapt, it risks producing graduates who lack the competencies required in modern workplaces. High-quality business education should make individuals competitive in both employment and entrepreneurship. This underscores the need to explore how artificial intelligence (AI) can be integrated into business education to better equip students for the future.

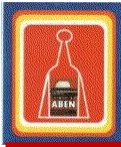
AI is increasingly influencing educational methods, transforming how learners acquire and apply knowledge. According to Chang, Pan, Manikandan, and Ramesh (2022), AI refers to machines or systems capable of executing tasks typically associated with human intelligence, such as interpreting speech, understanding language, making decisions, and learning from data. Through sophisticated algorithms, AI systems can analyze vast datasets, identify trends, and enhance their performance over time.

As digital technologies become more prevalent, business education is experiencing a shift. Tools like AI chatbots, virtual simulations, and intelligent content delivery platforms are being incorporated into teaching and learning (Brook, 2021). These tools promote personalized instruction and engagement, although their implementation presents challenges. Institutions can address these by offering proper training, investing in accessible technologies, and combining AI tools with traditional human-led teaching. The key lies in maintaining a balance between technology and the human experience, ensuring that learners still benefit from personalized, empathetic instruction.

Several innovative AI trends are transforming education. **Adaptive learning systems**, for example, tailor content to individual student abilities, ensuring that learners receive material aligned with their skill levels. AI-powered virtual assistants provide constant support, answering queries and offering guidance in real time. These tools adapt to individual learning styles and recommend customized resources. In addition, AI facilitates teamwork by analyzing students' strengths and matching them into effective collaborative groups.

As AI technology advances, it will play an even greater role in shaping business education. Institutions that actively adopt these innovations will be better prepared to develop future-ready graduates. AI focuses on enabling machines to perform tasks requiring cognitive functions such as problem-solving, pattern recognition, and decision-making. Applications like ChatGPT, Google Bard, Midjourney, and AI-enhanced platforms like Canva are becoming mainstream, reshaping communication, learning, and industry practices. As such, integrating AI literacy into academic programs is critical not only for students' career readiness but also for workforce development (Hannan & Shuguang, 2021; Butulis, 2023).

Equipping students with AI knowledge can bridge inequality gaps, build a more inclusive talent pipeline, and encourage creativity in AI innovation. Chaudhary (2017) notes that the use of AI in



classrooms benefits both teachers and students by enhancing interaction and creating collaborative environments. AI enhances precision and speed in learning and highlights the need for students to undergo relevant training to build their competence.

Introducing AI into higher education, particularly in business programs, can significantly improve how students learn, how learning outcomes are measured, and how knowledge is applied. AI applications include customizing educational content, automating administrative tasks like grading, and encouraging collaboration through shared learning platforms. Chatbots, for instance, can simulate business situations, assist students at any time, and provide immediate feedback. This allows for a more engaging and personalized learning experience (Charles-Davies & Pi, 2024).

Similarly, Gipps (2018) highlights that virtual reality can immerse students in lifelike business scenarios, allowing them to practice essential skills such as negotiation and customer interaction in a controlled environment. Additionally, AI-based recommendation systems can suggest educational materials—like videos or articles—based on a learner's interests and preferences, making learning more dynamic and exploratory.

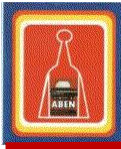
By integrating AI into business education, we can enhance the delivery of content and open new pathways for educational growth. Today's business learners are tomorrow's leaders, and preparing them for an evolving world is imperative. AI tools foster adaptability and a culture of continuous innovation. Nonetheless, educators and instructional designers remain central to this transformation. Educational institutions must guide the implementation of AI to preserve their instructional integrity. AI should be seen not as a replacement but as a supplement to human educators (Nicolaas, 2024). The most effective learning environments are those that harmonize advanced technology with human insight.

Although AI adoption in business education is gaining traction, there is still limited empirical research on its full impact. This presents a gap that future studies can address. Therefore, this study aims to examine how the use of AI tools can improve business education delivery in tertiary institutions across Bayelsa State.

Statement of the Problem

Although AI tools are becoming increasingly prominent in the delivery of business education, a significant number of educators and institutional leaders remain cautious about their full-scale adoption. This hesitation often stems from unfamiliarity with integrating AI into instructional methods, limited awareness of the potential advantages, and the absence of clearly defined guidelines or best practices for their implementation. Consequently, students who graduate without exposure to AI competencies may struggle to keep pace with evolving workplace technologies, which could hinder their career progression. Zouhaier (2023) highlights that lacking proficiency in AI may place graduates at a competitive disadvantage, as many businesses are now incorporating AI to streamline operations and foster innovation. Without foundational knowledge of AI tools, these individuals may also find it challenging to keep up with industry trends and practices, further widening the skills gap and making it harder for organizations to attract a well-rounded, diverse workforce in an AI-centric economy.

Given that future professionals are expected to engage with generative AI tools in the workplace, higher education institutions provide an ideal setting to develop and refine these competencies. With appropriate guidance from educators, students can gain hands-on experience with AI technologies, learn to use them responsibly, and critically evaluate their capabilities and limitations. According to Anthony Hié and Claire Thouary (2023), it is essential that instructors equip learners with the necessary skills to navigate AI tools effectively in both



personal and professional contexts. By integrating AI education into curricula, tertiary institutions can help close the gap between academic preparation and industry expectations, ensuring graduates are equipped to thrive in contemporary work environments.

Furthermore, as businesses continue to evolve alongside technological innovation, it is important to emphasize that AI should not be seen as a replacement for human intelligence, but as a complementary tool that enhances human abilities. Embedding AI into business education can lead to more engaging, customized, and impactful learning experiences, ultimately raising the standard of education and preparing learners for success in a fast-changing global economy. It is within this context that the current study finds its relevance and justification.

Purpose of the Study

The main objective of the study is to investigate the extent to which an adoption and implementation of Artificial Intelligence (AI) tools can enhance business education delivery in Tertiary Institutions in Bayelsa State. The study is guided by the following specific objectives:

1. To establish the extent to which AI-powered chatbots can enhance business education delivery in Tertiary Institutions in Bayelsa State.
2. To establish the extent to which AI-powered virtual reality can enhance business education delivery in Tertiary Institutions in Bayelsa State.
3. To establish the extent to which AI-powered content recommendation engine can enhance business education delivery in tertiary institutions in Bayelsa State.

Research Questions

The following research questions are developed to guide this study:

1. To what extent does AI-powered chatbots enhance business education delivery in tertiary institutions in Bayelsa State?
2. To what extent does AI-powered virtual reality enhance business education delivery in tertiary institutions in Bayelsa State?
3. To what extent does AI-powered content recommendation engine enhance business education delivery in tertiary institutions in Bayelsa State?

Research Hypotheses

The following hypotheses are formulated to guide the study:

Ho₁: There is no significant difference in the mean rating of male and female students on the adoption and implementation of AI-powered chatbots in enhancing business education delivery in tertiary institutions in Bayelsa State.

Ho₂: There is no significant difference in the mean rating of students based on different age background on the adoption and implementation of AI-powered virtual reality in enhance business education delivery in tertiary institutions in Bayelsa State.

Ho₃: There is no significant difference in the mean rating of students based on their status on the adoption and implementation AI-powered content recommendation engine in enhancing business education delivery in tertiary institutions in Bayelsa State.

Popenici and Kerr, as referenced in Nicolaas (2024), describe artificial intelligence (AI) as the development of computer systems capable of performing tasks that normally require human cognitive abilities such as reasoning, logic, and decision-making. AI draws on computational strategies modeled after the way humans perceive, learn, and act through their nervous systems and physical interactions. Broadly, AI is understood as the replication of human thought processes by machines, particularly computers. In this study, AI is defined as "computing

systems capable of performing human-like functions such as learning, adapting, synthesizing, self-correcting, and utilizing data for complex analytical tasks."

As a rapidly evolving area in education, AI holds great promise for enhancing teaching and learning in higher institutions. According to the Horizon Study 2020 report, AI is listed among six emerging technologies with the potential to make a major impact on higher education globally. The report identifies AI as a key technological advancement that is shaping the future of education worldwide (Hutson et al., 2022).

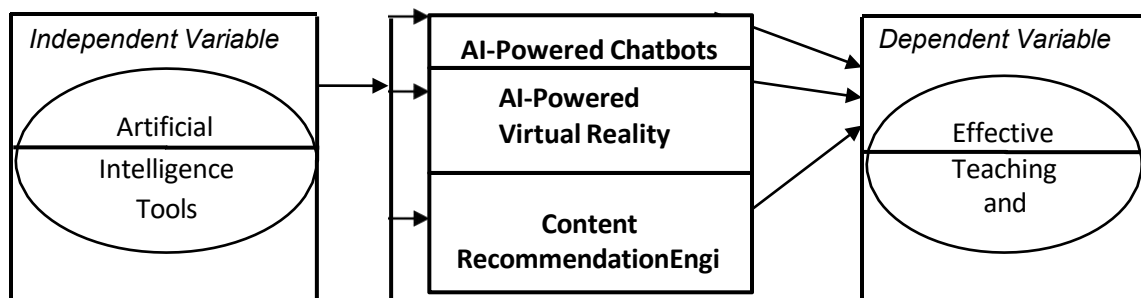
Fernández, Fernández, and Aburto (2019) emphasize that the integration of AI and modern technological tools can enrich educational experiences for both instructors and learners. These technologies provide valuable insights to educators and administrators regarding best practices and the scope of AI in achieving academic excellence. AI enhances the learning process by enabling tailored feedback, integrating human interaction with information and communication technologies, and raising overall education quality. Moreover, AI fosters the development of collaborative learning environments that benefit all stakeholders in the academic community.

The use of AI in higher education presents notable advantages for both educators and students. It supports more adaptable and accessible learning models, enabling students to learn without the usual constraints of time and location. This flexibility has allowed universities globally to accommodate larger student populations. Despite the potential financial investment required for AI integration, the long-term cost-effectiveness becomes evident when compared to the labor-intensive nature of traditional educational methods.

While AI has been successfully deployed in developed countries, developing nations remain at an early phase of adoption. Various challenges hinder the full implementation of AI in these regions, including underdeveloped infrastructure, limited access to reliable information, institutional resistance, inadequate funding, and a general lack of digital literacy and technical skills. These barriers underscore the need for further investigation into how AI can be effectively adopted and implemented in higher education, particularly within the context of developing countries. Therefore, this study aims to explore and address the existing gaps in AI adoption in tertiary institutions.

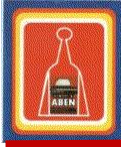
Artificial Intelligence (AI) Tools for Teaching and Learning

Dimensions



Source: Zhao, X., Xiao, Y., Tao, X., & Long, Y. (2021); Charles-Davies, S. & Pi, Al. (2023).

Types of AI Tools for Teaching and Learning in Education



The transformation of business education has accelerated with the rise of digital technologies, particularly through the adoption of artificial intelligence (AI) tools. Modern educational institutions are increasingly utilizing AI innovations like chatbots, virtual reality (VR), and content recommendation engines to facilitate effective and flexible learning. These technologies provide around-the-clock access to instructional resources, allowing students to learn at their own pace and according to their individual needs. Institutions also benefit from these tools by becoming more responsive and adaptive in their educational delivery. On the instructional side, educators are now using AI to generate course materials, write programming scripts, improve content accessibility, enhance writing workflows, and detect academic misconduct.

Chatbots

Chatbots, powered by AI, serve as interactive conversational agents designed to offer learners a more customized educational experience. They are capable of responding to student inquiries, simulating real-life scenarios, and guiding learners through business concepts in ways that traditional methods might not offer. Chatbots operate continuously, making them valuable for learners requiring flexible assistance at any time. Lourenço and Jabbour (2020) assert that chatbots can simulate customer service interactions, enabling students to develop communication and problem-solving skills. By embedding industry-specific knowledge into these systems, chatbots can provide immediate and relevant feedback. Their uses are diverse, ranging from tutoring and assignment support to role-playing complex business negotiations or sales discussions. As Sharma (2023) notes, students who face challenges with conventional learning approaches may benefit significantly from the interactivity and personalization chatbots offer.

Virtual Reality (VR)

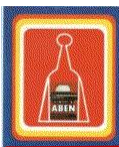
Virtual reality introduces students to immersive, simulated environments that mirror real-world business settings. This technology allows learners to apply theoretical knowledge through hands-on experiences in contexts such as marketing simulations, product launches, and trade events. It also provides global insights by replicating marketing strategies across diverse cultural and geographical environments. As Zhang and Chan (2021) explain, VR enables students to build essential skills—such as customer service, negotiation, and salesmanship—within realistic and interactive simulations. This learning approach deepens students' understanding and prepares them for real business challenges.

Content Recommendation Engines

Content recommendation engines use AI algorithms to analyze student preferences, learning behaviors, and demographic data to provide tailored educational resources. These tools recommend relevant materials such as academic papers, videos, podcasts, and blog posts that align with students' interests and knowledge levels. According to Duyar and Burić (2019), these engines can support learners in tracking industry trends and enriching their understanding of complex marketing theories. They are particularly effective in online and self-paced courses, where students independently navigate their educational journeys. By adapting to learners' evolving needs and interests, content recommendation engines promote continuous and autonomous learning (Elsayed &Elrasheedy, 2020).

The Role of AI in Delivering Business Education

AI plays a critical role in enhancing the delivery of business education in tertiary institutions. Its contributions include the following:



Personalizing learning by adapting content to individual student profiles, interests, and learning styles.

Automating routine instructional tasks, thus allowing educators to focus on mentorship and student engagement.

Providing instant feedback and progress assessments to identify learning gaps.

Supporting dynamic case study simulations that reflect changing business conditions.

Enhancing collaborative project management through tools that assist in task assignment and progress tracking.

Replicating real-world business experiences like product launches and market strategy development.

Delivering content through AI-driven chatbots, virtual assistants, and augmented reality applications.

Developing personalized learning paths to cater to each student's unique academic needs.

Assisting students in conducting market analysis, interpreting customer behavior, and creating strategic marketing plans (Charles-Davies & Pi, 2023).

1.

Implications for Business Students Without AI Competencies

The absence of AI knowledge and skills in business graduates can have far-reaching consequences. Ahmed, Alqahtani, and Mokhtar (2021) highlight several implications:

Graduates may be less competitive in the job market, especially as AI becomes integral to business operations.

They might struggle to adapt to industry developments and emerging technologies.

Inability to embrace evolving workflows could hinder career progression.

Lower salary prospects may result from limited technical capabilities in AI.

Opportunities to contribute to innovative, AI-driven projects may be inaccessible.

A lack of AI skills can cause their professional relevance to diminish over time.

These limitations can reduce employability and impact self-confidence.

Graduates may encounter collaboration difficulties in AI-centric teams.

They might miss critical opportunities for innovation and organizational growth.

The Concept and Importance of Business Education

Business education serves as a foundational component of general education, aimed at instilling business acumen for individual and national progress. It encompasses the teaching of core business principles, theories, and practices. According to Abdulkadir (2019), a distinguishing feature of business education is that it empowers individuals to become self-reliant, either as entrepreneurs or employers. It supports career readiness, entrepreneurial training, and practical exposure to the office and vocational environments. Ubulom (2012) characterizes business education as an academic discipline offered at universities and colleges, designed to teach learners how to become productive citizens through skill development and business knowledge acquisition.

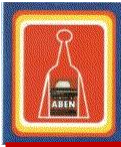
Son, Kim, and Kim (2019) outline several objectives of business education:

To expose all students to the opportunities and career paths within the business world.

To equip students with critical thinking skills for evaluating products and services.

To develop an informed understanding of diverse business occupations.

To build practical business competencies for personal and professional use.



To prepare students for employment or further studies in business fields.

To support training of future business educators.

In essence, business education equips individuals with both theoretical insight and practical skills needed for success in modern society. Erin and Shuguang (2021) stress that it helps cultivate a new generation of capable, responsible, and adaptive citizens prepared for the challenges of a dynamic global economy.

Methodology

This study employed a descriptive research design using a survey approach. According to Gall (as cited in Ojera, 2016), descriptive survey research aims to collect accurate and relevant data regarding the present condition of a subject or phenomenon, with the goal of making valid inferences where applicable.

The study targeted a population of 171 students drawn from the three tertiary institutions in Bayelsa State that offer business education programs. Due to the relatively small size of the population, no sampling technique was applied; the entire population was used as the sample for the study.

The primary data collection instrument was a structured questionnaire segmented into two main parts: one focusing on the demographic profile of the respondents, and the other on the use and integration of artificial intelligence (AI) tools in business education delivery. The questionnaire items were developed based on theoretical constructs and existing literature relevant to the study. In total, the instrument comprised 18 items, and was titled:

Adoption and Implementation of Artificial Intelligence (AI) Tools for Business Education Delivery in Tertiary Institutions in Bayelsa State Questionnaire (AIOAITFBEDTIBSQ).

A four-point Likert scale was utilized for rating responses:

Very High Extent (VHE) = 4

High Extent (HE) = 3

Low Extent (LE) = 2

Very Low Extent (VLE) = 1

A benchmark mean score of 2.5 was adopted for interpreting responses; values below 2.5 indicated low significance, while scores of 2.5 or higher were considered significant.

To ensure content validity and clarity, the questionnaire was pre-tested with 10 business education students from Rivers State University. Their feedback was instrumental in refining and improving the final version of the instrument.

Out of the total distributed questionnaires, 167 copies were validly returned, resulting in a response rate of 98%, which formed the basis for data analysis.

To ascertain the reliability of the instrument, Cronbach's alpha was computed, yielding a reliability coefficient of 0.82. This value exceeds the acceptable threshold of 0.70, as recommended by Hatcher (1994, cited in Amadi & Wali, 2017), indicating strong internal consistency.

For data analysis, mean and standard deviation were used to address the three research questions. In testing the hypotheses, the z-test statistical method was applied at a 0.05 level of significance.

Research Question 1

To what extent does AI-powered chatbots enhance business education delivery in tertiary institutions in Bayelsa State?



Table 1: Computation of male and female responses on AI-powered chatbots in enhancing business education delivery in tertiary institutions in Bayelsa State. F=102; M=65. (N=167).

N	Items	Females			Males		
		x_1	sd_1	Remark	x_2	sd_2	Remark
1	I think there is a lot of potential for AI-powered chatbots to significantly improve teaching and learning in tertiary education	.76	0.69	VHE	3.42	0.60	HE
2	Chatbots tools facilitate collaborative learning by enabling students to work together on projects and share resources in real time.	3.05	0.76	HE	3.10	0.77	HE
3	It provides personalized learning experiences, answer student questions, and even simulate real-world scenarios for students	3.33	0.58	HE	3.40	0.60	HE
4	Chatbots allows students to ask questions and receive immediate, personalized feedback on their business strategies and decisions	3.75	0.69	HE	3.54	0.68	HE
5	Chatbot technologies in teaching and learning can encourages more flexible learning solutions for students without any limitation.	3.30	0.58	HE	2.97	0.49	HE
6	Chatbots can help teachers and students gain more educational experience that are necessary to achieving excellence.	3.21	0.80	HE	3.15	0.79	HE
Grand Mean		3.40	0.68	HE	3.26	0.66	HE

Source: Field Survey, 2024

Analysis in Table 1 above reveal the extent AI-powered chatbots enhance business education delivery in tertiary institutions in Bayelsa State. From the analysis so far both male and female respondents agreed to a high extent the influence of chatbots in teaching and learning with a mean score of 3.40 and 3.26 respectively. The respondents also affirmed that chatbots tools can facilitate collaborative learning by enabling students to work together on projects and share resources in real time.

Research Question 2

To what extent does AI-powered virtual reality enhance business education delivery in tertiary institutions in Bayelsa State?



Table 2: Computation of respondent responses on AI-powered virtual reality in enhancing business education delivery in tertiary institutions in Bayelsa State based on age difference. 18-25=111; 26-33=56. (N=167).

N	Items	18-25years			26-33years		
		$\bar{x}_1$	sd_1	Remark	$\bar{x}_2$	sd_2	Remark
1	Virtual reality is used to develop learning environments and promote collaborative learning, which benefits both students and teachers	3.70	0.80	VHE	3.37	0.84	HE
2	The use of virtual reality provides a more realistic learning experience by simulating business environments and scenarios.	3.76	0.69	VHE	3.22	0.55	HE
3	Is used to create simulated business environments, where students can practice skills and apply their knowledge in a realistic setting.	2.96	0.69	HE	3.61	0.55	VHE
4	It used to create business simulations in different cultural and geographical contexts, giving students a more global perspective.	3.85	0.76	VHE	3.23	0.81	HE
5	Virtual reality can help students apply their knowledge in a simulated environment that closely resembles real-world situations.	3.35	0.84	HE	3.52	0.83	VHE
6	It provides students with feedback on their learning that is tailored to their needs, and improves the standard of the educational process.	3.68	0.83	VHE	3.76	0.87	VHE
Grand Mean		3.55	0.77	VHE	3.45	0.74	HE

Source: Field Survey, 2024

Analysis in Table 2 above reveal the extent AI-powered virtual reality enhances business education delivery in tertiary institutions in Bayelsa State. From the analysis from respondents from different age group, it was agreed to a very high extent that AI-powered virtual reality positively influence teaching and learning with a mean score of 3.55 and 3.45 respectively. The respondents also agreed that the use of virtual reality will provide a more realistic learning experience by simulating business environments and scenarios.

Research Question 3

To what extent does AI-powered content recommendation engine enhance business education delivery in tertiary institutions in Bayelsa State?

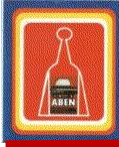


Table 3: Computation of respondents' responses on AI-powered content recommendation engine in enhancing business education delivery in tertiary institutions in Bayelsa State. S=114; M=53. (N=167).

N	Items	Single			Married		
		$\bar{x}_1$	sd_1	Remark	$\bar{x}_2$	sd_2	Remark
1	Content recommendation engine can analyze and recommend relevant business education content, including videos, articles, and other resources	3.35	0.59	HE	3.57	0.59	VHE
2	It can promote innovation and creativity in business education by enabling students to explore new ways of thinking and problem-solving.	3.47	0.54	HE	3.11	0.53	HE
3	AI-powered content recommendation engine can be used to create simulated scenarios that allow students to make real-time decisions in response to changing market conditions	3.70	0.68	VHE	3.58	0.64	VHE
4	It can provide real-time feedback and assessment, allowing educators to better understand how students are progressing and where they may need additional support.	3.84	0.71	VHE	3.33	0.41	HE
5	By providing personalized recommendations, the content recommendation engine can help students explore new topics, discover new resources, and deepen their understanding of business concepts	3.87	0.73	VHE	3.80	0.70	VHE
6	The content recommendation engine can help students explore new topics and expand their knowledge base.	3.55	0.79	VHE	3.25	0.61	HE
Grand Mean		3.63	0.67	VHE	3.44	0.58	HE

Source: Field Survey, 2024

Analysis in Table 3 above reveal the extent AI-powered content recommendation engine enhances business education delivery in tertiary institutions in Bayelsa State. From the analysis of respondents (single and married), it was agreed to a very high extent that AI-powered content recommendation engine positively influence teaching and learning with a mean score of 3.63 and 3.44 respectively. The respondents also agreed that AI-powered content recommendation engine can be used to create simulated scenarios that allow students to make real-time decisions in response to changing market conditions.

Hypothesis 1

There is no significant difference in the mean rating of male and female respondents on the adoption and implementation of AI-powered chatbots in enhancing business education delivery in tertiary institutions in Bayelsa State.



Table 4: Computation of no significant difference in the mean rating of male and female respondents on the adoption and implementation AI-powered chatbots in enhancing business education delivery in tertiary institutions in Bayelsa State.

Responses **n** **Mean** **SD** **z-cal** **α** **Df** **z-crit** **Dec.**

Gender χ (0.05)

Female 1023.400.68 **Accept**

Patients 653.260.661.270.051651.96 **H₀₁**

Source: Field survey, 2024

As shown in table 4, the z-calculated value of 1.27 is less than the z-critical value of 1.96 at 165 degree of freedom and 0.05 level of significance. The researcher accepts the null hypothesis. Based on the hypothesis testing, the researcher concludes that there is no significant difference in the mean rating of male and female respondents on the adoption and implementation of AI-powered chatbots in enhancing business education delivery in tertiary institutions in Bayelsa State.

Hypothesis 2

There is no significant difference in the mean rating of respondent based on different age background on the adoption and implementation of AI-powered virtual reality in enhance business education delivery in tertiary institutions in Bayelsa State.

Table 5: Computation of no significance Difference in the mean rating of respondent based on different age background on the adoption and implementation of AI-powered virtual reality in enhance business education delivery in tertiary institutions in Bayelsa State.

Responses **n** **Mean** **SD** **z-cal** **α** **Df** **z-crit** **Dec.**

Age Bracket χ (0.05)

18-25yrs 1113.550.77 **Accept**

26-33yrs 563.45 0.740.830.051651.96 **H₀₂**

Source: Field survey, 2024

As shown in Table 5, the z-calculated value of 0.83 is less than the z-critical value of 1.96 at 165 degree of freedom and 0.05 level of significance. The researcher accepts the null hypothesis and reject the alternative hypothesis. Based on the hypothesis testing, the researcher concludes that there is no significant difference in the mean rating of respondent based on different age background on the adoption and implementation of AI-powered virtual reality in enhance business education delivery in tertiary institutions in Bayelsa State.

Hypothesis 3

There is no significant difference in the mean rating of respondents based on their status on the adoption and implementation AI-powered content recommendation engine in enhance business education delivery in tertiary institutions in Bayelsa State.



Table 8: Computation of no significant difference on the mean rating of respondents based on their status on the adoption and implementation AI-powered content recommendation engine in enhance business education delivery in tertiary institutions in Bayelsa State.

ResponsesnMeanSD z-cal α Dfz-critDec.

Status χ (0.05)

Single1143.630.67Accept

Married533.440.581.900.051651.96H₀₃

Source: Field survey, 2024

As shown in Table 4.8, the z-calculated value of 1.90 is less than the z-critical value of 1.96 at 165 degree of freedom and 0.05 level of significance. The researcher accept the null hypothesis. Based on the hypothesis testing, the researcher concludes that there is no significant difference in the mean rating of respondents based on their status on the adoption and implementation AI-powered content recommendation engine in enhance business education delivery in tertiary institutions in Bayelsa State

Summary of Result Findings

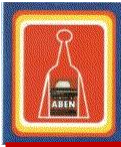
Table 4. 19 Result Summary of Hypotheses Analysis

Hypotheses	Statistical Tool	z_{crit}	z_{cal}	α	Statistical Decision	Remarks
Ho ₁	z-test	1.96	1.27	0.05	Significant	Accept
Ho ₂	z-test	1.96	0.83	0.05	Significant	Accept
Ho ₃	z-test	1.96	0.90	0.05	Significant	Accept

Source: Researcher's Computation, 2024

From the summary of hypotheses table above the result of the hypotheses of the study were presented in line with the statistical decision rule: 'For the hypothesis testing, the null hypothesis of no significant difference will be accepted when the z-calculated (z-cal) value will be less than z-table (z-tab) of 1.96 at 0.05 level of significance. On the other hand, the hypothesis of no significance will be rejected when the z-calculated (z-cal) value greater than the z-table (z-tab) value of 1.96 at 0.05 level of significance'. Hence:

- There is no significant difference in the mean rating of male and female students on the adoption and implementation AI-powered chatbots in enhancing business education delivery in tertiary institutions in Bayelsa State.
- There is no significant difference in the mean rating of students based on different age background on the adoption and implementation of AI-powered virtual reality in enhance business education delivery in tertiary institutions in Bayelsa State.
- There is no significant difference in the mean rating of students based on their status on the adoption and implementation AI-powered content recommendation engine in enhancing business education delivery in tertiary institutions in Bayelsa State.



Discussion of Findings

The central aim of this research was to examine how the adoption and application of Artificial Intelligence (AI) technologies can improve the delivery of business education in tertiary institutions within Bayelsa State. Specifically, the study focused on determining the potential of AI-driven tools—such as chatbots, virtual reality (VR), and content recommendation engines—in enhancing teaching and learning in this context.

Data collected from a sample of 167 business education students across the three tertiary institutions in Bayelsa State revealed that there was no statistically significant difference in respondents' ratings regarding the role of these AI tools in enhancing business education delivery. This implies a broad consensus among students about the positive impact of such technologies.

These findings align with the conclusions of Fernández, Fernández, and Aburto (2019), who emphasized that AI and modern digital tools enrich both teaching and learning experiences by offering valuable insights to educators and administrators. They further noted that AI fosters collaborative learning and improves learning environments. Similarly, Sharma (2023) highlighted that AI tools—like chatbots and VR—can simulate real-world business situations, personalize learning, and support assignment completion, all of which enhance student engagement.

Research by Son, Kim, and Kim (2019) supports these results by showing that AI-powered chatbots can provide a more personalized and interactive learning process, particularly benefiting students who may struggle with conventional instructional methods. Zhang and Chan (2021) also emphasized the usefulness of VR in creating immersive, practice-oriented learning environments for marketing and other business-related applications.

Furthermore, Tang, Dewan, and Kumar (2019) indicated that content recommendation engines can guide students toward relevant learning materials, expanding their understanding—especially in self-paced or online learning contexts. Additionally, Kumar, Sharma, and Sharma (2020) explained that AI not only streamlines the integration of communication technologies and human interactions but also improves educational quality by offering individualized feedback and enhancing teaching effectiveness.

Conclusion

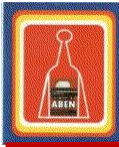
The overall mean responses of participants suggest that the use of AI technologies holds significant promise for improving business education delivery in Bayelsa State's tertiary institutions. Moreover, the results of the z-test showed no significant differences in students' perceptions, indicating widespread agreement on the value of these tools. Thus, the findings affirm that AI-powered educational technologies—such as chatbots, virtual reality, and content recommendation engines—can greatly support and enhance the learning experience within the business education field.

Recommendations

In light of these findings, the following recommendations are proposed:

Integration of AI Technologies: Tertiary institutions should incorporate AI tools like chatbots, virtual reality, and content recommendation systems into their business education programs to promote engaging, customized, and effective learning.

Capacity Building for Staff: Academic institutions should organize comprehensive training programs for faculty and administrative staff on the effective deployment of AI tools in instructional settings.

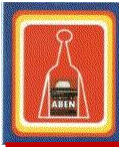


Collaboration with Industry Stakeholders: Institutions should partner with industry professionals and organizations to ensure their curricula reflect current technological advancements and business practices.

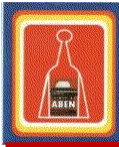
Support for Innovation and Research: Universities should foster research into the application of AI in education by encouraging faculty and students to experiment with and innovate new ways of leveraging these technologies to improve teaching and learning outcomes.

References

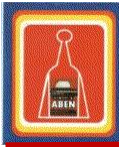
- Ahmed, A. A., Alqahtani, A., & Mokhtar, M. H. (2021). AI-enhanced teaching: Current applications and future opportunities in higher education. *Journal of Sustainability*, 13(10), 5825. <https://doi.org/10.3390/su13105825>
- Amadi, L. & Wali, K. (2017). Entrepreneurial orientation and success in exporting of food products by registered SME's in Rivers State, Nigeria. *RSUST Department of marketing and academic proceedings*. 6(2), 303-316.
- Anthony, H. & Thouary, C. (2023). How AI is reshaping higher education. <https://www.aacsb.edu/insights/articles/2023/10/how-ai-is-reshaping-higher-education>
- Artificial Intelligence in Higher Education. (2022). *Advances in Educational Technologies and Instructional Design Book Series*, 1-30.
- Berson, J., Zhao, J., Zhang, X., Wang, H., & Shaker, R. (2019). Exploring the Use of Artificial Intelligence in Higher Education: A Case Study of Chinese Universities. *IEEE Transactions on Education*, 62(3), 266-277.
- Bicknell, N. (2020). The impact of AI in education: A systematic review and critical synthesis. *Journal of Educational Technology & Society*, 23(2), 312-326.
- Brook, R. (2021). AI for digital marketing in higher education. *Higher Education Marketing: Ideas that work*, 149(5), 5. https://doi.org/10.1386/hemar_00065_1
- Butulis, M. (2023). Embracing artificial intelligence in the classroom. <https://www.facultyfocus.com/author/ff-meredithbutulis/>
- Charles-Davies, S. & Pi, Al. (2023). Artificial intelligence tools for effective teaching and learning in higher education in Nigeria: An Exploratory Study, Unpublished manuscript.
- Chang, Q., Pan, N. Manikandan, L. & Ramesh, S. (2022). Artificial Intelligence Technologies for Teaching and Learning in Higher Education. *International Journal of Reliability, Quality and Safety Engineering*, 29(05), 21-31.
- Dabbagh, S., & Harwood, T. (2020). AI in education: Exploring learning experiences through algorithms. *Computer Science Education*, 30(2), 255-271. <https://doi.org/10.1080/08993408.2020.1733424>
- Darrell, K. A., & Seifert, K. L. (2020). Artificial Intelligence and Education: An Open Road for Innovation? *Frontiers in Psychology*, 11, 391. <https://doi.org/10.3389/fpsyg.2020.00391>
- Davison, E., & Ring, J. (2019). How Will AI Affect the Higher Education System? *Educause Review*, 54(4), 12-16.
- Dean, R., Pugh, S., & Oliver, S. (2017). The potential of AI for personalized learning in higher education: Opportunities and challenges. *Journal of Computer Assisted Learning*, 33(5), 473-482. <https://doi.org/10.1111/jcal.12348>
- Deyton, J. (2021). *Gamification and personalization: How AI is transforming higher education*. Forbes.
- Duyar, A., & Burić, E. (2019). The Effect of Artificial Intelligence on Higher Education. *IEEE Access*, 7, 25435-25445.



- Elsayed, S. E. A., & Elrasheedy, A. I. (2020). Artificial intelligence in higher education: An overview. *Frontiers in Education*, 9(3), 713. <https://doi.org/10.3389/>
- Erin, H. & Shuguang, L. (2021). AI: new source of competitiveness in higher education. *Competitiveness Review: An International Business Journal Incorporating Journal of Global Competitiveness*. 1(4), 16-31.
- Gipps, C. (2018). Technological innovation and personalised learning: Focusing on the individual student. *Learning, Media & Technology*, 43(4), 406-424. <https://doi.org/10.1080/17439884.2018.1528928>
- Hannan, E. & Shuguang, L. (2021). AI: new source of competitiveness in higher education. *Competitiveness Review: An International Business Journal Incorporating Journal of Global Competitiveness*. 2(1), 13-22.
- Heidari, S., Rakhshani, A., Ghasemi, H., & Zeinali, F. (2018). The impact of AI-based tools on higher education: An overview. *International Journal of Interactive Mobile Technologies*, 9(3), 48-63. <https://doi.org/10.4018/ijimt.2018070103>
- Hutson, J., Jeevanjee, J., Graaf, V. V., Lively, J., Weber, J., & Weir, G. (2022). Artificial Intelligence and the Disruption of Higher Education: Strategies for Integrations across Disciplines. *Creative Education*, 13(12), 3953-3980.
- Iltner, M., & Dicksen, M. (2021). Artificial intelligence and machine learning: Opportunities and challenges for the future of education. *Frontiers in Education*, 12(2), 1-5. <https://doi.org/10.3389/>
- Kay, M. (2020). Artificial Intelligence in Higher Education: Opportunities, Risks, and Ethical Considerations. *Journal of Educational Technology & Society*, 23(3), 1-16.
- Kriz, M., Sedlak, S., & Heimgärtner, C. (2020). The role of AI-based adaptive learning in higher education: A systematic review. *International Journal of Educational Technology in Higher Education*, 17(4), 166-191. <https://doi.org/10.1186/s41239-019-0177-4>
- Liu, G., Choi, C., & Hudson, J. (2019). The Impact of Artificial Intelligence on the Design of Higher Education Curriculum. *SAGE Open*, 9(4), 1-12.
- Lourenço, H., & Jabbour, A. M. (2020). Leveraging AI to enhance education in the 21st century. *Journal of Educational Technology & Society*, 23(4), 504-512. <https://doi.org/10.1177/1098612X20952078>
- Marx, K. (1867). *Das Kapital*. Leipzig: Verlag von Otto Wigand. (Marx's work on the relationship between technology and society)
- Muhar, K. (2020). AI for better learning: Using personalized learning and artificial intelligence in educational settings. Springer. <https://doi.org/10.1007/978-3-030-44733-9>
- Nicolaas, M. (2024). What AI means for higher education teaching: hype vs reality. <https://www.universityworldnews.com/post.php?story=20240123095419557>
- Rajaratnam, V. (2024). AI in Higher Education: Potentials, Pitfalls, and Strategies for Implementation. <https://www.languagemagazine.com/2023/05/31/the-importance-of-artificial-intelligence-in-education-for-all-students/>
- Rogers, E. M. (1962). *Diffusion of innovations*. New York, NY: The Free Press.
- Sarmanie, A., Dabbagh, S., & Selwyn, N. (2021). Learning algorithms: Exploring the implications of AI for educational processes. *Journal of the Learning Sciences*, 30(6), 1059-1089. <https://doi.org/10.1080/10508406.2021.2028696>
- Sele, R. (2021). Impact of artificial intelligence in the development of marketing competencies in higher education. *PATT (Proceedings of the Academic Track of Technology)*, 8(2), 828-838. <https://doi.org/10.18240/patt.2021.82.51>



- Sharma, S. (2023). Integrating artificial intelligence into education. *International Journal of Advanced Academic Studies*, 5(6), 35-39.
- Simuka, J. (2022). Emerging Role of artificial intelligence in higher education. *Arabian Journal of Business and Management Review*, 12(9), 1-12.
- Son, E. Y., Kim, Y. M., & Kim, Y.-S. (2019). AI-powered learning: Enhancing the effectiveness of higher education. *Journal of Educational Technology & Society*, 22(4), 443-454. <https://doi.org/10.1177/1098612X19833041>
- Srinivasan, L. (2020). *How AI is transforming education for the digital age*. Harvard Business Review.
- Trigwell, K. (2019). Rethinking the nature and role of personalization in higher education: New possibilities enabled by artificial intelligence. In C. Herrington & K. Trigwell (Eds.), *Personalization in higher education: Revisiting theory, practice, and policy* (15-38).
- Tudor, E., Zaharia, R. M. & Zaharia, R. (2023). Implementing Artificial Intelligence in Higher Education: Pros and Cons from the Perspectives of Academics. *Societies*, 13(5), 118-118.
- Veblen, T. (1914). The instinct of workmanship and the state of the industrial arts. *The Quarterly Journal of Economics*, 28(1), 122-145.
- Wang, S., Zeytinoglu, A., & Zhao, X. (2020). Artificial intelligence in higher education: A systematic literature review. *Educational Technology & Society*, 23(2), 191-209. <https://doi.org/10.1177/1098612X20933041>
- Zhang, D., & Chan, A. (2021). Artificial intelligence in higher education: Emerging technologies, pedagogies, and practices. *IEEE Transactions on Learning Technologies*, 14(1), 131-147. <https://doi.org/10.1109/1098612X20933041>
- Zhao, X., Xiao, Y., Tao, X., & Long, Y. (2021). The impact of AI on higher education: A survey study of perceived impacts and approaches of teachers. *Frontiers in Education*, 11(2), 1-9. <https://doi.org/10.3389/feduc.2021.638911>
- Zouhaier, S. (2023). The impact of artificial intelligence on higher education: An empirical Study. *European Journal of Educational Sciences*, 10(1), 1-15.
- Kumar, V., Sharma, N., & Sharma, P. (2020). Chatbots in education: A review. *International Journal of Information and Education Technology*, 10(1), 1-9.
- Tang, T., Dewan, P., & Kumar, V. (2019). Recommendation systems in education: A systematic review. *International Journal of Artificial Intelligence in Education*, 29(2), 151-173.



ARTIFICIAL INTELLIGENCE FOR CREATIVITY AND INNOVATION IN ECONOMICS IN SECONDARY SCHOOLS: CHALLENGES AND WAY FORWARD

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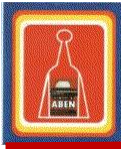
Abstract

The integration of Artificial Intelligence into education is transforming the way we learn and teach. In this era of technological advancement, Artificial Intelligence is becoming increasingly essential in the classroom, offering new intelligent teaching tools, innovative teaching and learning modes, and promoting creativity and innovation in teaching evaluation methods and management. The reformation of education and teaching in schools is breaking the time and space restrictions of traditional education, forming a superhighway of information, and making education more interesting and informative. Artificial Intelligence refers to the replication of human intelligence patterns by computer systems, codes, or machines to act and reason like humans. As it pertains to teaching economics, Artificial Intelligence can be used to enhance creativity and innovation through tools such as ChatGPT, Chatbot, Educational copilot, Grammarly, QuillBot, Turnitin, and others. Economics aims to equip students with the basic principles necessary for useful living and higher education, prepare them for the practical solution of economic problems, and raise their respect for the dignity of labor. Integrating Artificial Intelligence for delivery of Economics education can revolutionize the way students learn and understand as it would facilitate creativity and innovation. This paper raised that Artificial Intelligence has the potential to reshape teaching and learning in innovative ways, providing better ways of grading written answers and essays, and promoting creative thinking and problem-solving skills. By embracing Artificial Intelligence, secondary schools can create a nurturing environment for the next generation of creative thinkers and problem solvers.

Keywords: Artificial Intelligence, Creativity and Innovation, Economics Subject, Challenges, Way-forward

Introduction

Technology is fundamentally transforming education. In a world that is increasingly driven by technology, integrating Artificial Intelligence into the classroom has become imperative (González-Pérez & Ramírez-Montoya, 2022). This is not just a matter of following trends but of making more profound and systematic changes to the very nature of education. Artificial Intelligence has begun to permeate daily life in a variety of forms and applications, as well as being used and impacting education and teachers. Some examples include translation systems, search engines, Chatbots, ChatGPT navigation programs, and specialized web applications that provide learning in a variety of fields (Kingsley, 2023). Artificial Intelligence refers to the replication of human intelligence patterns by computer systems, codes or machines to act and reason like humans (Bupo&Akpomi 2023). Artificial intelligence is the simulation of human intelligence processes by machines, especially computer systems (Yashpal, 2024). Artificial Intelligence would bring new intelligent teaching tools to schools, form new teaching and learning



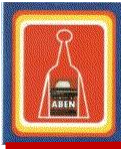
modes, and promote innovation and creativity in teaching evaluation methods and teaching management methods. Educators ought to actively change their way of thinking, explore new forms of combinations between Artificial Intelligence and teaching, promote the deep integration of technology and teaching, and the innovative development of education and teaching (Guo & Xiao, 2019). The reformation of education and teaching in schools would break the time and space restrictions in traditional education, thus form a superhighway of information, promote Artificial Intelligence processes in education, and make education and teaching more interesting and reasonable (Zhang, Zhang & Li, 2019). Students are able to develop according to their own potential, whereas teachers' repetitive workload would be replaced by artificial intelligence systems, and the school environment would become more intelligent (Fu, 2019).

In this 21st century era, the academic world is becoming more and more personalized and thus the way of learning is transforming from traditional to Application based education system. In the 2019 pandemic outbreak, numerous learning management systems came forth to assist students to learn in online mode such as WebEx, Zoom, Microsoft team, and Google Meet. Hence, students have no need to attend the class physically (Bupo&Akpomi, 2023). Students in secondary schools were not left behind.

In secondary schools, the affordances of using Artificial Intelligence within teaching and learning modalities are emerging and these affordances have implications for teacher education, such as the need for Artificial Intelligence literacy for new educators (Navidi & Landry, 2021). This transformative technology is the catalyst for nurturing the innovators and creativity of tomorrow. Artificial Intelligence is an instrumental tool in sparking creativity and solving complex problems in a classroom setting (Liu, 2020). By embracing Artificial Intelligence, secondary schools are not just enriching the educational experience but are taking a giant leap towards creating a nurturing environment for the next generation of creative thinkers and problem solvers. Potential abilities are developed in the process of learning, communicating and acting within secondary and higher educational environment. Therefore, modern technologies of psychological and pedagogical support of the personality development in the framework of the educational process also ought to be focused on the results of the research devoted to creativity and innovation among adolescents and students of secondary school.

Creativity and innovation is an essential aspect of teaching and learning that is influencing worldwide educational policy and teacher practice and is shaping the possibilities of 21st century learners (Annie & Leon, 2018). Economics Students ought to be aware of how Artificial Intelligence can support their creativity and learning. Modern education favours problem-solving-based pedagogies, which emphasis the importance of fostering children's ability to think creatively (Marrone, Taddeo & Gillian, 2022). Marrone et al 2022, further stated that Artificial Intelligence in education address some of the main concerns associated with the creativity slump, particularly an emphasis on the creative process. This helps in improving creative thinking in students and comfortability using Artificial Intelligence, and to adequately prepare students to enter the modern workforce. Economics teachers can tap into the boundless potential of Artificial Intelligence to significantly enhance students' creativity and innovation in secondary schools. In education Artificial Intelligence is being adopted in the teaching and learning process, hence traditional teaching methods are transforming drastically and Economics subject in secondary schools cannot be left out.

Economics subject has become increasingly important in today's world, as it provides students with the skills and knowledge necessary to navigate complex economic systems (Pandey & Sonal, 2023). Teaching and learning of Economics in secondary school with Artificial Intelligence is essential for developing digital literacy, critical thinking skills, and preparing



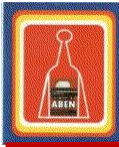
students for future academic and career success. A basic understanding of Artificial Intelligence systems enables students to engage and ideate with Artificial Intelligence technologies safely, responsibly and ethically. Artificial intelligence technology has not only promoted changes in schools' teaching methods, learning methods, campus environment, and curriculum, but the entire education industry is also undergoing changes through Artificial Intelligence (Karsenti, 2019). From basic education to higher education and adult education, schools are increasingly transforming with Artificial Intelligence technology. These systems can help people learn better and achieve their learning goals (Hinojo-Lucena, Aznar-Díaz, Cáceres-Reche, & Romero-Rodríguez, 2019). As artificial intelligence (AI) is increasingly becoming a part of our lives, the government and schools are paying more and more attention to the development of Artificial Intelligence in education (Malik, Tayal, & Vij, 2019). Given the growing prevalence of Artificial Intelligence (AI), it is domineering or secondary school pupils to possess a comprehensive comprehension of both the theoretical foundations of Artificial Intelligence and its diverse practical applications (Balka, 2021). However, traditional teaching methods may not be sufficient to fully engage students of economics and enhance creativity and innovation. This is where artificial intelligence (AI) come in.

Concept of Artificial Intelligence (AI)

Artificial intelligence refers to the replication of human intelligence patterns by computer systems, codes or machines to act and reason like humans (Bupo&Akpomi, 2023). Artificial Intelligence (AI), generally expressed by the general public as the ability of machines or computers to think and act as humans do, represents the efforts towards computerized systems to imitate the human mind and actions (Wartman & Combs, 2018). In this respect, the basic definition of artificial intelligence is expressed as the skilful imitation of human behaviour or mind by tools or programme (Mohammed & Watson, 2019). According to Timms (2016) stated that the current structure may create an illusion that leads to certain beliefs the Artificial Intelligence would come within the computer format used at home. It could get into our lives within different functions and shapes. Andrew (2017) Artificial Intelligence artificial intelligence to be the new electricity of this age. Artificial Intelligence is a candidate to be presented as the basic building block of the Fifth Industrial Revolution by providing itself to be a powerful factor in ensuring economic development with its potential (Golic, 2019). Pannu (2018) viewed that Artificial Intelligence gives the ability to the machines to think analytically, using concepts. Barua (2023) also identified Artificial intelligence tools such as SciSpace, Schoarlcly, Jenni AI, ChatGPT, Paperpal, Casper, Grammarly, QuillBot, Elicit, Turnitin, Consensus, Search Smart, Mendeley and, Evidence Hunt. Artificial Intelligence would continue to play an increasingly important role in various fields. Therefore, rtificial intelligence is the impersonation of human knowledge procedures for discourse and visual acknowledgment, interpretation of the dialects and virtual decision-making by machines for creativity and innovation on teaching and learning of Economics in secondary school.

Concept of Economics as a Secondary School Subject

Economics was first taken in the West African School Certificate Examination as a school subject in Nigeria in 1967. Since school certificate was a two years course, it may be said that economics came into the secondary school curriculum in Nigeria in 1966, much later than most other secondary school subjects. Economics was, however, taken by private candidates in the General Certificate Examination before it became a secondary school subject. It was recognized that economics problems were at the heart of modern society. Ever since economics was first taken as a school subject in West African School Certificate Examination in 1967, the number of

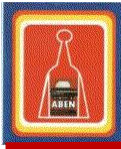


schools that teach it, and the number of candidates that take the examination have witnessed a phenomenal increase. For example, in 1967, it was 0.07% of the total number of candidates that sat for the examination, in 1969 it was increased to 12.56%, in 1970, it was 17.16% and by 1976 exactly 10 years of its inception, the population has risen to 76.95% (Noun, 2016). Gbemisola and Vusy (2016) submitted that the Nigerian Educational system constantly changes through consistent research and meaningful innovations. According to Gbemisola and Vusy (2016) the concept and philosophy of the 6-3-3-4 was to cater for the whole man that is, to provide for the intellectual, social, material and spiritual needs of a student through its multi-purpose curriculum. With this mind, the secondary school curriculum is divided into three parts namely: Core subjects or vocational subjects, Pre-vocational subjects and Elective subjects or non-vocational subjects. The core subjects such as Mathematics, English language, one Nigeria language among: Yoruba, Igbo and Hausa and others like Physics, Chemistry, Biology, Agricultural Science, and Economics are basic intended to give students opportunity to offer Arts or Science subjects in higher education. Noun (2016) submitted that Economics is concerned with human behaviour such as how people earn their living and make a choice between alternatives to satisfy their wants. It focuses on the study of firms and the government whose activities are geared to the production of goods and services for the satisfaction of human want since economics is concerned with human behaviour. So, Economics is a social science, and like any science subject, the reasoning procedure in Economics is methodological, its analysis is systematic, and the validity of its various theories is tested. Adu, Galloway and Olaoye, (2018) opined that the teaching of Economics provides a learner with the opportunities to live meaningfully within the changing economic world. The following are the objectives or attainable outcomes of teaching Economics:

1. To equip students with the basic principles of Economics necessary for useful living and higher education;
2. To prepare and encourage students to be prudent and effective in the management of scarce resources;
3. To raise students' respect for the dignity of labour and appreciation of economic, cultural and social values of our own society; and
4. To enable students to acquire knowledge for the practical solution of the economic problems of the society, such as Nigeria, developing countries and the world at large.

Adu et al. (2018) also listed the following reasons why students study economics in senior secondary schools as follows:

- a) The study of Economics enables a student to understand the nature of the complexity of the economic activities in which he is only a very small part.
- b) It enables students to understand and appreciate various government policies where choices have to be made such as probably to spend more money on free education and therefore provide less employment opportunities.
- c) The study of Economics provides the students with basic skills for analysing Economic problems thereby preparing them better for positions where economic decisions have to be made
- d) The study of Economics helps a government to promote growth and development therefore improving the quality of life of the citizens.
- d) Knowledge of Economics is useful to analyze fascinating patterns of socio-economic behaviour.
- e) The study of Economics is useful to understand and alter the inequalities in the distribution of income and opportunities. (Adu, 2016)



Artificial Intelligence in economics education can revolutionize the way students learn and understand economics in secondary schools by using Artificial Intelligence tools such as ChatGPT, Paperpal, Casper, Grammarly, QuillBot, Elicit, Turnitin for creativity and innovation in Economics. Modern technologies are emerging at faster rate, and should be applied in teaching and learning of Economics subject in secondary schools in other for the teachers and students to remain updated in the current dispensation of technological advancement for foster creativity and innovation.

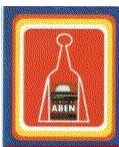
How Artificial Intelligence fosters Creativity and Innovation in Economics Education

The role of Artificial Intelligence in education reshapes teaching and learning in innovative ways. Recently numerous software companies are coming up with their Learning Management System (LMS) to provide better ways of grading written answers and essays in schools. According to Bupo and Akpomi (2023), that Learning Management Systems are Virtual Learning Environments (VLE) where teachers can interact with their students by providing educational resources (or links to these resources) and providing feedback on inquisitions from students. It is a platform where teachers and students can come together to interact to achieve an educational goal (Rowell, 2018). There are some Artificial Intelligence tools that can facilitate learning of economics subject such ChatGPT, Chatbot, Grammerly, Turnitin, Educational copilot, semantic scholar etc.

ChatGPT is an Artificial Intelligence tool that uses natural language processing to create human-like conversational dialogue. The language model can respond to questions and compose various written content, such as articles, social media posts, essays, code, and emails. Javaid, Haleem, Singh, Khan, and Khan (2023) stated that chatGPT offers a personalized learning experience, enabling students to engage with content tailored to their unique needs and pace, enhancing the overall educational process without replacing teachers. chatGPT also enables users to pose and answer a variety of questions, summarize texts, and interact with it like peers (Sok, 2023). Another Artificial intelligence tools is called Chatbot.

Chatbots are now used across various sectors, including education. Most of the latest intelligent Artificial Intelligence chatbots are web-based platforms that adapt to the behaviors of both instructors and learners, enhancing the educational experience (Chassignol, Khoroshavin, & Bilyatdinova, 20218). Artificial Intelligence chatbots have been applied in both instruction and learning within the education sector. They possess the ability to generate text, create diverse creative content, and provide informative answers to questions, although their accuracy may not always be perfect Chatbots specialize in personalized tutoring, homework help, concept learning, standardized test preparation, discussion and collaboration, and mental health support. Also there are some Artificial intelligence tool that is used to checkmate chatbot and chatGPT named Ai-Turnitin.

Turnitin is an etool designed to identify and flag unoriginal written content, with the goal of detecting and preventing plagiarism. While technological advances are invaluable to education, technology has also made it easier for students to cheat and plagiarize assignments. Some of the ways technology can facilitate plagiarism include copying text directly from the Internet, buying term papers online, and readily sharing files among peers. Though technology has made it easier for students to commit acts of academic dishonesty, technology can also be used to keep students accountable and honest. Turnitin represents one digital tool that can help curtail plagiarism and promote academic integrity. Turnitin generates similarity reports on student submissions, which can provide educators with information about plagiarized sources, but the reports can also be used to help students understand the proper use of quotation marks, how to cite sources properly, and how to paraphrase. In response to the recent emergence of Artificial



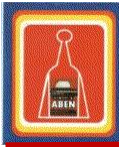
Intelligence tools (such as ChatGPT) capable of generating convincing human-written text, Turnitin have now released a new Artificial Intelligence detection tool that will detect texts created by Artificial Intelligence tools known as turnitinArtificial Intelligence detector (University of Lincoln, 2024). Also Grammarly is an Artificial Intelligence tool that's been utilized in educational sector.

Grammarly is an AI-powered writing assistant that generates content, improves existing content, and fixes any grammatical errors to make sound and concise content (Tom 2024). Grammarly is undeniably a powerful writing assistant that offers numerous benefits, such as error-free writing, enhanced style, and plagiarism detection. Kripesh (2024) observed that Grammarly is one of the most popular grammar checkers and proofreading tools, and it offers basic grammar checking options. Galuh and Antonina (2023) explained that while doing the writing activities, teachers and students may find several problems in their writing, such as errors in their sentence structures, grammatical errors, punctuation, word choices, and other kinds of language errors.

Quillbot is a paraphrasing and summarizing tool that helps millions of students and professionals cut their writing time by more than half using state-of-the-art Artificial Intelligence to rewrite any sentence, paragraph, or article (Eka & Rahmah, 2022). QuillBot is one of the most popular applications known as a paraphrasing tool. QuillBot offers a product that uses Artificial Intelligence to suggest paraphrases, grammatical checkers, summarizing, and even plagiarism detectors.

Education Copilot is an AI-powered platform that helps teachers streamline lesson planning, prep work, and creating educational materials. Ahmed (2023) stated that Education Copilot is an AI-powered platform that simplifies lesson-making plans and instruction techniques for educators and college students as well. The platform generates customizable lesson plans, academic handouts, templates, PowerPoint, and scholar performance reviews in seconds. Educators can spend time, power, and awareness on scholar studying and improvement with its unique Artificial Intelligence lesson planner feature. The reformation of education and teaching in schools would break the time and space restrictions in traditional education, thus form a superhighway of information, promote Artificial Intelligence processes in education, and make education and teaching more interesting and reasonable (Zhang, Zhang & Li, 2019). Students are able to develop according to their own potential, whereas teachers' repetitive workload would be replaced by artificial intelligence systems, and the school environment would become more intelligent (Fu, 2019).

Economics teachers can coordinate all the learning activities of students ranging from registration, class activities, assignments, education resource material provision to examinations, assessment and giving out feedback. Artificial Intelligence can help to create customized learning plans and individualized programme to meet the unique needs of each student. It can analyze data on student performance, learning style, preferences, and interests to offer Artificial Intelligence recommendations. Artificial intelligence help teachers improve personalized education for their students (Sekeroglu, Dimililer&Tuncal, 2019). It is identified that personalized learning with other pedagogical models, such as mobile learning, ubiquitous learning, game-based learning, collaborative learning, etc., has a high potential to enhance the respective model by improving the learning progress and outcome of learners. Economics teachers can, however, identify students' learning abilities with data collection some of the practical Artificial Intelligence notwithstanding, it is identified that personalized learning with other pedagogical models, such as mobile learning, ubiquitous learning, game-based learning, collaborative learning, etc., has a high potential to enhance the respective model by improving the learning progress and outcome of learners (Pandey & Sonal, 2023). Artificial Intelligence can help to create customized learning

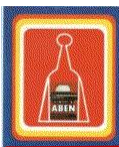


plans and individualized programs to meet the unique needs of each student. It can analyze data on student performance, learning style, preferences, and interests to offer Artificial intelligence recommendations. These data make the added value and global impact of artificial intelligence more understandable for the future economy, and in our case, for the future of education, which in turn, directs the economy and workforce, paving the way for the new Industrial Revolution. The in-depth development of artificial intelligence would affect many situations, from the restructuring of the social order in the broadest sense to the education and administration processes in classes and schools. Schools that are expected to adapt to the digital age and embed 21st century skills in their Artificial Intelligence agenda are some of the Artificial Intelligence institutions that could be most affected by the development of artificial intelligence. Karsenti (2019) points out that new forms of technology would fill in our lives and captivate our youth, and this case may leave schools with no choice but to make room for them. Educators can, however, identify students' learning abilities with data collection. Artificial Intelligence-driven tools promote communication and teamwork among students, fostering interactive discussions and group projects. Artificial Intelligence (AI) is applied in teaching across various facets, transforming traditional educational approaches. In essence, Artificial Intelligence in teaching transforms content creation, personalizes learning experiences, fosters collaboration, and supports data-driven decision-making. Artificial Intelligence serves as a facilitator of creativity by generating interactive learning materials, such as simulations and virtual labs, enhancing content beyond traditional methods. Moreover, it plays a pivotal role in shaping collaborative learning environments. These applications collectively contribute to a more dynamic, efficient, and student-centric educational environment such as:

Language learning systems: Artificial Intelligence create lessons for real situations and needs, such as directions for a trip, communicating with the doctor at the hospital, and meeting a foreign speaking classmate (V-soft, 2023). Artificial Intelligence are on various operating systems and a multitude of electronic devices, computers, laptops, tablets, and mobile phones. Artificial Intelligence allow the voice communication of students who speak different languages. Also, offer, voice and text recognition, of objects in real time via camera, for immediate. Improving the capabilities of students in special education. Akash (2023) opined that Students with various learning difficulties, such as comprehension of written or spoken language, difficulty in spelling, hyperactivity, distraction, various learning gaps, socialization difficulties, and students with mobility Artificial Intelligence, is directly helped with the appropriate applications of artificial intelligence and join world classes, with students who need to be treated accordingly and special instructors who have the appropriate qualifications for the specific case.

Virtual libraries: Through Artificial Intelligence programme students would be able to advance to libraries and scientific articles targeted, Artificial Intelligence knowledge, saving time, and expanding the possibilities of a school library. Thus, economics students would have the opportunity to deal with more complex issues and focus on the broader study and understanding of their teaching subjects (Frąckiewicz, 2023).

Simulations: Virtual environments that combine Artificial Intelligence to cover every requirement or every aspect of students' thinking and imagination. Even with the students being a part of the virtual world, the simulation environments are immersive and engage the participants. Tangible and total participation in the experiments, in contrast to traditional classrooms, where there were many restrictions to do so. Artificial Intelligence offer an easy way to gain hands-on experience without being in a similar environment, properly preparing for the rigors of the real world. Artificial Intelligence prepare students for a collaborative environment by providing



opportunities for collaborative work and problem solving. Engaging with such innovative environments paves the way for the future business world for students (Bouroniko, 2023).

Time management and creating a study plan: This reduces students' stress and boosts confidence in their abilities (Rem, 2023). Artificial intelligence applications allow students to create a study plan, that is, suggest what to do and when, prioritize key study items, Artificial Intelligence for faster study with better learning outcomes.

Virtual classrooms and collaborative environments. Classrooms are becoming global through virtual environments. A student has access to, may connect with, and encounter classmates from all over the world, as well as groups with comparable learning styles and interests. Artificial intelligence can provide access to appropriate and better learning opportunities for excluded people and communities, people with disabilities, refugees, people out of school, and those living in isolated communities (Pedro, Subosa, Rivas, & Valverde, 2019). Artificial Intelligence enables real-time use of virtual whiteboards, virtual teaching aids and simulations, in collaborative environments with students and teachers from around the world. Such environments can eliminate the limitations of a real classroom and give new possibilities and perspectives to students. Beyond automation, Artificial Intelligence shapes personalized learning, adaptive assessments, and innovative content creation. The importance of Artificial Intelligence in education marks a profound shift in teaching and learning.

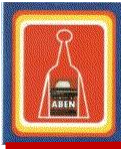
Importance of Artificial Intelligence in Secondary Schools

Haseski (2019) briefly states that the use of Artificial Intelligence in secondary schools would make learning more individual, provide effective learning experiences, enable students to discover their talents, improve their creativity and reduce teachers' workload. Artificial Intelligence are now becoming an important point of academic literature and scientific circles. With more usage of artificial intelligence in education, major transformations is foreseen in the education systems and its processes. It would help to mitigate the learning gaps, generate learning interests among students, increase-learning ability, and language affinity, and improve learning pace. Salunke (2020) stated that with the help of Artificial Intelligence in the education sector the quality and more of industry ready professionals would be out in the job market.

Although quality education seems to require the active participation of human teachers, artificial intelligence envisages increasing education and quality at all levels, especially by providing personalization (Grosz & Stone, 2018). In today's digital world, it's hard to imagine running a classroom without a using electronic learning facilities (Amesi & Ezeora, 2020). Given the growing prevalence of Artificial Intelligence (AI), it is imperious for secondary school pupils to possess a comprehensive comprehension of both the theoretical foundations of AI and its diverse practical applications (Balka, 2021). This is why Artificial Intelligence needs to be incorporated in classroom using some strategies for creativity and innovation in Economics subject in secondary schools.

Strategies for Economics Teachers to Incorporate Artificial Intelligence in Classrooms for Creativity and Innovation:

1. **Provide access to students to Artificial Intelligence tools** such as chatbots, virtual assistants, and personalized learning platforms that can help them learn more effectively.
2. **Encourage collaboration among** students by providing a platform for them to work together on projects and share ideas.
3. **Artificial Intelligence assess** student learning by providing real-time feedback and insights into student progress.
4. **Personalize learning** for students based on their individual needs, interests, and learning styles.



5. **Artificial Intelligence provide students with feedback** on their work and help them improve their skills.
6. **Artificial Intelligence conduct research** more efficiently and effectively.
7. **Integrate Artificial Intelligence with existing curriculum** or into existing lesson plans to make them more engaging and interactive.
8. **Foster creativity** among students by providing them with new and innovative tools and resources.
9. **Encourage exploration and experiment** with them to discover new ways of learning and creating.

Teachers can leverage the strategies of Artificial Intelligence in education to enhance classroom dynamics and enrich the learning experience in several ways. Artificial Intelligence-driven educational tools can facilitate personalized learning. These tools analyze individual student data to tailor instructional content, accommodating diverse learning styles and preferences. Teachers, therefore, ought to be conversant with the development in the technology space and how this affects the teaching of business and educational management to raise students that can cope with the present world of work (Bupo&Akpomi, 2023). These strategies ill not only be centered at teachers but also to Economics student for them to know the strategies on how to use Artificial Intelligence for creativity and innovation'

Strategies for Economics students to utilize Artificial Intelligence for Creativity and Innovation

1. Use Artificial Intelligence tools for self-assessment to track your progress as student and identify areas where you need to improve.
2. Personalize learning path with Artificial Intelligence based on your individual needs and preferences.
3. Collaborate with Artificial Intelligence-powered chatbots and virtual assistants and interact in the class with classmates and get help with your work using several sources for acquire knowledge or have feedback.
4. Create with Artificial Intelligence new and innovative projects that showcase your creativity and problem-solving skills.
5. Artificial Intelligence as feedback tools to receive feedback on your work and improve your skills.
6. Stay up-to-date to be informed about the latest Artificial Intelligence technologies and how they is used to support your learning.
7. Experiment with Artificial Intelligence tools and explore new ways of learning and creating.
8. Take ownership of your learning and set goals for yourself.
9. Think critically about Artificial Intelligence and its role in education and consider the potential benefits and drawbacks of using these technologies.

The fusion of Artificial Intelligence and education is indeed a game-changer, promising a brighter and more innovative future. Therefore, xcluding Economics students from using Artificial Intelligence for Creativity and Innovation would be very risky. To mitigate these dangers, it is essential to promote equitable access to Artificial Intelligence education for all Economics students, regardless of their background or socioeconomic status. This would help to ensure that everyone has the opportunity to benefit from the advancements in Artificial Intelligence. Moreover, Artificial Intelligence is transforming the job market, with increasing demand for professionals skilled in Artificial Intelligence and related fields. Teaching students about Artificial Intelligence can help them develop the knowledge and skills needed to pursue careers in



technology, data science and other in-demand industries. Artificial Intelligence learning can inspire students to generate ideas and solutions, fostering creativity and innovation but there are also some challenges to its implementations.

Challenges facing Artificial Intelligence for Creativity and Innovation in Economics

While Artificial Intelligence is a valuable tool for teachers, there is a danger that it could lead to education because it does not encourage students to think outside the box. Transferring the roles of teachers to computers is seen as a danger in the studies on artificial intelligence (Humble & Mozellus, 2019). According to Bupo and Akpomi (2023) some of the challenges attached is seen as:

- a. High cost of these technologies
- b. Lack of technical know-how
- c. Poor orientation of major key-players
- d. Lack of necessary infrastructure (power supply and internet facilities)
- e. Lack of funds

According to Pandey (2023), some of the challenges of Artificial Intelligence for creativity and Innovation which are:

- i. Lack of access to high-quality data.
- ii. Need for specialized expertise.
- iii. Lack of a team of experts with knowledge in both economics and computer science.

There is a wide range of not knowing how to apply Artificial Intelligence in teaching because of the complexity and cross-disciplinary nature of Artificial Intelligence, so teachers must possess a high level of intellect and comparative expertise in the usage of Artificial Intelligence. The results of Artificial Intelligence education as a whole are unexpected since there are significant gaps in professional knowledge, technology application expertise. Another challenge is that Artificial Intelligence would replace human teachers altogether, leading to a loss of the human element in education. **Teachers play a vital role in fostering creativity and critical thinking in students, and their input cannot be replaced by Artificial Intelligence.** While Artificial Intelligence is used to provide automated feedback and support, there is a danger that it could lead to a lack of empathy and understanding for the needs of individual students. There is a concern that **Artificial Intelligence would be used to replace creative tasks, such as writing or painting, leading to a decline in creativity and originality in teaching and learning Economics in Secondary Schools in Rivers State.** With Artificial Intelligence models like DALL-E that can generate realistic images from textual prompts, it is possible for people to create images without having any artistic skills. While this is a useful tool for designers and artists, there is a danger that it could lead to a homogenization of artistic expression that stifles creativity.

Conclusion

Artificial intelligence has entered almost in all the areas of our lives. Also it is the way to change the trends of life in all the aspects. Artificial intelligence is here to encourage the implementation of artificial intelligence education and promoting the development of cognitive and pedagogical skills. In order to make aware and use of the applications of Artificial Intelligence, secondary schools ought to apply artificial intelligence into for economics curriculum in order to lead the trend of the times. It is the concern of each and every Economics teacher to understand the benefits of Artificial Intelligence and how to use in an effective way to practice as a familiar skill. Artificial Intelligence redefines education by fostering creativity through innovative content creation, shaping collaborative learning environments, and facilitating comprehensive assessments. Its multifaceted role as a catalyst for dynamic and effective educational paradigms positions Artificial Intelligence as an invaluable tool in preparing students for the challenges of the



future. The integration of Artificial Intelligence marks a transformative shift, enriching the educational experience for both educators and learners alike. Artificial Intelligence helps teachers in economics in seeking out new ideas through research, professional development, and collaboration continually reviews curriculum to meet the ever-changing needs of the student. It can empower teacher to adjust to instructional methods for varied learning styles and tries out new assessments which offer students creative ways to demonstrate their knowledge and skills. When a teacher is empowered with Artificial intelligence knowledge for creativity and innovation, teachers' takes risk and is not afraid to let student choose their learning path while staying focused on the key learning competencies. Teachers can integrate Artificial Intelligence-generated content, such as simulations and virtual labs into lessons to make subjects more interactive and engaging. Furthermore, teachers can use artificial Intelligence analytics to gain insights into student performance trends. Finally, teachers can use Artificial Intelligence in the classroom to personalize learning, provide real-time support, integrate interactive content, streamline administrative tasks, and make data-informed decisions. It is the concern of teachers to understand and apply common artificial intelligence products, such as ChatGPT, Chatbot, QuillBot, Educational copilot, Duolingo, Gradescope, and Grammarly for creativity and innovation in Economics in Secondary Schools in Rivers State.

Way forward

Despite these concerns, there is also the potential for Artificial Intelligence to enhance creativity and innovation in economics in secondary schools. Artificial Intelligence is used as a tool to help students explore new ideas and perspectives, and to generate new insights and perspectives. With Artificial Intelligence, it is possible to analyze large amounts of data and identify patterns and connections that would be difficult for humans to identify on their own. This can help students to think more critically and creatively about the world around them. Providing students with access to Artificial Intelligence education can help close opportunity gaps, ensure they have the skills and knowledge to compete in the global workforce, and create a more diverse pool of talent in Artificial Intelligence and related fields. This diversity can lead to better problem-solving, creativity and innovation in the development of Artificial Intelligence technologies and solutions.

The following are way forward for this study:

1. We must embrace change and embrace the potential of Artificial Intelligence for creativity and innovativeness in Economics, in this journey, we ought to also prepare students for the future of work.
2. Secondary Schools are required to train and develop their students to upgrade them to face the challenge of the Artificial Intelligence revolution and fight successfully in the Artificial Intelligence age.
3. **Stay informed** about the latest Artificial Intelligence technologies and how they is used to improve learning in the classroom.
4. Most important, is time to focus on ethical considerations, as Artificial Intelligence becomes more prevalent in education (and everything and everywhere, all at once) it is important to focus on the ethical considerations surrounding its use, including issues of bias, privacy, and data security.
5. Artificial Intelligence has the potential to revolutionize the education sector by enhancing learning experiences, supporting teachers and offering more personalized learning opportunities for students. We must equip teachers with the knowledge and strategies they would need to use this new technology to improve and streamline everyday processes as well as classroom implementation. To prepare for this future, the task of



states and nations is to create a teacher profile that would work with these support structures (Wogu, Misra, Olu-Owolabi, Assibong & Udoh, 2018).

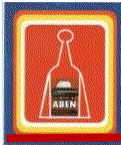
6. **Secondary schools ought to start small** by incorporating Artificial Intelligence into a few classrooms or specific areas of the curriculum before scaling up.
7. Provide teachers and staff with training on how to use Artificial Intelligence tools effectively and ethically.
8. Encourage a culture of innovation and experimentation, where teachers and students can explore new ideas and technologies in a safe and supportive environment

References

- Akash S. (2023). Collaborative learning in the metaverse: the future of education. Available from: <https://www.analyticsinsight.net/collaborative-learning-in-the-metaverse-the-future-of-education/>.
- Ahmed, B. E. (2023). Education copilot: the AI ultimate teaching platform. Retrieved from: <https://medium.com/@nelta133/education-copilot-the-ai-teaching/platform>
- Amesi, J. & Ezeora C.I (2022). Business Educators' Utilization of Software Internet Resources for Instructional Delivery in Postgraduate Programme in Rivers State Universities. *Nigeria Journal of Business Education*, 9(1). 194-208
- Andrew Ng. (2017). *Artificial intelligence is the new electricity*. Speech presented at Stanford MSx Future Forum in California, Stanford. <https://www.youtube.com/watch?v=21EiKfQYZXc>.
- Bouronikos V. (2023). Revolutionizing AI education with the power of simulation-based learning. from: <https://ied.eu/blog/education-blog/simulation-based-learning-ai-education/>.
- Bupo, G.C. & Akpomi, M.E. (2023). Artificial intelligence, robotics and information and communication technologies: Tools for enhancing business and educational management. *Journal of Business and Entrepreneurship Education*. 2(1). Pp21-29.
- Eka, Y. K., & Rahmah, F. (2022). Post-graduate student's perception of quillbot utilization in English academic writing class. *English teaching and linguistics*, 7(3), 437-451
- Frąckiewicz M. (2023) Transforming school libraries with AI. Available from: <https://ts2.space/en/transforming-school-libraries-with-ai/>.
- Fu, D. (2019) "Where Is School Education Going in the Era of Artificial Intelligence?" *Modern Education Management* 1(5):52-57.
- Gbemisola, M. O., & Vusy, N. (2016). Factors Affecting Effective Teaching and Learning of Economics in Some Ogbomosho High Schools, Oyo State, Nigeria. *Journal of Education and Practice*, 7(28), 115-124.
- Galuh, P. & Antonina, A. S. (2023). The use of grammarly by tertiary English language learners in their online writing classes. *Journal on English Teaching and Research*, 8(2), 163-179.
- Golic, Z. (2019). Finance and artificial intelligence: The fifth industrial revolution and its impact on the financial sector. *Zbornik radova Ekonomskog fakulteta u Istočnom Sarajevu*, (19), 67-81.
- Grosz, B. J., & Stone, P. (2018). A century-long commitment to assessing artificial intelligence and its impact on society. *Communications of the ACM*, 61(12), 68-73.
- Guo, Y., and Y. Xiao. (2019). "Artificial Intelligence in Education." *In 4th International Conference on Modern Management, Education Technology and Social Science (MMETSS 2019)* Atlantis Press.
- Harris, A., & De Bruin, L. (2018). Creativity in Education. Oxford Research Encyclopedia of Education. Retrived from: <https://oxfordre.com/education/view/10.1093/acrefore/97801>.
- Haseski. H.I. (2019). What do Turkish pre-service teachers think about artificial intelligence? *International Journal of Computer Science Education in Schools*, 3(2), 76-89



- Hinojo-Lucena, F. J., I. Aznar-Díaz, & J. M. Cáceres-Reche, M. P., & Romero-Rodríguez. (2019). "Artificial Intelligence in Higher Education: A Bibliometric Study on Its Impact in the Scientific Literature." *Education Sciences* 9(1), 51-69.
- Javaid, M., Haleem, A., Singh, P. R., Khan, S., & Khan, I. H. (2023). Unlocking the opportunities through chatGPT tool towards ameliorating the education system. *Benchcouncil Transactions on Benchmark, Standards and Evaluation*, 3(2), 345-355.
- Karsenti, T. (2019). Artificial intelligence in education: the urgent need to prepare teachers for tomorrow's schools. *Formationet profession*, 27(1), 112-116.
- Kingsley A. (2023). ChatGPT use in education, for and against. Available from: <https://www.linkedin.com/pulse/chatgpt-useeducation-against-al-kingsley>.
- Kripesh, A. R. (2014). Grammarly review. Is it really worth it? Retrieved from: <https://Kripeshadwani/grammarly-review>.
- Liu, Shufei. 2019. "Analysis on the Application of Face Recognition Technology in Smart Campus." *Telecom World* 9(1), 44-45.
- Malik, G., Tayal D. K, & Vij S. (2019). "An Analysis of the Role of Artificial Intelligence in Education and Teaching." *In Recent Findings in Intelligent Computing Techniques* 407-17.
- Marrone, R., Victoria T, & Gillian H. (2022). Creativity and Artificial Intelligence—A Student Perspective. *Journal of Intelligence* 10 (2), 65-72.
- Navidi, N., & Landry, R. (2021). New approach in human-AI interaction by Reinforcement-Imitation Learning. *Applied Sciences*, 11(7), 306-327.
- Pandey S. (2023). Artificial Intelligence-Powered Economics Education: Maximizing Learning Outcomes. *International Journal of Teaching and Education* 7(1) 22-41.
- Pannu, A. (2015). Artificial intelligence and its application in different areas.
- Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). *Artificial intelligence in education: Challenges and opportunities for sustainable development*. Paris: UNESCO.
- Sekeroglu, B., Dimililer, K., & Tuncal, K. (2019). Artificial intelligence in education: application in student performance evaluation. *DilemasContemporáneos: Educación, Política y Valores*, 7(1), 1-21.
- Sok, S. (2023). Opinion: Benefits and risks of ChatGPT in education. Cambodianess. Retrieved from: <https://cambodianess.com/article/opinion-benefitsand-risks-of-chatgpt-in-education>
- Timms, M. J. (2016). Letting artificial intelligence in education out of the box: educational cobots and smart classrooms. *International Journal of Artificial Intelligence in Education*, 26(2), 701-712.
- Tom, T. (2024). Grammarly Ai Review: How good is grammarly as an Ai writer: Retrieved from: <https://www.Contentelect.com/grammarly-review>.
- University of Lincoln (2024). Artificial Intelligence (AI) Detection in Turnitin. <https://digitaleducation.lincoln.ac.uk/resources-hub/artificial-intelligence-ai-detection-in-turnitin>.
- V-soft (2023). Consulting of the best language-learning chatbot apps. Available from: <https://blog.vsoftconsulting.com/blog/7-of-the-best-language-learning-chatbot-apps>
- Wartman, S. A., & Combs, C. D. (2019). Medical education must move from the information age to the age of artificial intelligence. *Academic Medicine*, 93(8), pp. 1107-1109.
- Wogu, I. A. P., Misra S., Olu-Owolabi, E. F., Assibong, P. A. & Udoh, O. D. (2018). Artificial intelligence, artificial teachers and the fate of learners in the 21st century education sector: Implications for theory and practice. *International Journal of Pure and Applied Mathematics*, 119(16), pp. 2245-2259.
- Zhang K., Zhizheng, Linlin Z., & Mang Li. (2019). "The Due Analysis of Artificial Intelligence Education Application: The Necessity and Possibility of Teaching Automation." *Distance Education in China* (1):25-35.



ENHANCING TEACHING EFFECTIVENESS THROUGH AI POWERED LEARNING MANAGEMENT SYSTEMS AMONG BUSINESS EDUCATORS IN TERTIARY INSTITUTIONS IN ANAMBRA STATE: OPPORTUNITIES AND CHALLENGES

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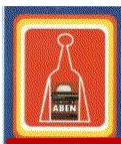
Abstract

This study investigated the potential of AI-driven Learning Management System (LMS) in improving educational practices among business educators in public tertiary institutions in Anambra State. Three research questions guided the study. The study employed a descriptive survey research design using 112 business educators as population. Data were collected using questionnaire, structured into three clusters, with reliability coefficients of 0.71, 0.74, and 0.86, respectively, as assessed by Cronbach's alpha. Data analysis was conducted using mean scores and standard deviations. The findings of this study reveal a low level of utilization of AI-powered Learning Management Systems (LMS) among business educators in public tertiary institutions in Anambra State. The adoption and integration into teaching practices remain limited among these educators. Additionally, the study also identified several challenges and barriers faced by business educators in adopting and integrating AI-powered LMS into their teaching practices. These challenges include a lack of training on effectively using AI-powered LMS, limited access to necessary technology and infrastructure among others. Based on these findings, the study recommended that government in collaboration with public tertiary institutions should organise comprehensive training programmes for business educators to ensure effective AI integration. These programmes should encompass fundamental AI technologies, practical classroom applications, and strategies for leveraging AI tools to enhance teaching effectiveness. Continuous professional development should be provided to keep business educators abreast of the latest advancements in AI and educational technology.

Keywords: Teaching Effectiveness, Artificial Intelligence, AI, Learning Management Systems, LMS, business educators, opportunities, challenges

Introduction

Higher education in the 21st century is evolving rapidly due to advances in technology, globalization, and changing student demographics. With the widespread availability of online learning platforms, universities are increasingly offering courses and degree programs that can be completed entirely online (Dieguez et al., 2021). This practice provides greater access to higher education and offers students more flexibility in their learning process (Neumann et al., 2021). As educational sectors become more diverse, with students enrolling from a variety of environments, there is a growing emphasis on cross-cultural understanding and global citizenship. As the pace of technological change accelerates, universities are playing a more



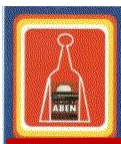
significant role in driving innovation and research (Bisen, et al., 2021). This has led to more partnerships between academia and industry, as well as a greater focus on entrepreneurship and commercialization. In contemporary employment drives, employers are increasingly seeking graduates with specific skills and competencies rather than a broad-based education (Kocak et al., 2021). Consequently, notable institutions are shifting towards teaching and learning process that can enhance skills-based learning patterns that offer students practical, career-focused skills.

Teaching and learning process can be defined as a transformation process of knowledge from teachers to students. It is referred as the combination of various elements within the process where an educator identifies and establishes the learning objectives and develops teaching resources and implements the teaching and learning strategy. Teaching effectiveness is a multifaceted concept that goes beyond the mere delivery of content. According to Centra (1993), it involves the ability of instructors to not only convey subject matter but also engage students in a way that promotes deep understanding and critical thinking. This definition emphasizes the importance of interaction and adaptability in the teaching process, recognizing that effective teaching requires responsiveness to the varied needs and learning styles of students. Engaging students and fostering a participatory learning environment are critical components of effective teaching, as they help students develop critical thinking skills and a deeper understanding of the material.

Marzano (2003) expands on this by highlighting the comprehensive impact of teaching on student achievement. This definition underscores the significance of creating a positive learning environment, utilizing diverse instructional strategies, and continually assessing and refining teaching practices. Effective teaching, in this view, is not static but dynamic, requiring educators to be reflective practitioners who are committed to ongoing professional development. The use of varied instructional methods is crucial for addressing different learning styles and ensuring that all students can benefit from the instruction. Both definitions agree on the necessity of engaging students and adapting teaching methods to meet their needs. They also highlight the importance of continuous improvement in teaching practices, whether through formal assessment or reflective practice. Together, these definitions of teaching effectiveness provide a holistic view, emphasizing the interaction between teacher behavior, student engagement, and educational outcomes.

Teaching effectiveness is a multi-dimensional construct that encompasses various aspects of the teaching process, including the ability to deliver content clearly, engage students, manage the classroom, and assess student learning (Munna & Kalam, 2021). For business educators, teaching effectiveness is crucial as it directly impacts students' understanding of complex business concepts, their ability to apply theoretical knowledge in practical scenarios, and their readiness for the business world. AI-powered learning management systems (LMS) offer significant opportunities to enhance teaching effectiveness among business educators in public tertiary institutions by addressing these three critical components; teacher behaviour, student engagement and educational outcomes. AI-powered LMS can significantly enhance teaching effectiveness for business educators by providing advanced tools and resources that address the key components of effective teaching.

The development of AI has resulted in an array of advancements and innovations that have impacted many facets of human life. As a fundamental component to societal evolution and individual development, education has had significant benefits from AI breakthroughs. For instance, the integration of AI in educational systems is altering the ways in which students learn, teachers educate, and institutions function (Bisen, et al., 2021). By personalizing learning



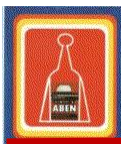
experiences, automating administrative responsibilities, and delivering real-time feedback, AI is revolutionizing the educational landscape, bridging gaps, and encouraging a more inclusive and effective learning environment.

AI-powered learning management systems (LMS) are digital platforms that leverage artificial intelligence to enhance the delivery, management, and assessment of educational content. These systems utilize AI algorithms to provide personalized learning experiences, automate administrative tasks, and offer real-time feedback to both students and educators, thereby improving the overall efficiency and effectiveness of the educational process (Choi, 2020). As Aldosari (2020) opined, AI-powered learning management systems (LMS) are advanced educational platforms that integrate artificial intelligence technologies to support and optimize teaching and learning processes. These systems enable adaptive learning, personalized content delivery, automated grading, and predictive analytics to identify and support at-risk students, fostering a more individualized and data-driven educational environment. Chaudhry et al. (2023) emphasize that AI-powered LMS can adapt to the teaching and learning preferences of teachers and students, making the educational process more engaging and effective.

AI in LMS can significantly improve teacher behaviour by automating routine administrative tasks, allowing educators to focus more on pedagogical strategies and student engagement. According to Munna and Kalam (2021), the teaching and learning process can be enhanced through continuous feedback and adaptive learning, which AI systems can provide. AI tools can analyze teaching practices, suggest improvements, and offer personalized professional development opportunities. For example, AI-powered teaching tools provide feedback on teaching performance, helping educators refine their teaching methods to better engage students. Also, student engagement is a key factor in effective teaching, and AI-powered LMS can greatly enhance this aspect by providing personalized learning experiences. Pedro et al. (2019) highlight that AI in education can tailor educational content to individual student needs, making learning more interactive and meaningful.

Additionally, AI-driven tools such as chatbots and virtual assistants can offer instant support and answers to student queries, fostering a more responsive and engaging learning environment. AI-powered LMS can also improve educational outcomes by offering real-time feedback and data-driven insights into student performance. Kamalov et al. (2023) note that AI applications can analyze large datasets to identify patterns and predict student performance, enabling early intervention for those at risk of academic failure. This proactive approach ensures that students receive the necessary support to succeed, ultimately leading to better educational outcomes. Moreover, AI can facilitate more accurate and efficient assessment methods, providing immediate feedback to students and helping them understand their strengths and areas for improvement. Thus, the holistic approach to teaching effectiveness, which includes teacher behaviour, student engagement, and educational outcomes, can be significantly enhanced through the integration of AI-powered LMS. As Ndem (2016) points out, effective teaching requires continuous improvement and adaptation to meet the evolving needs of students. AI provides the tools and insights necessary for educators to enhance their teaching practices, engage students more effectively, and achieve better educational outcomes.

Artificial intelligence is playing a vital role in upgrading the quality of higher education in numerous ways (Choi, 2020). AI-powered learning approaches have been employed to evaluate students' performance records, determine their strengths and weaknesses, and provide them with customized learning experiences that are tailored to their individual needs. This approach provides students with a tool kit model to gain knowledge more effectively with a productive outcome (Aldosari, 2020). AI-based technology such as chatbots, virtual assistance tools, and

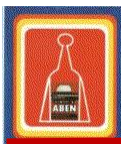


adaptive learning systems offer immersive and engaging learning experiences that allow students to discover complex theories and solutions in a more interactive and meaningful manner (Chaudhry et al., 2023; Pradana et al., 2023). In assessment and feedback, AI assists in grading and appraising student assignments, for example, monitoring students' participation and involvement in library resource utilization, providing faster and more precise feedback to students, and freeing up time for instructors to focus on other aspects of teaching (Essien et al., 2020).

Consequently, as technology continues to evolve and improve, one can expect to see even more innovative and effective applications of AI in education, leading to more personalized, engaging, and effective learning experiences for students (Li et al., 2021). This promising journey of AI has the potential to significantly improve the performance and engagement of teachers in higher education. Since teaching staff in higher education have a critical role both in administrative and academic areas and are completely engaged in regulatory, accreditation, and other important activities, the adoption of AI can help teachers automate administrative tasks, such as grading assignments, tracking attendance, and providing feedback to students (Bisen et al., 2021). AI also can help teachers identify areas where they can improve their teaching skills and provide personalized professional development opportunities.

Though the integration of AI in LMS offers several benefits, however, the adoption of AI in education also presents certain challenges, especially in developing country like Nigeria. Essien et al. (2020) discuss the potential obstacles, including the need for substantial investment in technology infrastructure and the training required for educators to effectively utilize these advanced systems. Additionally, there are concerns about data privacy and the ethical implications of using AI to monitor and analyze student behavior. In the landscape of higher education in Nigeria, persistent challenges such as unequal access, limited inclusivity, and the inadequacy of catering to diverse learning styles can pose significant challenges (Odhiambo, 2016; Sanusi, 2022). As Odhiambo reasoned, the prevailing use of traditional, one-size-fits-all teaching methods falls short of effectively engaging students with varied learning preferences, hindering the development of active participation and critical thinking skills. Moreover, reliance on traditional assessment methods fails to capture a comprehensive understanding of students' knowledge, skills, and practical application, with limited tools for assessing and enhancing non- cognitive skills. Going by these notions, traditional teaching and assessment approaches seem insufficient in addressing these pressing issues.

Moreover, the absence of opportunities for international collaboration and cultural exchange in higher education compounds these challenges. To bridge these gaps, the integration of artificial intelligence (AI) emerges as a pivotal solution. AI algorithms have the capacity to analyze individual learning patterns, allowing for the tailoring of coursework to accommodate diverse students learning preferences. The incorporation of predictive analytics for instance, can effectively identify students at risk, facilitating timely interventions to support their academic journey (Neumann et al., 2021). Also, AI-driven educational content delivery systems can offer adaptability to students' pace, learning styles, and knowledge gaps, thereby revolutionizing the approach to content dissemination. Additionally, the automation of administrative tasks through AI can provide the means to liberate educators from routine responsibilities, allowing them to focus on more impactful activities. Hence, this research will actively contribute to the empowerment of the higher education system through the adoption of AI. The findings of this research endeavour will serve to assist institutional policymakers in recognizing how the adoption of new technology is perceived in higher education, enabling them to provide the necessary infrastructure and training to overcome specific challenges. Since the role of AI is inevitable in future education, current research aims to investigate opportunities and challenges in enhancing teaching effectiveness



through AI powered learning management systems among business educators in public Tertiary institutions in Anambra State.

Statement of the Problem

In the rapidly evolving educational landscape, the integration of artificial intelligence (AI) in learning management systems (LMS) has emerged as a transformative approach to enhance teaching effectiveness. AI-powered LMS have the potential to personalize learning experiences, automate administrative tasks, provide real-time feedback, and ultimately improve educational outcomes. However, despite these promising benefits, the adoption and implementation of AI-powered LMS in public tertiary institutions, particularly among business educators in Anambra State, Nigeria, remain limited and uneven. Business educators play a critical role in preparing students for the dynamic and competitive business environment. Yet, many of these educators face challenges in effectively engaging students, personalizing instruction, and managing administrative tasks. Traditional teaching methods often fail to address the diverse learning needs of students and the increasing demand for innovative teaching strategies. Moreover, there is a significant gap in understanding the current level of awareness, utilization, and challenges and barriers faced by business educators in adopting and integrating AI-powered LMS in their teaching practices among business educators in public tertiary institutions in Anambra State.

The potential opportunities offered by AI-powered LMS, such as enhancing teaching practices, improving student engagement, and streamlining administrative processes, are significant. However, these opportunities are often accompanied by challenges, including technological barriers, lack of training, resistance to change, and concerns about data privacy and ethical implications. This study seeks to investigate the current state of AI-powered LMS adoption among business educators in public tertiary institutions in Anambra State, explore the opportunities these systems present for enhancing teaching effectiveness, and identify the challenges that hinder their widespread implementation.

Purpose of the Study

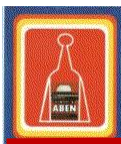
The main purpose of the study is to investigate opportunities and challenges in enhancing teaching effectiveness through AI powered learning management systems among business educators in public Tertiary institutions in Anambra State. Specifically, the study sought to examine:

1. To assess the current level of utilization of AI-powered learning management systems (LMS) among business educators in public tertiary institutions in Anambra State.
2. To identify the opportunities provided by AI-powered LMS for enhancing teaching and administrative duties of business educators in public tertiary institutions.
3. To examine the challenges and barriers faced by business educators in adopting and integrating AI-powered LMS in their teaching practices.

Research Questions

The following research questions will guide the study:

1. What is the current level of utilization of AI-powered learning management systems among business educators in public tertiary institutions in Anambra State?
2. What opportunities do AI-powered LMS provide for enhancing the teaching and administrative duties of business educators in public tertiary institutions?
3. What are the challenges and barriers faced by business educators in adopting and integrating AI-powered LMS in their teaching practices?



Method

This study aims to investigate the enhancement of teaching effectiveness through AI-powered Learning Management Systems (LMS) among business educators in public tertiary institutions in Anambra State, focusing on both opportunities and challenges. This methodology section outlines the research design, population and sample, data collection methods, data analysis procedures, and ethical considerations.

The study employed a mixed-methods approach, combining quantitative and qualitative data collection and analysis techniques. This approach will provide a comprehensive understanding of the current state of AI-powered LMS adoption, its impact on teaching effectiveness, and the opportunities and challenges associated with its implementation. The target population for this study includes all the 112 business educators in public tertiary institutions in Anambra State. The entire population of 112 business educators in all the public institutions in Anambra State was used for the study. Thus, there was no sampling since the population was manageable.

The instrument for data collection is a questionnaire titled "Questionnaire for Enhancing Teaching Effectiveness through AI-Powered Learning Management Systems" (QEETAPLS) is a structured data collection questionnaire consisting of a series of questions designed to gather information from respondents. In the context of this study, the questionnaire is used to assess the utilization, opportunities, and challenges associated with AI-powered learning management systems (LMS) among business educators in public tertiary institutions in Anambra State. The questionnaire includes items related to three key research questions arranged in clusters A, B, and C. Each cluster was structured to address specific research question and with items tailored to capture specific aspects of the educators' experiences and perceptions gearing towards answering the research questions. The questionnaire has a Likert-scale items and closed-ended response options designed to assess:

Utilization of AI-powered LMS

Opportunities presented by AI-powered LMS

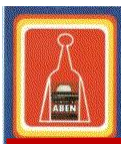
Challenges and barriers to adoption

The questionnaire was validated by two experts in Vocational and Technology Education and 1 in measurement and evaluation. The internal consistency reliability was established through a pilot test. Cronbach alpha statistical method was used to establish the reliability coefficient of 0.71, 0.74 and 0.86 for each of the clusters. Copies of the questionnaires were distributed directly to the respondents to ensure a wide reach and facilitate easy data collection.

Data from the questionnaires were analysed using descriptive statistics. Descriptive statistics (mean, standard deviation, frequency, and percentage) will summarize the responses. The decision rule for research question 1 include: Low = 10 – 15, Moderate = 20 – 25, High = 30 – 40. However, mean decision rule of 2.5 was used in taking decision for research questions two and three. All participants will be provided with detailed information about the study's purpose, procedures, potential risks, and benefits. Informed consent will be obtained before participation. Participants' identities and responses will be kept confidential. Data will be anonymised to protect privacy. Participation in the study will be entirely voluntary, and participants can withdraw at any time without any consequences.

Results

Data from the field of study are analysed and presented in the table as follows:

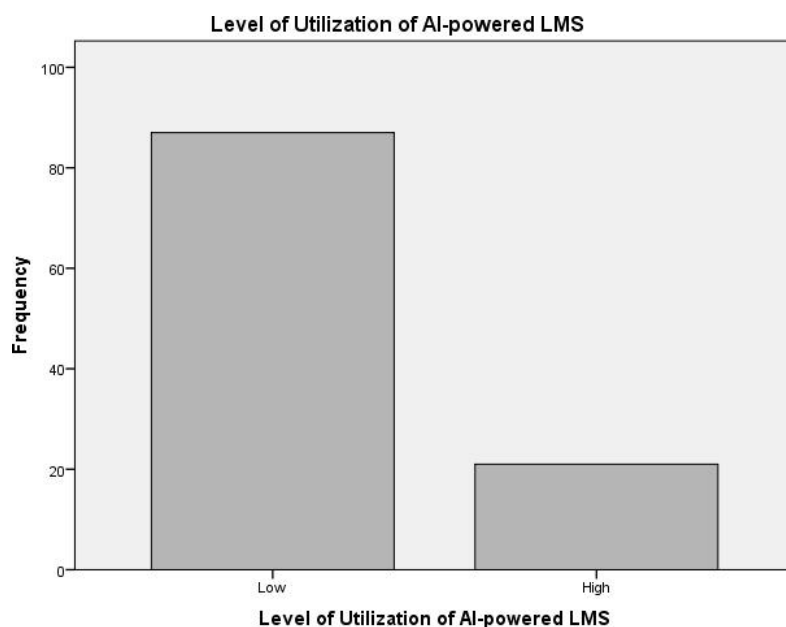


Research Question 1

What is the current level of utilization of AI-powered learning management systems among business educators in public tertiary institutions in Anambra State?

Table 1: Range of scores and percentages showing the current level of utilization of AI-powered LMS among business educators in public tertiary institutions

Range	Frequency	Percent	Decision
Low	87	80.6	Low
High	21	19.4	
Total	108	100.0	



Findings in table 1 and the chart revealed that with frequency and percentages responses of majority of business educators low = 87(80.6 percent) and High = 21(19.4 percent), the current level of utilization of AI-powered learning management systems among business educators in public tertiary institutions in Anambra State is low.

Research Question 2

What opportunities do AI-powered LMS provide for enhancing the teaching and administrative duties of business educators in public tertiary institutions?

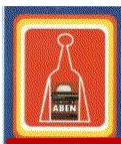


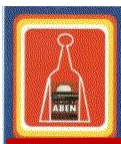
Table 2: Mean response scores of business educators on opportunities that AI-powered LMS provide for enhancing teaching of business educators in public tertiary institutions

	N	Mean	Std. Deviation
AI-powered LMS improves my ability to provide personalized learning experiences for students.	108	3.49	.502
AI-powered LMS helps me manage administrative tasks more efficiently.	108	3.08	.810
Using AI-powered LMS enhances student engagement in my classes.	108	2.96	.875
AI-powered LMS provides valuable insights into student performance and progress.	108	3.55	.500
AI-powered LMS enables more effective communication with students.	108	2.54	1.072
AI-powered LMS facilitates better collaboration among faculty members.	108	2.95	.825
Using AI-powered LMS helps in identifying at-risk students early.	108	3.55	.500
AI-powered LMS streamlines the process of creating and updating course materials.	108	3.54	.501
AI-powered LMS supports a more flexible and adaptive learning environment.	108	2.99	.803
AI-powered LMS has positively impacted my teaching and administrative efficiency.	108	3.47	.502

Table 2 revealed that based on the mean decision rule of 2.5, highlight the transformative impact of AI-powered Learning Management Systems (LMS) on teaching effectiveness among business educators in public tertiary institutions in Anambra State. Educators reported that these systems significantly enhance their ability to provide personalized learning experiences for students; manage administrative tasks more efficiently; enhances student engagement in classes; provide valuable insights into student performance and progress; enable more effective communication with students; facilitates better collaboration among faculty members. Using AI-powered LMS helps in identifying at-risk students early; streamline the process of creating and updating course materials and supports a more flexible and adaptive learning environment.

Research Question 3

What are the challenges and barriers faced by business educators in adopting and integrating AI-powered LMS in their teaching practices in Anambra State?

**Table 3:** Mean response scores on the challenges and barriers faced by business educators in adopting and integrating AI-powered LMS in their teaching practices

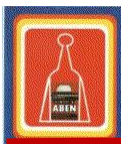
	N	Mean	Std. Deviation
Lack of training on how to use AI-powered LMS effectively is a significant barrier.	108	3.04	.853
Limited access to necessary technology and infrastructure hinders the adoption of AI-powered LMS.	108	2.98	.831
Concerns about data privacy and security prevent me from fully utilizing AI-powered LMS.	108	1.99	.859
Resistance to change among faculty members is a major challenge in adopting AI-powered LMS.	108	2.35	1.035
The cost of implementing AI-powered LMS is a significant barrier.	108	3.00	.809
Technical issues and software glitches make it difficult to use AI-powered LMS effectively.	108	2.06	.783
Lack of institutional support and resources for AI-powered LMS adoption is a challenge.	108	3.60	.492
Difficulty in integrating AI-powered LMS with existing teaching practices and curriculum.	108	2.60	1.191
Uncertainty about the effectiveness of AI-powered LMS in improving teaching outcomes.	108	1.84	.799
The challenges and barriers to adopting AI-powered LMS outweigh the potential benefits.	108	2.06	.783

Table 3 revealed that based on the mean decision rule of 2.5, the challenges and barriers faced by business educators in adopting and integrating AI-powered LMS in their teaching practices include: Lack of training on how to use AI-powered LMS effectively, limited access to necessary technology and infrastructure, the high cost of implementing AI-powered LMS, lack of institutional support and resources for AI-powered LMS adoption and difficulty in integrating AI-powered LMS with existing teaching practices and curriculum.

Discussion

The Findings of the study are hereby discussed:

The findings of the research question one reveal that the current level of utilization of AI-powered learning management systems (LMS) among business educators in public tertiary institutions in Anambra State is low, with a significant majority of respondents, 87 (80.6%), reporting low usage and only 21 (19.4%) indicating high usage. This indicates that despite the potential benefits of AI-powered LMS, their adoption and integration into teaching practices remain limited among these educators. This finding aligns with previous studies that have highlighted similar challenges in the adoption of AI and advanced technologies in education. For instance, Essien, Chukwukelu, and Essien (2020) discuss the opportunities and challenges of adopting AI for learning and teaching in higher education. They emphasize that while AI technologies have the potential to revolutionize



education; their adoption is often hindered by factors such as lack of training, infrastructure, and institutional support. This supports the current finding of the study that the utilization of AI-powered LMS is low due to similar barriers.

Furthermore, Aldosari (2020) in his study on the future of higher education in the light of AI transformations also emphasised on the slow adoption rate of AI technologies in educational settings. Aldosari points out that despite the transformative potential of AI to enhance educational outcomes and administrative efficiency, many educators and institutions are still in the early stages of integration due to a variety of challenges including resistance to change, cost, and technical issues. This reinforces the current findings that the utilization of AI-powered LMS among business educators in Anambra State is not yet widespread. On the other hand, there are studies that suggest a more optimistic view of AI integration in education. For example, Choi (2020) highlights the opportunities for higher education in Korea through AI, suggesting that with proper support and training, educators can effectively leverage AI technologies to enhance teaching and learning outcomes. However, the low level of utilization found in the current study indicates that such support and training might be insufficient or lacking in the context of public tertiary institutions in Anambra State, especially among business educators.

Findings of the research question two reveals that AI-powered Learning Management Systems (LMS) have a transformative impact on teaching effectiveness among business educators in public tertiary institutions in Anambra State. Educators reported significant improvements in their ability to provide personalized learning experiences for students, manage administrative tasks more efficiently, and enhance student engagement in classes. Additionally, AI-powered LMS provides valuable insights into student performance and progress, enables more effective communication with students, facilitates better collaboration among faculty members, and helps in identifying at-risk students early. Furthermore, these systems streamline the process of creating and updating course materials and support a more flexible and adaptive learning environment.

These findings are supported by previous studies. Dieguez et al. (2021) emphasize the transformative role of technology in education, particularly in developing 21st-century skills such as entrepreneurship and leadership. Their study highlights that the integration of advanced technologies, including AI, significantly enhances the educational experience by providing personalized learning opportunities and improving administrative efficiencies, which is consistent with the current study's findings. Similarly, Kocak et al. (2021) discuss the mediating role of critical thinking and cooperatively in the 21st-century skills of higher education students, emphasizing that the adoption of AI and advanced technologies in educational settings leads to improved student engagement and collaboration among faculty members. This aligns with the current findings that AI-powered LMS enhances student engagement, facilitates better faculty collaboration, and supports a flexible and adaptive learning environment. However, some studies highlight challenges that might hinder the full realization of AI-powered LMS's potential. For instance, Essien, Chukwukelu, and Essien (2020) discuss the opportunities and challenges of adopting AI in higher education, noting barriers such as lack of training, infrastructure, and institutional support. These challenges could explain why the utilization of AI-powered LMS remains low among business educators in Anambra State, despite the reported benefits.

Findings of the research question three revealed that business educators in public tertiary institutions in Anambra State face several challenges and barriers in adopting and integrating AI-powered Learning Management Systems (LMS) into their teaching practices. These challenges include a lack of training on effectively using AI-powered LMS, limited access to necessary technology and infrastructure, the high cost of implementing AI-powered LMS, lack of institutional



support and resources for AI-powered LMS adoption, and difficulty integrating AI-powered LMS with existing teaching practices and curriculum. These findings are in agreement with previous studies, highlighting the difficulties educators face in adopting new technologies. For instance, Essien, Chukwukelu, and Essien (2020) discuss the opportunities and challenges of adopting artificial intelligence for learning and teaching in higher education. They emphasize that while AI offers significant potential for enhancing educational outcomes; its implementation is often hampered by inadequate training, insufficient infrastructure, and lack of institutional support. This supports the current findings that these barriers significantly impact the adoption of AI-powered LMS.

Similarly, Neumann et al. (2021) explore the barriers to teaching 21st-century competencies and the impact of digitalization in higher education. They identify several challenges, including the need for professional development, the high cost of technology, and difficulties in integrating new technologies with existing curricula. These findings corroborate the current study's results, which highlight similar barriers faced by business educators in Anambra State. In contrast, some studies suggest that despite these challenges, there are ways to overcome these barriers. For example, Dieguez, Loureiro, and Ferreira (2021) emphasize the importance of entrepreneurship and leadership in higher education to develop the necessary 21st-century skills. They argue that with proper training, support, and leadership, the integration of advanced technologies, including AI, can be successfully achieved, leading to improved educational outcomes. While this perspective acknowledges the challenges identified in the current study, it also offers a potential pathway for overcoming them.

Conclusion

The findings of this study reveal a low level of utilization of AI-powered Learning Management Systems (LMS) among business educators in public tertiary institutions in Anambra State. Despite the well-documented potential benefits of AI-powered LMS, their adoption and integration into teaching practices remain limited among these educators. The study also demonstrates that AI-powered LMS have a transformative impact on teaching effectiveness among business educators in public tertiary institutions in Anambra State. Business educators reported significant improvements in various aspects of their teaching practices. These include enhanced ability to provide personalized learning experiences, more efficient management of administrative tasks, and increased student engagement in classes. However, the study also identified several challenges and barriers faced by business educators in adopting and integrating AI-powered LMS into their teaching practices. These challenges include a lack of training on effectively using AI-powered LMS, limited access to necessary technology and infrastructure, the high cost of implementing AI-powered LMS, lack of institutional support and resources for AI-powered LMS adoption, and difficulty in integrating AI-powered LMS with existing teaching practices and curriculum.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Federal and State government in collaboration with public tertiary institutions should organise comprehensive training programs for business educators to ensure effective AI integration. These programs should encompass fundamental AI technologies, practical classroom applications, and strategies for leveraging AI tools to enhance teaching effectiveness. Continuous professional development should be provided to keep educators abreast of the latest advancements in AI and educational technology.
2. Public tertiary institutions should organize comprehensive training programs to equip business educators with the necessary skills to effectively use AI-powered LMS. This



should include hands-on workshops, online courses, and continuous professional development opportunities to ensure educators are proficient in utilizing these systems. These training sessions should cover all aspects of LMS utilization, including personalized learning, administrative task management, and student engagement strategies.

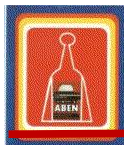
3. Public tertiary institutions should invest in upgrading their technological infrastructure to support the effective implementation of AI-powered LMS. This includes providing reliable internet access, modern computer labs, and necessary hardware and software resources.
4. Given the high cost of implementing AI-powered LMS, institutions should seek funding from government bodies, educational grants, and private partnerships to subsidize these costs. Additionally, providing financial incentives for educators who adopt and integrate AI-powered LMS could encourage wider usage. Institutions should strengthen their support structures for educators by providing dedicated IT support teams, offering regular troubleshooting sessions, and maintaining a robust helpdesk service to address technical issues promptly.
5. Strong institutional support is crucial for the successful adoption of AI-powered LMS. Government should develop policies that promote the use of these systems and provide continuous support and resources to educators.

References

- Aldosari, S. A. M. (2020). The future of higher education in the light of artificial intelligence transformations. *International Journal of Higher Education*, 9(3), 145-151. <https://doi.org/10.5430/ijhe.v9n3p145>
- Bisen, I. E., Arslan, E. A., Yildirim, K., & Yildirim, Y. (2021). *Artificial intelligence and machine learning in higher education. In machine learning approaches for improvising modern learning systems* (pp. 1-17). IGI Global. <https://doi.org/10.4018/978-1-7998-5009-0.ch001>
- Centra, J. A. (1993). *Reflective Faculty Evaluation: Enhancing Teaching and Determining Faculty Effectiveness*. Jossey-Bass.
- Chaudhry, I. S., Sarwary, S. A. M., El Refae, G. A., & Chabchoub, H. (2023). Time to revisit existing student's performance evaluation approach in higher education sector in a new era of ChatGPT — a case study. *Cogent Education*, 10(1), 2210461. <https://doi.org/10.1080/2331186X.2023.2210461>.
- Choi, K.-S. (2020). Opportunities for higher education of artificial intelligence in Korea. *International Journal of Engineering Research & Technology*, 13(11), 3428-3430. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85099496874&partnerID=40&md5=b17ea209ef4c14d7520981bc79ea5b22>
- Dieguez, T., Loureiro, P., & Ferreira, I. (2021). Entrepreneurship and leadership in higher education to develop the needed 21st Century skills. In 17th European Conference on Management, Leadership and Governance, ECMLG 2021. Academic Conferences International Limited, pp. 143-151. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85122925043&partnerID=40&md5=65810f73e090f33037e2729a253b6adf>.
- Egwu, S.O. (2015). Enhancing Teachers' Effectiveness in Secondary Schools in Nigeria through Motivation for Education Development. *Research on humanities and social sciences*, 5(2), 52-56. <https://core.ac.uk/download/pdf/234674591.pdf>



- Essien, A., Chukwukelu, G., & Essien, V. (2020). Opportunities and challenges of adopting artificial intelligence for learning and teaching in higher education. In *Fostering communication and learning with underutilized technologies in higher education*, pp. 67-78. IGI Global. <https://doi.org/10.4018/978-1-7998-4846-2.ch005>
- Kamalov, F.; Santandreu Calonge, D.; Gurrib, I. (2023). New era of artificial intelligence in education: Towards a sustainable multifaceted revolution. *Sustainability*, 15, 12451. <https://doi.org/10.3390/su151612451>
- Kocak, O., Coban, M., Aydin, A., & Cakmak, N. (2021). The mediating role of critical thinking and cooperativity in the 21st century skills of higher education students. *Thinking Skills and Creativity* 42, 100967. <https://doi.org/10.1016/j.tsc.2021.100967>
- Marzano, R. J. (2003). *What Works in Schools: Translating Research into Action*. Association for Supervision and Curriculum Development (ASCD).
- Munna, A.S. & Kalam, M.A. (2021). Teaching and learning process to enhance teaching effectiveness: a literature review. *International Journal of Humanities and Innovation*, 4(1), 1-4. <https://files.eric.ed.gov/fulltext/ED610428.pdf>
- Ndem, J.U. (2016). Mechanisms for enhancing teachers' effectiveness in the implementation of agricultural science programme in secondary schools in Afikpo Education Zone of Ebonyi State. *Journal of Education and Practice*, 4(7), 6-16. <https://files.eric.ed.gov/fulltext/EJ1092385.pdf>
- Neumann, C. Stroud, K. M, Bailey, S, Allison, K, & Everts, S. S. (2021). 21st-century competencies in higher education: A practitioner's guide. In *Handbook of research on barriers for teaching 21st-Century competencies and the impact of digitalization*. IGI Global pp. 293-315. <https://doi.org/10.4018/978-1-7998-6967-2.ch016>.
- Paolini, A. (2015). Enhancing teaching effectiveness and student learning outcomes. *The Journal of Effective Teaching*, 15(1), 20-33. <https://files.eric.ed.gov/fulltext/EJ1060429.pdf>
- Pedro, F., Subosa, M., Rivas, A., Valverde, P. (2019). Artificial intelligence in education: challenges and opportunities for sustainable development. United Nations Educational, Scientific and Cultural Organization. <https://unesdoc.unesco.org/ark:/48223/pf0000366994>
- Pradana, M., Elisa, H. P., & Syarifuddin, S. (2023). Discussing ChatGPT in education: A literature review and bibliometric analysis. *Cogent Education*, 10(2), 2243134. <https://doi.org/10.1080/2331186X.2023.2243134>
- Sanusi, M. S. (2022). Action research to reassess the acceptance and use of technology in a blended learning approach amongst postgraduate business students. *Cogent Education*, 9(1), 2145813. <https://doi.org/10.1080/2331186X.2022.2145813>



CHALLENGES AND PROSPECTS OF INTEGRATING ROBOTICS IN BUSINESS EDUCATION PROGRAMMES IN TERTIARY INSTITUTIONS IN DELTA STATE

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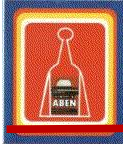
Abstract

The main purpose of the study was to investigate the challenges and prospects of integrating robotics in tertiary institutions in Delta State. Two research questions guided the study and two hypotheses were tested at 0.05 level of significance. The study adopted the descriptive survey research design. The population of the study comprised 157 business educators in tertiary institutions in Delta State. The instrument of data collection was a structured validated questionnaire developed by the researchers. The test of reliability of the instrument using Cronbach Alpha yielded reliability co-efficient of 0.83 and 0.89 for clusters, 1 and 2 with a general reliability co-efficient of 0.85. Mean, standard deviation and t-test were used to analyse data for the study. The finding of the study revealed that the challenges of integrating robotics in business education programmes in tertiary institutions in Delta State are lack of infrastructure to support the integration of robotics and lack of experts to facilitate the integration of robotics in business education programmes in tertiary institutions among others. Findings further revealed that robotics can help business education programmes in tertiary institutions promote hands-on learning experiences that stimulate critical thinking, problem-solving, and creativity among students, assists business education programmes in tertiary institutions to align academic curricula with the needs of industries that rely on automation and robotics technologies and encourages entrepreneurship by empowering students to develop innovative solutions and products. Furthermore, findings revealed no significant difference in the mean ratings of lecturers in Federal owned tertiary institutions and State owned tertiary institutions. The researchers therefore recommended among others that the Federal and State governments in collaboration with university authorities should prioritize investment in infrastructure to support the integration of robotics.

Keywords: Integrating, Robotics, Challenges, Prospects, Business Education

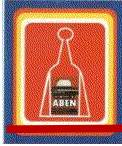
Introduction

Business education is a vocational discipline aimed at enhancing workplace competence, career readiness, and adaptability to change. It involves the acquisition of specialised skills in commercial subjects. Ajie-Uche et al. (2018) defined business education as a programme that equips individuals with functional and sustainable skills, knowledge, attitudes, and values necessary for effective operation within their environments. Otamiri and Otomiewo (2022) defined



business education as a type of occupational training that aims to make students productive in the classroom, in paid jobs, and in their businesses. Beneficiaries of education are better prepared for lucrative jobs and enduring subsistence. It is typically viewed as business education. Obi and Arhueremu (2020) defined business educators as specialised instructors possessing professional training and pedagogical expertise to teach business-related courses in schools. Okoye and Udegbumam (2019) saw business education as a crucial academic programme in Nigerian tertiary institutions, enabling individuals to compete on a global scale and contribute to national development. Umezulike (2021) defined a business education programmes as a broad and comprehensive discipline whose instructional programmes encompasses knowledge, skills, vocation and aptitude needed by all citizens to effectively manage their businesses and also function in the economic system. Business education students are expected to possess relevant skills, competencies and knowledge in major aspects of business. Edokpolor and Egberi (2017) saw the business education programme as a unique academic programme that equips its recipients with skills to function independently as self-employed and employers of labour. Business education, therefore, is an academic field focused on the study and research of business practices. At the tertiary level, business education aims to equip students with the ability to apply their acquired knowledge in their future careers in business or related sectors. Graduates of business education often find employment in firms or government organisations as supervisors and managers, or they pursue entrepreneurship. Traditional business courses typically include accounting, business law, economics, entrepreneurship, finance, human resources, international business, management, marketing, organisational behaviour, organisational development, and technology management. However, recent developments and changes in the global labour market have placed increased emphasis on the integration of artificial intelligent technologies like robotics.

Robotics is a branch of Artificial Intelligence (AI) focused on designing, developing, and implementing physical devices known as robots. These robots comprise sensors, actuators, and computer systems, enabling them to interact with the physical world and perform tasks autonomously or with human guidance (Sophokleous et al., 2021). In university education, robotics is a growing field where robots teach students various subjects, engaging with them through human-like facial features and emotion-perceiving technology. Robotics is becoming increasingly common in tertiary education, offering students valuable hands-on experience and the chance to explore the subject of robotics and its applications (Shoikova et al., 2017). Many tertiary institutions offer academic programmes in robotics or related fields such as mechatronics or electrical engineering (Sophokleous et al., 2021). These courses provide students with a comprehensive understanding of robotics principles, technology, and applications. Students learn about topics such as robot design, control systems, computer vision, machine learning, and human-robot interaction (Goswami et al., 2020). Business education programmes in tertiary institutions in developed countries often conduct advanced robotics research, and students can participate in research projects (Shoikova et al., 2017). Through these research programmes, students work closely with faculty members and industry partners to explore new technologies, develop innovative solutions and contribute to the advancement of robotics (Amanatiadi et al., 2017). This hands-on experience enhances their critical thinking, problem-solving, and communication skills. University robotics laboratories are typically equipped with state-of-the-art equipment and software (Sophokleous et al., 2021). These labs provide interactive learning environments where students can build and program robots, conduct experiments, and test algorithms (Shoikova et al., 2017). Goswami et al. (2020) noted that working in these labs helps



university students improve their creative and technical abilities while gaining practical robotics skills and understanding the challenges of real-world implementations.

Integrating robotics in business education programme has the potential to act as effective educational aids (Alnajjar et al., 2021). Studies suggest that robots can assume roles such as tutors, peers, or facilitators in learning environments. Educational robotics (ER) has become a popular method for teaching STEM subjects to students across all educational levels, from primary school to university (Souza et al., 2018; Zhong & Xia, 2020). This method introduces engaging and hands-on activities, which can make the learning experience more enjoyable (Afari & Khine, 2017; Alnajjar et al., 2021). By fostering an interactive atmosphere, ER can capture students' attention and spark their curiosity (Anwar et al., 2019). Additionally, ER offers a substantial educational benefit by boosting students' interest and motivation to learn (Alnajjar et al., 2021). Leoste et al. (2021) highlighted that the integration of android robots with sophisticated AI has the potential to create machines that are perceived as human-like entities, influencing various aspects of human existence. However, the author also noted that the growing presence of such machines might result in the development of new communication patterns that better facilitate interaction between humans and AI-enhanced robots. On the other hand, it could also lead people to adopt familiar communication patterns when interacting with robots, thereby expanding our understanding and interaction with machines. On the other hand, these changes challenge traditional teaching methods. Robotics offer educational institutions both an opportunity and a responsibility to modernize their curricula and develop suitable pedagogical approaches that embrace new methods and policies for teaching and learning (Niederhauser et al., 2018). Even when some 21st century skills have already been integrated into curricula, there is still a need to create systematic approaches, supported by effective pedagogies and assessment methods (Grimus, 2020). This process can often be hindered by teachers' reluctance, which may stem from various factors. The use of technology in business education programmes in tertiary institutions is greatly shaped by individual preferences, which are in turn influenced by various factors such as cultural and ethical background, level of education, and technological expertise. For example, individuals with strong technical knowledge are more inclined to adopt and apply new technologies in their designs compared to those with less experience. Similarly, those from traditional cultural backgrounds may be less inclined to use new technologies or may prefer to apply them in a more conventional manner (Akande, 2023). Highly educated individuals may be more open to exploring and learning about new technologies, while those with less education may be more likely to adhere to perceived simpler concepts. Also, cost could be a major challenges in successful integration of robotics in university education. The procurement and integration of technology, including hardware and software, can be costly, especially for institutions with limited budgets (Ghobakhloo & Ching, 2019). Nyako et al. (2023) opined that some of the drawback in the integration of emerging technologies include negative attitude, a lack of computers, technical difficulties, poor funding, resistance to change, poor administrative support, low levels of computer literacy and technical skills, technology misaligned with the curriculum, lack of incentives, poor training opportunities, a lack of vision for integrating technology into learning processes, a lack of required IT skills, and feelings of discomfort. Despite these views, the existing gap in literature shows that studies have not been conducted to determine the challenges and prospects of integrating emerging technologies with specific reference to robotics in the business education programme in tertiary institutions in Delta State. Based on this background, the researcher investigated the challenges and prospects of integrating robotics in business education programme in tertiary institutions in Delta state.



Statement of the Problem

Business education programs play a crucial role in preparing students for the business world by equipping them with essential skills, knowledge, and competencies. The business education programme in tertiary institutions is meant to be pacesetters in the integration of novel initiatives and innovations in the business and academic environment. However, in Delta State, business education programs are struggling to keep pace with the rapid technological advancements seen in developed countries. The integration of robotics and other emerging technologies in teaching and learning is transforming business education globally. Sadly, the business education programmes in tertiary institutions in Delta State have not fully embraced these innovations. This gap raises concerns about the effectiveness of graduates from these programs in a competitive global business environment. The failure to adapt to these technological trends could negatively impact the quality of business education graduates, limiting their ability to function effectively in the increasingly digital and automated business world. The researcher expresses a significant worry that the inadequacies in the current business education framework may hinder students' preparedness for real-world challenges, ultimately affecting their employability and contribution to the economy.

Research Questions

The following research questions guided the study:

1. What are the challenges of integrating robotics in business education programme in tertiary institutions in Delta state?
2. What are the prospects of integrating robotics in business education programme in tertiary institutions in Delta state?

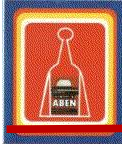
Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the mean ratings of lecturers in federal owned tertiary institutions and state owned tertiary institutions on the challenges of integrating robotics in business education programme in tertiary institutions in Delta State.
2. There is no significant difference in the mean ratings of lecturers in federal owned tertiary institutions and state owned tertiary institutions on the prospects of integrating robotics in business education programme in tertiary institutions in Delta State.

Methods

The descriptive survey research design was adopted for the study, which was carried out in Delta State. The population comprised 157 business education lecturers in public tertiary institutions in Delta State. The instrument for data collection was a researcher-developed questionnaire titled "Questionnaire on Challenges and Prospects of Integrating Robotics in Business Education Programmes in Tertiary Institutions (QCPIRBEPTI)". The instrument consisted of 23 items organized into two sections: Section A collected demographic information, particularly the ownership status of institutions (federal or state), while Section B was divided into two clusters—B1 (11 items) on challenges and B2 (12 items) on prospects of robotics integration. The items were structured on a 4-point Likert scale: Strongly Agree, Agree, Disagree, and Strongly Disagree. The instrument underwent face and content validation by three experts in Business Education at the Federal College of Education (Technical), Asaba. A pilot test was conducted using 10 business educators from the University of Benin, Edo State, selected for accessibility and professional equivalence. Reliability was established using the Cronbach Alpha method, yielding coefficients of 0.83 for B1, 0.89 for B2, and an overall reliability index of 0.85. The questionnaire was administered both electronically (via email and WhatsApp) and



physically where necessary. Of the 157 copies distributed, 132 were returned in usable condition, representing an 84% response rate. Data collected were analyzed using mean and standard deviation to answer the research questions. Items with a mean score of 2.50 and above were considered "Agree," while scores below 2.50 were considered "Disagree." To test the null hypotheses, independent samples t-tests were conducted at a 0.05 level of significance. A p-value greater than 0.05 indicated no significant difference (hypothesis accepted), while a p-value less than or equal to 0.05 indicated a significant difference (hypothesis rejected).

Results

Research Question 1: What are the challenges of integrating robotics in business education programme in tertiary institutions in Delta state?

Table 1: Respondents Mean Ratings on the Challenges of Integrating Robotics in Business education programmes in tertiary institutions (N=132)

S/No.	Item Statements	Mean	SD	Remarks
1.	Lack of infrastructure to support the integration of robotics	3.67	0.85	Agree
2.	Lack of expertise to handle technical issues related to robotics integration in business education programmes in tertiary institutions	3.43	0.85	Agree
3.	Lack of funds for integration of robotics	3.79	0.93	Agree
4.	High cost of materials and tools for integrating robotics in business education programmes in tertiary institutions	3.71	0.89	Agree
5.	Poor institutional commitment to integrating robotics in business education programmes in tertiary institutions	3.66	0.78	Agree
6.	Poor attitude of lecturers towards the integration of robotics in business education programmes in tertiary institutions	3.65	0.87	Agree
7.	Lack of training for lecturers on current trends in robotics integration in university education system	3.63	0.74	Agree
8.	Non-alignment with existing curriculum in some business education programmes in tertiary institutions	3.61	0.83	Agree
9.	Challenges in facilitating collaboration with industry for practical training opportunities.	3.55	0.82	Agree
10.	Resistance to change towards the integration of robotics among lecturers	3.09	0.71	Agree
11.	Cultural barriers	3.22	0.76	Agree
Cluster Mean		3.55		Agree

Source: Field Study (2024)

Data in Table 1 show that the respondents rated items, 1-11 as the challenges of integrating in business education programmes in tertiary institutions in Delta State with mean rating ranging between 3.09 and 3.79. The standard deviation scores ranging between 0.71 and 0.93 showed



that the respondents' opinions were related. the cluster mean of 3.55 indicated that the challenges of integrating robotics in business education programmes in tertiary institutions in Delta State are lack of infrastructure to support the integration of robotics, lack of experts to facilitate the integration of robotics in business education programmes in tertiary institutions, lack of funding, challenges in facilitating collaboration with industry for practical training opportunities and poor institutional commitment to integrating robotics in business education programmes in tertiary institutions among others.

Research Question 2: What are the prospects of integrating robotics in business education programme in tertiary institutions in Delta state?

Table 2: Respondents Mean Ratings on the Prospects of Integrating Robotics in Business education programmes in tertiary institutions in Nigeria (N=132)

S/No.	Item Statements	Mean	SD	Remarks
12.	Provides engaging and functional exercises to make learning more joyful	3.48	0.86	Agree
13.	Helps students to participate in research projects.	3.30	0.76	Agree
14.	Educational robots may function as facilitators in learning activities	3.21	0.85	Agree
15.	Robotics increases students' interest and drive to study	3.18	0.73	Agree
16.	Facilitatespersonalised learning experiences aimed at improving specific needs of students	3.44	0.78	Agree
17.	Fosters the development of technical skills necessary for today's job needs.	3.58	0.84	Agree
18.	Fosters the development of digital skills necessary for today's job needs.	3.56	0.70	Agree
19.	Foster interdisciplinary learning among students across various faculties in business education programmes in tertiary institutions	3.67	0.92	Agree
20.	Facilitates the implementation of blended learning models that combine traditional face-to-face instruction with online learning activities.	3.74	0.74	Agree
21.	Encourages entrepreneurship by empowering students to develop innovative solutions and product	3.61	0.88	Agree
22.	Robotics can help business education programmes in tertiary institutions promote hands-on learning experiences that stimulate critical thinking, problem-solving, and creativity among students	3.77	0.82	Agree
23.	Assists business education programmes in tertiary institutions to align academic curricula with the needs of industries that rely on automation and robotics technologies	3.89	0.78	Agree
Cluster Mean		3.54		Agree

Source: Field Study (2024)

Data in Table 2 show that the respondents rated items, 12-23 as the prospects of integrating robotics in business education programmes in tertiary institutions in Delta State with mean rating ranging between 3.18 and 3.89. The standard deviation scores ranging between 0.70 and 0.92



showed that the respondents' opinions were related. The cluster mean of 3.54 indicated that the prospects of integrating robotics as an emerging technology in business education programmes in tertiary institutions in Delta State are that robotics assists business education programmes in tertiary institutions to align academic curricula with the needs of industries that rely on automation and robotics technologies; help business education programmes in tertiary institutions promote hands-on learning experiences that stimulate critical thinking, problem-solving, and creativity among students; facilitates the implementation of blended learning models that combine traditional face-to-face instruction with online learning activities; fosters the development of technical skills necessary for today's job needs and foster interdisciplinary learning among students across various faculties in business education programmes in tertiary institutions among others.

Hypothesis 1: There is no significant difference in the mean ratings of lecturers in federal owned tertiary institutions and state owned tertiary institutions on the challenges of integrating robotics in business education programmes in tertiary institutions in Delta State.

Table 3: Summary of t-test Analysis on the Challenges of Integrating Robotics in Business education programmes in tertiary institutions in Delta State Based on Ownership

Variable	N	SD	d.f	p-value	Decision
Federal Owned Tertiary institutions	51	3.60	0.81		
State Owned Tertiary institutions	81	3.53	0.76	130.05	Not Significant

Source: Field Study (2024)

Data in Table 3 showed that the p-value of .60 is greater than the .05 alpha level of significance. This means that there is no statistically significant difference in the mean ratings of lecturers in federal owned tertiary institutions and state owned tertiary institutions on the challenges of integrating robotics as an emerging technology in tertiary institutions in Delta State. The hypothesis was therefore accepted.

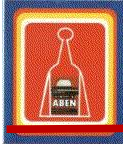
Hypothesis 2: There is no significant difference in the mean ratings of lecturers in federal owned tertiary institutions and state owned in tertiary institutions on the prospects of integrating robotics in business education programmes in tertiary institutions in Delta State.

Table 4: Summary of t-test Analysis on the Prospects of Integrating Robotics in Business education programmes in tertiary institutions in Delta State Based on Ownership

Variable	N	SD	d.f	p-value	Decision
Federal Owned Tertiary institutions	51	3.58	0.85		
State Owned Tertiary institutions	81	3.52	0.88	130.05	Not Significant

Source: Field Study (2024)

Data in Table 4 showed that the p-value of .67 is greater than the .05 alpha level of significance. This means that there is no statistically significant difference in the mean ratings of lecturers in federal owned tertiary institutions and state owned tertiary institutions on the prospects of integrating robotics in business education programmes in tertiary institutions in Delta State. The hypothesis was therefore accepted.



Discussion

The finding of the study revealed that the challenges of integrating robotics in tertiary institutions in Delta State are lack of infrastructure to support the integration of robotics, lack of experts to facilitate the integration of robotics in business education programmes in tertiary institutions, lack of funding, challenges in facilitating collaboration with industry for practical training opportunities and poor institutional commitment to integrating robotics in business education programmes in tertiary institutions among others. This finding is in agreement with Nyako et al. (2023) revealed that some of the drawback in the integration of emerging technologies include negative attitude, a lack of computers, technical difficulties, poor funding, resistance to change, poor administrative support, low levels of computer literacy and technical skills, technology misaligned with the curriculum, lack of incentives, poor training opportunities, a lack of vision for integrating technology into learning processes, a lack of required IT skills, and feelings of discomfort. Ghobakhloo and Ching (2019) stated that the procurement and integration of technology, including hardware and software, can be costly, especially for institutions with limited budgets. Furthermore, findings of the study revealed no statistically significant difference in the mean ratings of lecturers in federal owned business education programmes in tertiary institutions and state owned business education programmes in tertiary institutions on the challenges of integrating robotics as an emerging technology in business education programmes in tertiary institutions in Delta State. This is in consonance of Akande (2023) who reported that the use of technology in business education programmes in tertiary institutions is could be influenced by cost, cultural and ethical background, level of education, and technological expertise.

The finding of the study revealed that the prospects of integrating robotics in tertiary institutions in Delta State are that robotics assists tertiary institutions to align academic curricula with the needs of industries that rely on automation and robotics technologies; help business education programmes in tertiary institutions promote hands-on learning experiences that stimulate critical thinking, problem-solving, and creativity among students; facilitates the implementation of blended learning models that combine traditional face-to-face instruction with online learning activities; fosters the development of technical skills necessary for today's job needs and foster interdisciplinary learning among students across various faculties in business education programmes in tertiary institutions among others. This finding is in line with Alnajjar et al. (2021) who revealed that robotics have the potential to be effective instructional aides. Zhong and Xia (2020) stated that robots may function as tutors, peers, or facilitators in learning activities. Afari and Khine (2017) asserted that educational robotics provides engaging and functional exercises to make learning more joyful. Furthermore, the findings of the study revealed no statistically significant difference in the mean ratings of lecturers in federal owned business education programmes in tertiary institutions and state owned business education programmes in tertiary institutions on the prospects of integrating robotics as an emerging technology in business education programmes in tertiary institutions in Delta State. This finding highlights the prospects of robotics in facilitating effective administration and instruction in business education programmes in tertiary institutions in Delta State. This is in agreement with Anwar et al. (2019) who noted that robotics in education increases students' attention and curiosity. Alnajjar et al. (2021) stated that integrating robotics in education also provides a major learning advantage by increasing students' interest and drive to study.



Conclusion

Based on the findings of the study, the researcher concludes that integration of robotics in business education programmes in tertiary institutions presents both challenges and prospects in Delta State. The potential prospects include enhanced learning experiences, personalized education, and practical skill development for students. Robotics also offers opportunities for research and innovation, interdisciplinary learning, and improved administrative efficiency. However, challenges remain in the form of high costs, lack of expertise, and infrastructure limitations. Resistance to change, inadequate training and curriculum misalignment among others issues can also hinder the successful integration of robotics. To fully capitalise on the benefits of integrating robotics, business education programmes in tertiary institutions in Delta State must address these challenges by adopting remediating measures to ease the integration processes.

Recommendations

The following recommendations were made based on the findings of the study:

1. Administrators of business education programmes in tertiary institutions in Delta State in collaboration with curriculum planners in all courses in the business education programmes in tertiary institutions should revise existing curricula to include robotics in a way that meets current industrial demands. The curriculum planners should create interdisciplinary programmes that combine robotics with other disciplines including engineering, computer science, and business.
2. Federal and state government in conjunction with administrators of tertiary institutions should go into collaborative initiatives with industry stakeholders and technology companies in for the provision of financial resources, infrastructural resources and expertise in tertiary institutions for successful integration of robotics in tertiary institutions.

References

- Afari, E., & Khine, M. (2017). Robotics as an educational tool: Impact of legomindstorms. *International Journal of Information and Education Technology*, 7, 437-442. <https://doi.org/10.18178/ijiet.2017.7.6.908>.
- Ajie-Uche, G., Efughi, S.A. & Ajaero, O.O. (2018). Capacity building needs of business education lecturers in ICT-based teaching in tertiary institutions in south-south Nigeria. *Nigeria Journal of Business Education*, 5(1), 322-334.
- Akande, I., Alagbe, O. T., Adebayo, O. A., Olaosun, S. & Oyedele, I. O. (2024). Prospects and challenges of emerging technologies in architectural design practice within the Nigerian context. *Journal of Namibian Studies*, 35 (S1), 4594-4610.
- Alnajjar, F., Bartneck, C., Baxter, P., Belpaeme, T., Cappuccio, M. L., Di Dio, C., Eyssel, F., Handke, J., Mubin, O., & Obaid, M. (2021). *Robots in education: An introduction to high-tech social agents, intelligent tutors, and curricular tools*. Routledge. <https://doi.org/10.4324/9781003142706>
- Amanatiadis, A., Kaburlasos, V.G., Dardani, C. & Chatzichristofis, S.A. (2017). *Interactive social robots in special education*. Proceedings of the 2017 IEEE 7th International Conference on Consumer Electronics-Berlin (ICCE-Berlin), Berlin, Germany, 3-6 September.
- Anwar, S., Bascou, N. A., Menekse, M., & Kardgar, A. (2019). A Systematic review of studies on educational robotics. *Journal of Pre-College Engineering Education Research (J-PEER)*. <https://doi.org/10.7771/2157-9288.1223>
- Edokpolor, J. E. & Egbri, J. N. (2017). Business education in Nigeria for value re-orientation: A strategic approach for poverty alleviation and national development. *Journal of Educational Research and Review (JERR)*, 5 (3), 41-48.



- Federal Republic of Nigeria (2013). *National policy on education* (6th ed.). Federal Ministry of Education.
- Ghobakhloo, M. & Ching, N. (2019). Adoption of digital technologies of smart manufacturing in SMEs. *Journal of Industrial Information Integration*, 16, 100107.
- Goswami, S., Uddin, M.S. & Islam, M.R. (2020). Implementation of active learning for ICT education in Schools. *International Journal of Innovation, Scientific Research and Technology*, 5, 455-459.
- Grimus, M. (2020). *Emerging technologies: Impacting Learning, pedagogy and curriculum Development*. Springer:
- Leoste, J., Heidmets, M., Ley, T. & Stepanova, J. (2021). Classroom innovation becoming sustainable: a study of technological innovation adoption by estonian primary school teachers. *IxDA Interact. Des. Archit.* 42, 144-166.
- Niederhauser, D.S., Howard, S.K., Voogt, J., Agyei, D.D., Laferriere, T., Tondeur, J. & Cox, M.J. (2018). Sustainability and scalability in educational technology. *Technology Knowledge Learning*, 23, 507-523.
- Nyako A.A., Ochoyi, E.E. & Luka, L. (2023). Integration of emerging technologies in teaching and learning at the federal college of education, Yola, Adamawa State, Nigeria. *International Journal of Research Publication and Reviews*, 4(10), 1441-1446.
- Obi, B. I. & Arhueremu, M. V. (2020). Extent of availability and utilization of information and communication technology resources in business education programmes of colleges of education in Delta State. *NAU Journal of Technology and Vocational Education*, 5(1), 128 – 140.
- Okoye, A.C. & Udegbumam, E.O. (2019). Challenges of business education for preparing students for global competition in Nigerian tertiary institutions. *Nigerian Journal of Business Education (NIGJBED)*, 6(1), 8-16.
- Otamiri, S. & Otomiewo, E.E. (2022). Smart facilities and instructional delivery of business education programmes in colleges of education, South-South, Nigeria. *Journal of Business Education and Entrepreneurial Studies*, 9(2), 25-36.
- Shoikova, E., Nikolov, R. & Kovatcheva, E. (2017). Conceptualizing of smart education. *Electrotech. Electron. E+ E*, 52.
- Sophokleous, A., Christodoulou, P., Doitsidis, L. & Chatzichristofis, S.A. (2021). Computer vision meets educational robotics. *Electronics* 10, 730. <https://doi.org/10.3390/electronics10060730>.
- Souza, I. M. L., Andrade, W., Sampaio, L. M. R., & Araujo, A. L. (2018). A systematic review on the use of LEGOÆ robotics in education. *IEEE Frontiers in Education Conference (FIE)*, 1-9. <https://doi.org/10.1109/FIE.2018.8658751>
- Ujah-Ogbuagu, B.C. (2021). Utilizing emerging technologies for national development in Nigeria: challenges, prospects and strategies. *International Conference on Innovative Systems for Digital Economy*, 187-196.
- Umezulike, A. N. (2021). Inhibitions and rewards of professionalization of business education programmes in Nigeria. *Nigerian Journal of Business Education (NIGJBED)*, 8(1), 32-39.
- Varghese, N.V. & Mandal, S. (2020). *Teaching–learning and new technologies in higher education: An introduction. in teaching learning and new technologies in higher education*. Springer.
- Zervoudi K. E. (2020). Fourth industrial revolution: opportunities, challenges, and proposed policies, industrial robotics- New paradigms. *IntechOpen*, DOI: 10.5772/intechopen.90412.
- Zhong, B., & Xia, L. (2020). A systematic review on exploring the potential of educational robotics in mathematics education. *International Journal of Science and Mathematics Education*, 18(1), 79-101. <https://doi.org/10.1007/s10763-018-09939-y>



ARTIFICIAL INTELEGENCE AS A TOOL FOR EFFECTIVE TEACHING AND LEARNING OF BUSINESS EDUCATIONCOURSES

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Abstract

This paper discussed the link of using artificial intelligence tools for effective teaching and learning of business education courses. The paper further discussed the meaning of artificial intelligence , types of artificial intelligence, artificial intelligence in education for learners, artificial intelligence in education for teachers, artificial intelligence tools for effective teaching and learning of business education courses and later concluded that Artificial intelligence as a tool for effective teaching and learning of business education courses cannot be over emphasized, it create succor in completing tasks that consume instructor"s time at a faster pace, identifying students" preferences and learning styles to generate personalized learning plans, and providing them with timely and direct feedback or assisting teachers in their data-related decisions or works. The paper suggested that the government should ensure to provide enabling environment for effective use of artificial intelligence tools for effective teaching and learning of business education courses, business educators should embrace the use of artificial intelligence tools in teaching business education courses to reduce stress of attending to the needs of the students among others

Introduction

Online and blended learning are now prevalent in modern communities and emerging economies as they strive to integrate these methods into the educational system. Artificial intelligence (AI) is the simulation of human intelligence in machines that are programmed to think and act like humans. Learning, reasoning, problem-solving, perception, and language comprehension are all examples of cognitive abilities. Artificial Intelligence is a method of making a computer, a computer-controlled robot, or a softwarethink intelligently like the human mind. AI is accomplished by studying the patterns of the human brain and by analyzing the cognitive process. The outcome of these studies develops intelligent software and systems. Artificial intelligence (AI) is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience.

Tan (2020) underlines that the teacher exerts a triple role, being a content expert and creator, a knowledge spreader, and "an ethical-spiritual guide|| with wisdom. The students should be able to chase trends and not just stay current with the events and environment (Elhajjar, Karam and Borna, 2021). Hence, the demand for innovative teachers embracing change, integrating new materials, and enabling student-AI interactions in education is increasing. The



demand for adaptive digital learning with AI support has surged in the past decade, driven by challenges like the Covid-19 pandemic and social conflicts in contemporary societies (Matzavela and Alepis, 2021). When discussing artificial intelligence (AI), it is common to distinguish between two broad categories: weak AI and strong AI. Let's explore the characteristics of each type,

Weak AI refers to AI systems that are designed to perform specific tasks and are limited to those tasks only. These AI systems excel at their designated functions but lack general intelligence. Examples of weak AI include voice assistants like Siri or Alexa, recommendation algorithms, and image recognition systems. Weak AI operates within predefined boundaries and cannot generalize beyond their specialized domain while Strong AI, also known as general AI, refers to systems that possess human-level intelligence or even surpass human intelligence across a wide range of tasks. Strong AI would be capable of understanding, reasoning, learning, and applying knowledge to solve complex problems in a manner similar to human cognition. However, the development of strong AI is still largely theoretical and has not been achieved to date. AIED provides feasible solutions to complex societal problems, enabling students to engage closely with global challenges and develop real-life problem-solving skills South worth et al., (2023). In envisioning future jobs and human resources specialists' requirements, teachers must equip students with a proficiency that makes them adaptable to challenges. Teachers significantly contribute to society by educating generations of upcoming students that will become future entrepreneurs. AI technology in education is expected to grow significantly in the coming decades, presenting new opportunities and challenges Ouyang & Jiao, (2021); Zhang & Aslan, (2021); Khosravi, (2022). Researchers, policymakers, and practitioners are integrating AIED to enhance teaching, personalized learning, assessments, and administrative services Zhang & Aslan, (2021); Chiu et al., (2023).

Types of Artificial Intelligence

Purely Reactive: These machines do not have any memory or data to work with, specializing in just one field of work. For example, in a chess game, the machine observes the moves and makes the best possible decision to win. **Limited Memory:** These machines collect previous data and continue adding it to their memory. They have enough memory or experience to make proper decisions, but memory is minimal. For example, this machine can suggest a restaurant based on the location data that has been gathered. **Theory of Mind:** This kind of AI can understand thoughts and emotions, as well as interact socially. However, a machine based on this type is yet to be built. **Self-Aware:** Self-aware machines are the future generation of these new technologies. They will be intelligent, sentient, and conscious. AI represents progress in education, offering benefits on multiple levels, and stimulates the evolution of teaching and learning through technologies like chat bots, robots, automated assessment, digitized artifacts, and intelligent tutoring systems, despite occasional organizational challenges (Chiu et al., 2023).

Artificial intelligence in education for learners

AI systems in education significantly enhance learners' involvement and performance (Zhang and Aslan, 2021). Chiu et al. (2023) identified essential roles for learners: competency-based task assignments, learner-machine discussions, feedback, and adaptive digital environments. Zhang and Aslan (2021) added other AI facilitations, including engagement, enriched learning resources, and intellectual stimuli. South worth et al. (2023) highlights AIED's benefits, fostering technical skills, creativity, critical thinking, and problem-solving abilities for students. AIED personalizes learning experiences and communication to cater for individual needs and abilities, enhancing efficiency (Hopcan et al., 2022; Southworth et al., 2023). Customized learning materials are tailored based on students' evaluations, addressing their



strengths and weaknesses (Hopcan et al., 2022). Artificial Intelligence emphasizes three cognitive skills of learning, reasoning, and self-correction, skills that the human brain possesses to one degree or another. We define these in the context of AI as: Learning: The acquisition of information and the rules needed to use that information. Reasoning: Using the information rules to reach definite or approximate conclusions. Self-Correction: The process of continually fine-tuning AI algorithms and ensure that they offer the most accurate results they can. However, researchers and programmers have extended and elaborated the goals of AI to the following: Logical Reasoning, AI programs enable computers to perform sophisticated tasks. On February 10, 1996, IBM's Deep Blue computer won a game of chess against a former world champion, Garry Kasparov. Knowledge Representation, Smalltalk is an object-oriented, dynamically typed, reflective programming language that was created to underpin the "new world" of computing exemplified by "human-computer symbiosis."

Planning and Navigation, The process of enabling a computer to get from point A to point B. A prime example of this is Google's self-driving Toyota Prius. Natural Language Processing set up computers that can understand and process language. Perception, Use computers to interact with the world through sight, hearing, touch, and smell. Emergent Intelligence, Intelligence that is not explicitly programmed, but emerges from the rest of the specific AI features. The vision for this goal is to have machines exhibit emotional intelligence and moral reasoning.

Li and Wang (2023) proposed using advanced technology to create a comfortable communication environment, fostering learner networks with increased information accessibility for future generations. Adapting learning experiences sustains student progress and engagement in virtual environments, promoting skill development (Southworth et al., 2023). Interactivity and participation substantially increase among students and teachers. Khosravi et al. (2022) emphasized the significance of AI in various learning interfaces. For remote learners, AI offers a crucial advantage through simulation cases on complex life topics challenging to address in traditional settings (e.g., welfare system, losses, and violence) (Asakura et al., 2020). Artificial intelligence has its pluses and minuses, much like any other concept or innovation. Here's a quick rundown of some pros and cons. Pros include, It reduces human error, It never sleeps, so it's available at every time of the day, It never gets bored, so it easily handles repetitive tasks, It's fast while Cons are, It's costly to implement, It can't duplicate human creativity, It will definitely replace some jobs, leading to unemployment, People can become overly reliant on it.

Ouyang and Jiao (2021) identified three AIEd paradigms: "AI-direct, learner-as-recipient", where AI leads learning with a defined pathway for the learner, "AI-supported, learner-as-collaborator", where AI optimizes interaction among learners, information, and technology, and "AI-empowered, learner-as-leader", where AI enhances learners' intelligence through a complex system. Cope, Kalantzis and Sears (2021) acknowledged AI's intrinsic limitations, cautioning against reducing students' results to simple numbers without human thought and implications beyond AI's cognitive processes and calculations.

Artificial intelligence in education for teachers

Crompton, Jones and Burke (2022) emphasized that AIEd builds upon previous learning theories, facilitating teacher adoption of educational tools and integrating best practices to enhance learning. AIEd benefits teachers and the teaching process through tailored content for individual learners, at-risk or gifted students, learning predictive models, personalized educational resources, improved classroom management, enhanced teaching across various subjects, academic progress facilitation, and qualified development in pedagogical skills, human behavior, and interactions (Zhang and Aslan, 2021; Chiu et al., 2023).



AI unlocks new research potential in universities and colleges by expanding experimental and investigative activities and disseminating study results (Li and Wang, 2023). Teachers can focus on complex tasks as AI provides student support and answers (Southworth et al., 2023). Artificial intelligence (AI) has a wide range of applications across various industries and domains. Here are some notable applications of **AI: Natural Language Processing (NLP)**, AI is used in NLP to analyze and understand human language. It powers applications such as speech recognition, machine translation, sentiment analysis, and virtual assistants like Siri and Alexa. **Image and Video Analysis. AI techniques:** including computer vision, enable the analysis and interpretation of images and videos. This finds application in facial recognition, object detection and tracking, content moderation, medical imaging, and autonomous vehicles. **Robotics and Automation**, AI plays a crucial role in robotics and automation systems. Robots equipped with AI algorithms can perform complex tasks in manufacturing, healthcare, logistics, and exploration. They can adapt to changing environments, learn from experience, and collaborate with humans. **Recommendation Systems**, AI-powered recommendation systems are used in e-commerce, streaming platforms, and social media to personalize user experiences. They analyze user preferences, behavior, and historical data to suggest relevant products, movies, music, or content. **Financial Services**, AI is extensively used in the finance industry for fraud detection, algorithmic trading, credit scoring, and risk assessment. Machine learning models can analyze vast amounts of financial data to identify patterns and make predictions. **Healthcare**, AI applications in healthcare include disease diagnosis, medical imaging analysis, drug discovery, personalized medicine, and patient monitoring. AI can assist in identifying patterns in medical data and provide insights for better diagnosis and treatment. **Virtual Assistants and Chat bots**, AI-powered virtual assistants and chat bots interact with users, understand their queries, and provide relevant information or perform tasks. They are used in customer support, information retrieval, and personalized assistance. **Gaming**, AI algorithms are employed in gaming for creating realistic virtual characters, opponent behavior, and intelligent decision-making. AI is also used to optimize game graphics, physics simulations, and game testing. **Smart Homes and IoT**, AI enables the development of smart home systems that can automate tasks, control devices, and learn from user preferences. AI can enhance the functionality and efficiency of Internet of Things (IoT) devices and networks. **Cybersecurity**, AI helps in detecting and preventing cyber threats by analyzing network traffic, identifying anomalies, and predicting potential attacks. It can enhance the security of systems and data through advanced threat detection and response mechanisms.

Khosravi (2022) advocates integrating explainable AI (XAI) in education, prioritizing human-centered design of educational tools, assessing XAI implementation, and enhancing AIED systems for reliability and knowledge transfer support. Many teachers avoid AIED due to a lack of understanding (Crompton, Jones and Burke, 2022). To effectively integrate AI tools, teachers should update their educational practices and embrace the challenges of technology in teaching (Skavronskaya, Hadinejad and Cotterell, 2023). In the future, teachers can integrate into their pedagogical approach aspects related to learners' behavior, such as emotions, attention, gestures, and movement, with the support of AI technologies (Crescenzi-Lanna, 2023).

Artificial intelligence tools for effective teaching and learning of business education courses

AI-based education enhances entrepreneurial competencies and fosters creativity, benefiting businesses (Nuseir, Basheer and Aljumah, 2020). While AI offers real support in business scenarios for students, further conceptualization of AI's use in business and education is needed, covering critical aspects like processes, activities, and actors (Yang et al., 2022). AI



tools have proven firmly and vastly helpful in various fields, in education or business education. Amongst them, there are computer vision, prediction systems, data mining (Das et al., 2015), intelligent learning or teaching systems, learning analytics (Ley et al., 2023), facial recognition systems, voice or speech recognition systems, virtual laboratories, augmented reality, virtual reality, hearing and sensing technologies, edge computing, virtual personalized assistants, real-time analysis, AI chatbot, image recognition, personalized learning approach, academic analytics, and adaptive learning method (al-Zyoud, 2020; Han, Park and Lee, 2022).

Artificial Intelligence (AI) has become an integral part of our daily lives, revolutionizing various industries and enhancing user experiences. Here are some notable examples of AI applications: ChatGPT is an advanced language model developed by OpenAI, capable of generating human-like responses and engaging in natural language conversations. It uses deep learning techniques to understand and generate coherent text, making it useful for customer support, chatbots, and virtual assistants. Google Maps utilizes AI algorithms to provide real-time navigation, traffic updates, and personalized recommendations. It analyzes vast amounts of data, including historical traffic patterns and user input, to suggest the fastest routes, estimate arrival times, and even predict traffic congestion. Smart assistants, like Amazon's Alexa, Apple's Siri, and Google Assistant employ AI technologies to interpret voice commands, answer questions, and perform tasks. These assistants use natural language processing and machine learning algorithms to understand user intent, retrieve relevant information, and carry out requested actions. Snapchat's, augmented reality filters, or "Lenses," incorporate AI to recognize facial features, track movements, and overlay interactive effects on users' faces in real-time. AI algorithms enable Snapchat to apply various filters, masks, and animations that align with the user's facial expressions and movements. Self-driving cars rely heavily on AI for perception, decision-making, and control. Using a combination of sensors, cameras, and machine learning algorithms, these vehicles can detect objects, interpret traffic signs, and navigate complex road conditions autonomously, enhancing safety and efficiency on the roads. Wearable devices, such as fitness trackers and smart watches, utilize AI to monitor and analyze users' health data. They track activities, heart rate, sleep patterns, and more, providing personalized insights and recommendations to improve overall well-being. MuZero is an AI algorithm developed by Deep Mind that combines reinforcement learning and deep neural networks. It has achieved remarkable success in playing complex board games like chess, Go, and shogi at a superhuman level. MuZero learns and improves its strategies through self-play and planning. These examples demonstrate the wide-ranging applications of AI, showcasing its potential to enhance our lives, improve efficiency, and drive innovation across various industries.

Chiu et al. (2023) identified two main contributions of AIEd assessment: automatic grading and learners' foreseen performance in online classes. The feedback provided to students after the assessment process is immediate and constructive, and instructors can support students in improving specific skills (Hopcan et al., 2022; Southworth et al., 2023). Cope, Kalantzis and Sears (2021) underline the role of AI in the assessment process, not in the conventional form, but especially related to tracking progress and providing "just-in-time feedback". AI can improve assessments (Al Braiki et al., 2020), with benefits highlighting its efficiency and consistency (Chassignol et al., 2018) and presenting the possibility of automating the assessment process. The sustenance provided by AI in education refers to supporting and enhancing the performance of management platforms, analysis of scaled data, personalization of various academic services, increasing work efficiency of administrative staff, and consistency in the decision-making process (Zhang and Aslan, 2021; Chiu et al., 2023).



Conclusion

Artificial intelligence as a tool for effective teaching and learning business education courses cannot be over emphasized, it create succor in completing tasks that consume instructor's time at a faster pace, identifying students' preferences and learning styles to generate personalized learning plans, and providing them with timely and direct feedback or assisting teachers in their data-related decisions or works.

Suggestions

- i. The government should ensure to provide enabling environment for effective use of artificial intelligence tools for effective teaching and learning business education courses
- ii. Business educators should embrace the use of artificial intelligence tools in teaching business education courses to reduce stress of attending to the needs of the students.
- iii. Students should be encouraged in applying artificial intelligence tools in learning business education courses by providing free internet facilities in the school by the school management.
- iv. Workshop to be organize by school administrators for both the students and business educators on how effective use of artificial intelligence tool for teaching and learning

References

- Al Braiki, B., Harous, S., Zaki, N. and Alnajjar, F. (2020). Artificial intelligence in education And assessment methods. *Bulletin of Electrical Engineering and Informatics*, [e-journal] 9(5), pp. 1998-2007. <https://doi.org/10.11591/eei.v9i5.1984>.
- Al-Zyoud, H.M.M., (2020). The Role of Artificial Intelligence in Teacher Professional Development. *Universal Journal of Educational Research*, [e-journal] 8(11B), pp. 6263-6272. <https://doi.org/10.13189/ujer.2020.082265>.
- Antonenko, P. and Abramowitz, B., (2023). In-service teachers' (mis)conceptions of artificial Intelligence in K-12 science education. *Journal of Research on Technology in Education*, [e-journal] 55(1), pp. 64-78. <https://doi.org/10.1080/15391523.2022.2119450>.
- Asakura, K., Occhiuto, K., Todd, S., Leithead, C. and Clapperton, R., (2020). A Call to Action On Artificial Intelligence and Social Work Education: Lessons Learned from A Simulation Project Using Natural Language Processing. *Journal of Teaching in Social Work*, [e-journal] 40(5), pp. 501-518. <https://doi.org/10.1080/08841233.2020.1813234>.
- Chen, L., Chen, P. and Lin, Z., (2020). Artificial Intelligence in Education: A Review. *IEEE Access*, [e-journal] 8, pp. 75264-75278. <https://doi.org/10.1109/ACCESS.2020.2988510>.
- Crompton, H., Jones, M. and Burke, D., (2022). Affordances and challenges of artificial Intelligence in K-12 education: a systematic review. *Journal of Research on Technology in Education*, [e-journal]. <https://doi.org/10.1080/15391523.2022.2121344>.
- Das, S., Dey, A., Pal, A. and Roy, N., (2015). Applications of artificial intelligence in machine Learning: review and prospect. *International Journal of Computer Applications*, [e-journal] 115(9), pp. 31-41. <https://doi.org/10.5120/20182-2402>.
- Elhajjar, X., Karam, S. and Borna, S., (2021). Artificial Intelligence in Marketing Education Programs. *Marketing Education Review*, [e-journal] 31(1), pp. 2-13. <https://doi.org/10.1080/10528008.2020.1835492>.
- Han, J.W., Park, J. and Lee, H., (2022). Analysis of the effect of an artificial intelligence chatbot Educational program on non-face-to-face classes: a quasi-experimental study. *BMC Medical Education*, [e-journal] 22, article no. 830, pp. 1-10. <https://doi.org/10.1186/s12909-022-03898-3>.
- Hua, H., Li, Y., Wang, T., Dong, N., Li, W. and Cao, J., (2023). Edge Computing with Artificial



- Intelligence: A Machine Learning Perspective. *ACM Computing Surveys*, [e-journal] 55(9), pp. 1-35. <https://doi.org/10.1145/3555802>.
- Ley, T., Tammets, K. et al (2023). Towards a partnership of teachers and intelligent learning Technology: A systematic literature review of model-based learning analytics. *Journal of Computer Assisted Learning*, [e-journal] pp. 1397-1417. <https://doi.org/10.1111/jcal.12844>.
- Li, F., He, Y. and Xue, Q., (2021). Progress, Challenges and Countermeasures of Adaptive Learning: A Systematic Review. *Educational Technology and Society*, [e-journal] 24(3), pp. 238-255. <https://www.jstor.org/stable/27032868>.
- Li, P. and Wang, B., (2023). Artificial Intelligence in Music Education. *International Journal of Human-Computer Interaction*, [e-journal] <https://doi.org/10.1080/10447318.2023.2209984>.
- Matzavela, V. and Alepis, E., (2021). Decision tree learning through a Predictive Model for Student Academic Performance in Intelligent M-Learning Environments. *Computers and Education: Artificial Intelligence*, [e-journal] 2, article no. 100035, pp. 1-12. <https://doi.org/10.1016/j.caeai.2021.100035>.
- Ouyang, F. and Jiao, P., (2021). Artificial intelligence in education: The three paradigms. *Computers and Education: Artificial Intelligence*, [e-journal] 2, article no. 100020, pp. 1-6. <https://doi.org/10.1016/j.caeai.2021.100020>.
- Ouyang, F., Zheng, L. and Jiao, P., (2022). Artificial intelligence in online higher education: A Systematic review of empirical research from 2011 to 2020. *Education and Information Technologies*, [e-journal] 27, pp. 7893-7925. <https://doi.org/10.1007/s10639-022-10925-9>.
- Southworth, J., Migliaccio, et al (2023). Developing a model for AI Across the curriculum: Transforming the highereducation landscape via innovation in AI literacy. *Computers and Education: Artificial Intelligence*, [e-journal] 4, article no. 100127, pp. 1-10. <https://doi.org/10.1016/j.caeai.2023.100127>.
- Tan, C., (2020). Digital Confucius? Exploring the implications of artificial intelligence in spiritual education. *Connection Science*, [e-journal] 32(3), pp. 280-291. <https://doi.org/10.1080/09540091.2019.1709045>.
- Yang, S.J.H., Ogata, H., Matsui, T. and Chen, N.S., (2021). Human-centered artificial intelligence in education: Seeing the invisible through the visible. *Computers and Education: Artificial Intelligence*, [e-journal] 2, article no. 100008, pp. 1-5. <https://doi.org/10.1016/j.caeai.2021.100008>.
- Yang, D., Zhao, W., Du, J. and Yang, Y., (2022). Approaching Artificial Intelligence in business and economics Research: a bibliometric panorama (1966-2020). *Technology Analysis and Strategic Management*, [e-journal] pp. 1-16. <https://doi.org/10.1080/09537325.2022.2043268>.
- Zhang, K. and Aslan, A.B., 2021. AI technologies for education: Recent research and future directions. *Computers And Education: Artificial Intelligence*, 2, article no. 100025, pp. 1-11. <https://doi.org/10.1016/j.caeai.2021.100025>.



ACQUISITION TRAINING AND RETRAINING IN THE USED OF ARTIFICIAL INTELLIGENCE FOR ENHANCED PERFORMANCE BY LECTURERS IN PUBLIC UNIVERSITIES IN CROSS RIVER STATE

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Abstract

This study examines the impact of skill acquisition training and retraining in the used of artificial intelligence for enhanced performance by lecturers in public universities in cross river state. Specifically, the study examined the impact of skill acquisition training and retraining in the use of Chatbots, Automatic Assessment, AI-based training as the independent variables and enhanced performance by lecturers in public universities in Cross River State as the dependent variable. Three research questions were posed, and three null hypotheses formulated accordingly to guide the study. The research design adopted for this study was descriptive survey research design. The population of the study is made up of 42 lectures from the department of Vocational education in University of Calabar and 29 lecturers from department of vocational and technical education, Cross River University, giving a total population of 71 lecturers. Sampling technique adopted was the census technique for the study. Skill Acquisition Training and Retraining Using Artificial Intelligence for Enhanced Performance Questionnaire (ASTRAIEPQ) was used to collect data or the study. It was measured on a four-point rating scale of strongly agree (SA), Agree (A), Strongly Disagree (SD), and Disagree (D). Data collected from this instrument was analysed using simple linear regression was employed to test the hypotheses with the aid of Statistical Package for Social Sciences (SPSS) at 0.05 level of significant. The results of the analysis revealed that, there is a significant influence of skill acquisition training and retraining in the used of artificial intelligence for enhanced performance by lecturers in Nigerian universities in Cross River State. The study concluded that skill acquisition training and retraining using artificial intelligence enhanced the performance of lecturers in public universities in Cross River State. Based on the findings of the study, it was recommended among others that Lecturers should increase the use of Chatbots in carrying out statutory duties of teaching and assessing students to increase their skill acquisition level for enhance performance.

Keyword: Artificial Intelligence, Skill Acquisition, Chatbots, Automatic Assessment, AI-based training, academic research Training, Retraining

Introduction

Success in every organization including educational institutions like the university is largely depended on number of skilled individuals or workforce in such organization. When there are a good number of qualified individuals in an organization, performance is likely to improve which will result in goal attainment. To keep skills of employees in check and maintain optimal performance in this competitive and ever-changing world of work occasioned by technological advancement and innovation, training and retraining is inevitable. Training is used to introduce new ways of carrying out a task or working, while retraining on the other hand serves as a reminder course to employees. Training and retraining are the process of maintaining the skills needed in the business world, be it academic institutions or other business sectors to achieve organizational goals and objectives through improved employees' performance.



According to Ezeani and Oladele (2013), training is the development of specific skills and attitudes needed to perform a particular job or series of jobs to maximize the productivity of the individual and improve the overall organizational efficiency. Ohakwe in Ezeani and Oladele (2013) defined training as continuous assistance or coaching, given to an employee to make him have current knowledge of the job content, scope and relationship within the organization. Training is a type of activity which is planned, systematic and it results in enhanced level of skill, knowledge and competency that are necessary to perform work effectively (Nassazi, 2013). Retraining in education on the other hand, is an on-the-job training used by institutions to bring about progress and enhanced competency in the educators. It is essential especially with the frequent changes of educational policies and in the evolving new knowledge and technology-based society. Retraining lecturers can help to reduce mistakes and improve quality and innovations in the teaching profession (Igbo, Eze, Eskay, Onu & Omeje, 2012). Oguejiofor and Ezenwanne (2020) noted that training and retraining programmes stand to increase lecturers' intellectual and professional background; produce knowledgeable, competent, and effective educators capable of inspiring students to learn; produce academically and professionally sound and highly motivated conscientious and dynamic breed of lecturers; and enhance lecturers' commitment to the teaching profession.

According to Adeogun (2013), lecturers' training and retraining programmes are associated with the general improvement of lecturers' quality in terms of behaviour, attitudes, skills, knowledge, and perception and in the performance of their duties. Alabi (2014) supported that the immediate aim of lecturer training and retraining programmes in tertiary institutions is to improve the quality of lecturers in terms of teaching and learning processes. Lecturers in tertiary institutions should be encouraged to attend training and retraining programmes for capacity building and development. These can be achieved by exposing them to in-service training, such as induction programmes, ICT training, workshops, conferences, seminars, and refresher courses (Alabi, 2014). These trainings especially, the ICT training would expose lecturers to the emerging tools in ICT including the recent artificial intelligence (AI) and equip them with the necessary skills to carry out their job of impacting knowledge to students.

Artificial intelligence (AI) is an innovative technical framework that encompasses the creation of computer systems with the ability to execute activities that usually need human intellect (Aina et al., 2023). These activities involve problem-solving, acquiring knowledge, comprehending language, and seeing visual information. AI has become increasingly prominent in recent years, bringing about a revolutionary transformation in the methods by which jobs are completed in numerous businesses. According to Aina et al. (2023), in education, artificial intelligence (AI) offers a multitude of opportunities to enhance the teaching and learning processes. Intelligent systems provide the ability to adjust to the specific requirements of each learner, deliver tailored learning experiences, and provide immediate feedback. Using artificial intelligence, educators could construct dynamic and interactive learning environments that accommodate the various learning styles and capabilities of students (Aina et al., 2023).

The emergence of artificial intelligence (AI) has a transformative technology with profound implications across various domains. AI has shown latent capability in education to revolutionize teaching and research methodologies, offering personalized learning experiences, enhancing academic performance, and streamlining research processes that required specific skills. Skill levels of lecturers in using AI, amongst others software applications, MS PowerPoint, Canvas, and gamma which emerged as powerful tools for creating captivating and informative presentations. These tools enable lecturers to incorporate multimedia elements, such as images, videos, and animations, to effectively convey complex concepts and engage students in the



learning process (Aiyedun, 2020). Ogunode and Olowonefa (2023) examined the problems facing development of AI education in Nigerian schools. And concluded that AI can be applied in preparation of students result report, school administration, aid effective learning, effective teaching implementation (intelligent tutoring), virtual learning environment and effective data management. Ogunode and Olowonefa further identified funding problems, shortage of AI teachers, inadequate infrastructure facilities (laboratories), shortage of instructional materials and lack of sound AI curriculum as problems facing development of teaching and learning of AI in Nigerian schools. With these tools, lecturers are equipped with the needed skills in advancing world like ours. A study by Ogunode, Agbade and Bassey, (2023) assessed the barriers to effective usage of AI in tertiary institutions in north-central, Nigeria. the result of the study revealed that poor funding, high cost of AI maintenances, high cost of artificial intelligence facilities, unstable internet services, unstable electricity, low level of digital literacy among staff, low level of digital literacy among students, and shortage of AI personnel are barriers to effective usage of AI in tertiary institution in north central, Nigeria. The use of AI requires users to develop specific skills.

According to Okute (2013), skill is the capacity to accomplish a task in a systematic and efficient manner, as well as experience gained through a rigorous training procedure. Skill is the combination of cognitive-knowledge and ability to learn new information; affective; feeling, emotion and expression of attitude; psychomotor - actions, origination of movement in conscious mental activities. Skill is the proficiency in performance and may be enhanced by practice and training. Skills are multidimensional constructs; they comprise the cognitive – knowledge and what is learnt; the affective - emotional expression and what is experienced; the behaviour - action at strategic, tactical, and personal levels; and the context - sectorial, occupational, job and task levels. Skills are abilities and competences needed to perform a task (Ediagbonya, 2010). An employee needs to acquire relevant skills that will help him perform in the job.

According to Ombugus and Umaru (2017) skill acquisition is a process of gaining manipulative skills by learners to make them perform more expertly and improve on their businesses or jobs. Omidiji and Ogwu (2019) defined skill acquisition as a systematic and sequential development of skills that promotes efficiency and effectiveness in the performance of a specified job. Skill acquisition is the process of developing capacities through all levels of education and training, occurring in formal, non-formal, and on-the-job settings, which enable individuals in all areas of the economy to be fully and productively engaged in livelihoods and to have the capacity to adapt their skills to meet the changing demands and opportunities of the economy and labour market especially in the e-world (Enang&Okute, 2019). Skill acquisition has been described by many as the recipe for eradicating extreme poverty and hunger by creating avenue for employment, thereby creating job opportunities and wealth creation (Enang&Okute, 2019). Gumbari in Mshelia (2019) asserts that skill acquisition in Nigeria should be perceived as a catalyst to increase the rate of economic growth, create job opportunities, reduce import of manufactured goods, and decrease trade deficits that result from such import. Technological skills that will enhance performance using Artificial Intelligence is indispensable in this economy era.

There are several Artificial Intelligence (AI) tools that will help lecturers in the public universities to acquire skills to be able impact knowledge to students that will prepare the learners future challenges of advancing technological world. These tools ranges from AI-chatbots, AI-based training in academic research and data analysis, Automatic Assessment (AA), Character AI, QuillBot, Mid Journey, Hugging Face, Google Bard/Gemini, NovelAI, CapCut, Janitor AI, Civitai, etc. However, this paper is delimited to AI-chatbots, AI-based training in academic



research and data analysis, and Automatic Assessment (AA) which are considered as the variable for this study.

According to Afonughe, Onah, Uzoma, Andor and Orisakwe (2021), AI-chatbots (artificial intelligence-enabled chatbots) is a conversational tool or a developed software application that operates with highly programmed algorithm and intelligence that runs on social network Apps/platform such as Facebook messenger, WhatsApps among others. The optimal goal of AI-chatbots is to explore the key AI functions (mimic human natural language, senses and perception in solving complex problem) to hold a conversation with the end user by giving directions and guidance to the individual who sought for these service (Afonughe, et al., 2021). According to Atlas (2023), chatbots for teachers provide a unique opportunity to improve the educational process and connect with students in new ways by providing individual feedback and assistance, allowing teachers to focus on other tasks. Cunningham-Nelson et al. (2019) state that chatbots can deliver and customize various aspects of education. Okonkwo and Ade-Ibijola (2021) noted that using chatbot technology holds promise in delivering efficient and tailored services to individuals within the educational domain. Sandu and Gide (2019) carried out a study on using AI chatbots inside the higher education system in India. And they stated that the advantages of utilizing chatbots to improve students' learning experiences. AI chatbots offer students prompt feedback, address inquiries, and make tailored suggestions. Moreover, chatbots can provide information without requiring extensive, time-consuming searches while concealing the underlying complexity (Ondáš et al., 2019).

According to the results of Pérez et al. (2020), chatbots have the potential to facilitate learning in a manner comparable to that of a human teacher. Also, Sung (2020) assesses AI English-language chatbots and posits that they are anticipated to significantly contribute to achieving speaking and listening proficiency benchmarks. Furthermore, AI chatbots support educators and administrators in their day-to-day responsibilities, particularly evaluating assignments, monitoring student advancement, and offering administrative assistance. AI chatbots have been found to assist in many educational endeavours. As a result, this technology provides educators with additional time to dedicate to tasks that necessitate human involvement, such as offering mentorship and assistance to students. Another important AI tool that can enhance lecturers' performance is virtual monitoring (Yang & Evans, 2019).

Afonughe, et al. (2021) found that there is no significant difference in the mean rating of respondents on the need for AI-Chabot in teaching and learning as well as performing administrative tasks among universities in South-South; and that there is little availability of AI-Chabot technology in handling universities' administrative duties; and the findings showed that poor internet facilities, instabilities in governance, inadequate funding, poor electricity supply among others are factors inhibiting the implementation of AI-chatbot towards administrative duties among universities in South-South, Nigeria. Another AI powerful tool that can be used in education is AI-based training in academic research and data analysis.

AI-based training is revolutionizing academic research and data analysis by enhancing efficiency, accuracy, and accessibility. Modern AI tools such as machine learning algorithms, natural language processing, and automated statistical models are being integrated into research methodologies to assist in data cleaning, hypothesis generation, and complex analytics (Jordan & Mitchell, 2015). These tools can process large datasets at speeds and depths previously unattainable through traditional methods, enabling researchers to identify patterns and insights more effectively (Shmueli et al., 2017). Moreover, AI-powered platforms like IBM Watson, ChatGPT, and Google's AutoML are being used in educational settings to train researchers in data analysis, promoting skill development through interactive, adaptive learning systems



(Holmes et al., 2019). These platforms facilitate the democratization of advanced analytics by making them accessible to non-experts, thus broadening participation in data-driven research. However, the use of AI raises concerns about data privacy, algorithmic bias, and reproducibility. Therefore, responsible implementation, transparency, and continuous ethical review are essential (Binns, 2018). Overall, AI-based training is a powerful enabler in academic research and data analysis, but it must be employed with caution and oversight to ensure trustworthy outcomes.

Ramasamy et al. (2025) conducted a controlled lab experiment with purposively sampled data scientists experienced in Jupyter notebooks. Approximately 24 participants recruited via Prolific and Upwork performed descriptive and predictive tasks with or without AI recommendations supplied through a GPT-4-powered notebook plugin. Prompt templates were pilot-tested to ensure consistency, and recommendation acceptance rates were tracked across sessions. The study found that including clear task-step prompts led to significantly higher acceptance of AI-generated suggestions; descriptive tasks elicited greater uptake than predictive ones, while offering multiple alternatives had no effect on adoption. Though reliable within its design, the sample was limited to experienced notebook users, constraining broader generalizability. Baillifard et al. (2023) performed a semester-long, quasi-experimental field study involving 51 psychology undergraduates in a neuroscience course at UniDistance Suisse. Participants using a GPT-3-powered tutor received personalized micro-learning quizzes based on spaced-repetition and retrieval practice, while a control cohort followed the standard curriculum. The neural "learnt" model was validated against final exam grades, and question-generation protocols were standardized across the intervention. Students who actively engaged with the AI tutor scored up to 15 percentile points higher, with mastery predictions strongly correlating with actual outcomes. This suggests that AI tutors built on learning-science principles can significantly enhance performance, although the non-random cohort assignment limits causal inference.

Zheldibayeva (2025) surveyed 36 postgraduate researchers in Kazakhstan who used CGScholar during an academic writing internship. Using a convenience sample, the study leveraged Likert-scale questionnaires to assess familiarity with AI tools, openness to feedback, and writing expectations. Reliability was supported by standardized survey items. A moderate positive relationship was observed between familiarity with AI tools and receptiveness to revision, and a strong correlation emerged between prior writing experience and expectations for methodological feedback. Participants appreciated AI feedback but continued to rely on human reviewers. The small, self-selected sample and self-report data, however, limit the findings' broader applicability. Gabriel et al. (2024) ran an experimental replication study testing GPT-3.5's ability to assist with quantitative data analysis in social science contexts. Researchers prompted ChatGPT to generate code for standard statistical tasks and evaluated functionality, interpretive accuracy, and reproducibility. Although GPT-3.5 reliably produced correct and executable code, occasional misinterpretations, errors, and superficial explanations appeared—especially when prompts lacked specificity. The study underlined the importance of user expertise and prompt engineering to avoid methodological pitfalls, and while validation was grounded in reproduction of published results, its scope was limited to GPT-3.5 and selected use cases.

Across these studies—a mixed-methods lab experiment, a quasi-experimental field trial, a survey, and replication experiments—several consistent themes emerge. Prompt clarity enhances AI usefulness in technical workflows; AI tutors aligned with pedagogical principles deliver measurable learning benefits; AI feedback works best in combination with human insight; and human oversight remains essential to address AI limitations and ensure reliability. These



empirical investigations consistently report quantitative metrics, standardized procedures, and validation checks, yet each is constrained by relatively small, non-random samples or specific contexts. Future research in AI-based training would benefit from larger, more diverse populations, rigorous randomization, and exploration of newer, fine-tuned models across various domains.

According to Fitria (2021), AI commonly used for online automatic assessment and question correction purposes. The use of features like this makes it easier for teachers and tutors to prepare and conduct quizzes and tests easily and practically. Lecturers and instructors no longer need to make questions and correct questions manually. The use of features like this makes it easier for teach lecturers and tutors to prepare and conduct quizzes and tests easily and practically. The feature in automatic assessment allows lecturers to create quizzes and tests easily and practically. Lecturers only need to choose the type of subject, level, number of questions, level of difficulty, and several other options. After that, the teacher only needs to share the quiz link with the students to do it directly online. This feature allows lecturers to create quizzes and tests easily and practically.

Lecturers only need to choose the type of subject, level, number of questions, level of difficulty, and several other options. After that, the lecturers only need to share the quiz link with the students to do it directly online. Student quiz results can be directly accepted automatically on the teacher's account. There is a score, a list of wrong questions, correct questions, and discussion. Just imagine that lecturers no longer must bother manually correcting and assessing the results of quizzes and student tests (Bin & Mandal, 2019). Everything has been done by the programmed AI system. Automation of these processes will give teachers more time to monitor student progress and focus on improving teaching techniques. The AI system will work independently according to programmed instructions and can learn according to the habits of the user or student. AI will even provide recommendations for material that needs to be studied again and others based on the results you have obtained (Bin & Mandal, 2019).

Statement of the Problem

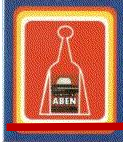
The use of artificial intelligence in educational environments requires special skills from lecturers. Artificial intelligence features offer lecturers and other educators' opportunities to assess varieties of teaching methods, materials and the curriculum at large. Features in artificial intelligence assist lecturers and tutors to prepare and conduct quizzes and tests easily and practically. Lecturers only need to choose the type of subject, level, number of questions, level of difficulty, and several other options. After that, the teacher only needs to share the quiz link with the students to do it directly online. This feature allows lecturers to create quizzes and tests easily and practically. There are special skills needed for lecturers to be able to use these features these special skills include critical skills, data analysis, digital skills, advanced cognition, decision-making, and continuous learning skills, analytical skills and soft skills and traditional hard skills of teaching.

Objectives of the study

1. Influence of skill acquisition training and retraining using Chatbots for enhanced performance by lecturers in public universities in Cross River State.
2. Influence of skill acquisition training and retraining using Automatic Assessment for enhanced performance by lecturers in public universities in Cross River State.
3. Influence of AI-based training in academic research and data analysis on the research productivity of lecturers in public universities in Cross River State

Research questions

The following research questions guided the study:



1. What is the influence of skill acquisition training and retraining using Chatbots for enhanced performance by lecturers in public universities in Cross River State?
2. What is the influence of skill acquisition training and retraining using Automatic Assessment for enhanced performance by lecturers in public universities in Cross River State?
3. What is the influence of AI-based training in academic research and data analysis on the research productivity of lecturers in public universities in Cross River State?

Null hypotheses

The following hypotheses were tested at 0.05 levels of significance.

1. There is no significant influence of skill acquisition training and retraining using Chatbots for enhanced performance by lecturers in public universities in Cross River State.
2. There is no significant influence of skill acquisition training and retraining using automatic assessment for enhanced performance by lecturers in public universities in Cross River State.
3. AI-based training in academic research and data analysis has no significant influence on the research productivity of lecturers in public universities in Cross River State.

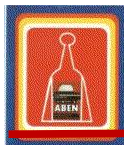
Research Method

The research design adopted for this study was descriptive survey research design. According to Isangedighi (2012), survey design is used to find out what situations, events, attitudes, or opinions are occurring in a population. Reports from other researchers suggest that survey research design measures what a person thinks (attitude and belief), what a person likes and dislikes (values and preferences) and to extract information from a target population using observation, questionnaire or interview and subjecting the data to statistical analysis to draw conclusion. The survey design is suitable for the study as this study aimed at finding out the opinions of lecturers in public universities in Cross River State on how training and retraining contributes to their artificial intelligence skill acquisition for enhanced performance which is in accordance with the view of Isangedighi (2012). The population of the study is made up of 42 lecturers from the department of Vocational education in University of Calabar and 29 lecturers from the department of vocational and technical education, University of Cross River State, giving a total population of 71 lecturers. These categories of persons were chosen for the study because it was considered suitable, and that the information needed for this study is embedded therein. Sampling technique adopted was the census technique. This technique allows the researcher to study the entire population since the number is manageable. Skill Acquisition Training and Retraining Using Artificial Intelligence for Enhanced Performance Questionnaire (ASTRAIEPQ) was used to collect data for the study. The ASTRAIEPQ is a 30-item questionnaire having 10 items per each variable. It was measured on a four-point rating scale of strongly agree (SA), Agree (A), Strongly Disagree (SD), and Disagree (D). These responses were scored 4, 3, 2, and 1 respectively for the items. Data collected from this instrument was analysed using simple linear regression.

Results and discussion

The data presentation and analysis were based on the research questions and hypotheses formulated for the study. The presentation was data analysis, interpretations, followed by the discussion of the findings.

Hypothesis one: There is no significant influence of skill acquisition training and retraining using Chatbots for enhanced performance by lecturers in public universities in Cross River State.



To provide answers to this hypothesis, simple linear regression was used with skill acquisition training and retraining using Chatbots as the independent variable, while enhanced performance in Nigeria universities in Cross River State was the dependent. The result is presented in Table 1.

TABLE 1: Simple Linear Regression Analysis of the influence of skill acquisition training and retraining using Chatbots for enhanced performance by lecturers in public universities in Cross River State.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.538 ^a	.510	.509	1.546

Source of variation	SS	Df	MS	F-ratio	Sig
Regression	447.871	1	447.871	57.508*	.000
Residual	537.350	69	7.788		
Total	985.221	70			

$\alpha = 0.05$, S = Significant

Table 1 shows the correlation of the influence of skill acquisition training and retraining using Chatbot for enhanced performance by lecturers obtained was .538. This means that, as skill acquisition training and retraining using Chabot improves, pperformance of lecturers would also improve. From the correlation coefficient, an R Square of .510 was obtained, this means that about 51% of the total variation in performance of lecturers accounted for by the use ofskill acquisition training and retraining using Chabot. Result shows that an F-ratio of 57.508 with associated or exact probability value of 0.00 was obtained. This exact probability value of 0.00 was less than 0.05 level of significance. Subsequently the null hypothesis which states there is no significant influence of skill acquisition training and retraining using Chabot for enhanced performance by lecturers in public universities in Cross River State was rejected. This implies that,there is significant influence of skill acquisition training and retraining using Chabot for enhanced performance by lecturers in public universities in Cross River State.

Hypothesis two: There is no significant influence of skill acquisition training and retraining using Automatic Assessment on enhanced performanceby lecturers in public universities in Cross River State

To provide answers to this hypothesis, simple linear regression was used with skill acquisition training and retraining using Automatic Assessment as the independent variable, while enhanced performance by lecturers was the dependent. The result is presented in Table 2.

Table 2 shows the correlation of the influence of skill acquisition training and retraining using Automatic Assessment for enhanced performance by lecturers in public universities in Cross River State obtained was .635. This means that as skill acquisition training and retraining using Automatic Assessment improves, performance of lecturers would by enhanced also. From the correlation coefficient, an R Square of .633 was obtained, this means that about 63.30% of the total variation is accounted for by skill acquisition training and retraining using Automatic Assessment improves. Result shows that an F-ratio of 54.558 with associated or exact probability value of 0.00 was obtained. This exact probability value of 0.00 was less than 0.05 level of significance. The null hypothesis which stated that there is no significant influence of skill



acquisition training and retraining using Automatic Assessment on enhanced performance by lecturers in public universities in Cross River State was therefore rejected. Inference drawn is that there is significant influence of skill acquisition training and retraining using Automatic Assessment on enhanced performance by lecturers in public universities in Cross River State.

TABLE 2: Simple Linear Regression Analysis of the influence of skill acquisition training and retraining using Automatic Assessment on enhanced performance by lecturers in public universities in Cross River State

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.635 ^a	.633	.632	1.421

Source of variation	SS	Df	MS	F-ratio	Sig.
Regression	435.044	1	435.044	54.558*	.000
Residual	550.177	69	7.974		
Total	985.221	70			

$\alpha = 0.05$, S = Significant

Hypothesis three: AI-based training in academic research and data analysis has no significant influence on the research productivity of lecturers in public universities in Cross River State.

To provide answers to this hypothesis, simple linear regression was used with skill acquisition training and retraining needs using AI-based training in academic research and data analysis as the independent variable, while enhanced performance of lecturers in public universities in Cross River State was the dependent. The result is presented in Table 3.

TABLE 3: Simple Linear Regression Analysis of the influence of AI-based training in academic research and data analysis on the research productivity of lecturers in public universities in Cross River State.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.589 ^a	.579	.578	1.339

Source of variation	SS	Df	MS	F-ratio	Sig.
Regression	410.976	1	410.976	49.384*	.000
Residual	574.245	69	8.322		
Total	985.221	70			

$\alpha = 0.05$, S = Significant

Table 3 shows the correlation of the influence of AI-based training in academic research and data analysis on the research productivity of lecturers in public universities in Cross River State obtained was .589. This means that as skill acquisition training and retraining needs using AI-based training in academic research and data analysis improves, performance of lecturers would be enhanced. From the correlation coefficient, an R Square of .579 was obtained, this



means that about 57.90% of the total variation in performance of lecturers accounted for by as skill acquisition training and retraining needs on AI-based training in academic research and data analysis. Result shows that an F-ratio of 49.384 with associated or exact probability value of 0.00 was obtained. This exact probability value of 0.00 was less than 0.05 level of significance. Consequently, the null hypothesis which states There is no significant influence of skill acquisition training and retraining needs on AI-based training in academic research and data analysis for enhanced performance by lecturers in Nigeria universities in Cross River State was rejected; this implies that AI-based training in academic research and data analysis has significant influence on the research productivity of lecturers in public universities in Cross River State..

Discussion

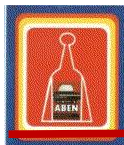
The finding revealed that there is significant influence of skill acquisition training and retraining using Chatbots for enhanced performance by lecturers in public universities in Cross River State. This finding corresponded with Yang and Evans (2019) who state AI chatbots have been found to assist in many educational endeavours. As a result, this technology provides educators with additional time to dedicate to tasks that necessitate human involvement, such as offering mentorship and assistance to students. Another important AI tool that can enhance lecturers' performance is virtual monitoring. The finding was also supported by Sung (2020), who assessed AI English-language chatbots and posits that they are anticipated to significantly contribute to achieving speaking and listening proficiency benchmarks. Furthermore, AI chatbots support educators and administrators in their day-to-day responsibilities, particularly evaluating assignments, monitoring student advancement, and offering administrative assistance. Also, in line with this finding is in line with Atlas (2023), who asserted that chatbots provide teachers a unique opportunity to improve the educational process and connect with students in new ways by providing individual feedback and assistance, allowing teachers to focus on other tasks.

The finding of hypothesis two shown that there is significant influence of skill acquisition training and retraining using Automatic Assessment on enhanced performance by lecturers in public universities in Cross River State. This finding is in agreement with the assertions of Fitria (2021) automatic assessment is easier for lecturers and tutors to prepare and conduct quizzes and tests easily and practically. And that features in automatic assessment allows lecturers to create quizzes and tests easily and practically. The finding is also supported by Bin and Mandal (2019) who stated that automation of these processes give teachers more time to monitor student progress and focus on improving teaching techniques.

The finding of hypothesis three revealed that AI-based training in academic research and data analysis has no significant influence on the research productivity of lecturers in public universities in Cross River State. This finding is in consonance with Ramasamy et al. (2025) who found that AI prompts improved uptake of GPT-4 suggestions in data science tasks, especially descriptive ones, though the sample's expertise limits generalizability. Also with Baillifard et al. (2023) who found that GPT-3 tutoring raised neuroscience student scores by 15 points, with mastery predictions aligning well with outcomes, though cohort assignment wasn't randomized. Zheldibayeva (2025) linked AI familiarity to feedback receptiveness among Kazakhstani postgraduates, but human reviewers remained essential. Gabriel et al. (2024) confirmed GPT-3.5 could generate accurate analysis code, yet user skill and clear prompts were key to avoiding errors, with limitations in scope and interpretability noted.

Conclusion

Assessment of skill acquisition training and retraining is very essential as it helps in identifying the skills gap among lecturers and to proffer solution to it. It is upon this premise that



this study seeks to examine the influence of skill acquisition training and retraining in the used of artificial intelligence for enhanced performance by lecturers in Nigerian universities in Cross River State. From the finding, it is evident that lecturers in public universities in Cross River State have failed to fully integrate Artificial Intelligence in discharge of the responsibility as academia. This further buttress that As Nigerian universities in Cross River and other tertiary institutions in Nigeria is still faced with the traditional approach in rendering academic services as well as delivery of learning contents in a conventional face-to-face setting.

Recommendation

Based on the findings of the study, the following recommendations were made:

1. Lecturers should increase the use of Chatbots in carrying out statutory duties of teaching and assessing students to increase their skill acquisition level for enhance performance.
2. For increase mentorship in the university community, educator should employ the use of virtue mentorship to allow students to access mentorship service at all round the clock.
3. Lecturers should increase proficiency in the use automatic assessment to administer quizzes and tests to reduce paper assessment and increase digital skills in students and themselves.

References

- Adeogun, A. A. (2013). Training and experience as predictors of teachers' productivity in secondary schools in Nigeria. *International Journal of Educational Management*, 4, 38-49.
- Afonughe, E., Onah, E. N., Uzoma, A. C., Andor, S. E., &Orisakwe, C. U. (2021). Integration of artificial intelligence tool (AI-chatbot) into teaching and learning: A panacea for improving universities' educational and administrative duties in South-South, Nigeria. *Journal of Computer Science & Systems Biology*, 4(6), 1-6.
- Aina, M. A., Gbenga-Epebinu, M. A., Olofinbiyi, R. O., Ogidan, O. C., &Ayedun, T. O. (2023). Perception and acceptance of medical chatbot among undergraduates in Ekiti State University, Nigeria. *British Journal of Education*, 11(11), 1-14.
- Aiyedun, T. G. (2020). Effect of animation teaching strategy on secondary school students' achievement, retention, and interest in climate change in Lokoja, Kogi State. *International Journal of Trend in Scientific Research and Development*, 4(3), 944-949.
- Alabi, C. O. (2014). Teacher personnel management as determinants of teacher productivity in Oyo Metropolis senior secondary schools. *Pakistan Journal of Social Science*, 8(1), 39-42.
- Atlas, S. (2023). *Chatbot prompting: A guide for students, educators, and AI-augmented workforce*. University of Rhode Island.
- Baillifard, L., Moser, C., & Schmid, U. (2023). *Enhancing neuroscience learning through GPT-3-powered microlearning: A quasi-experimental study*. UniDistance Suisse.
- Bin, Y., & Mandal, D. (2019). English teaching practice based on artificial intelligence technology. *Journal of Intelligent & Fuzzy Systems*, 37, 17.
- Binns, R. (2018). Fairness in machine learning: Lessons from political philosophy. *Proceedings of the 2018 Conference on Fairness, Accountability, and Transparency*, 149-159. <https://doi.org/10.1145/3287560.3287598>
- Enang, C. E., &Okute, A. L. (2019). Leveraging new technologies for skill acquisition of business education in tertiary institutions in Nigeria for the e-world. *Nigerian Journal of Business Education*, 6(1), 327-331.
- Ezeani, N. E., & Oladele, R. (2013). Implications of training and development programmes on accountants' productivity in selected business organizations in Onitsha, Anambra State, Nigeria. *International Journal of Asian Social Science*, 3(1), 266-281.
- Fitria, T. N. (2021). Artificial intelligence (AI) in education: Using AI tools for teaching and learning process. *Proceedings of Seminar Nasional & Call for Papers*, 134-147.
- Gabriel, T., Lin, Y., & Koenig, J. (2024). *Replicating quantitative data analysis using GPT-3.5: Opportunities and limitations in social science research*. *Journal of Computational Social Science*.



- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
- Igbo, J. N., Eze, J. U., Eskay, M., Onu, V. C., & Omeje, J. (2012). Influence of retraining programme on the self-esteem of primary school teachers in Ebonyi State, Nigeria. *US-China Education Review*, 12.
- Isangedighi, A. J. (2012). *Essentials of research and statistics in education and social sciences*. Eti-nwa Associates.
- Jordan, M. I., & Mitchell, T. M. (2015). Machine learning: Trends, perspectives, and prospects. *Science*, 349(6245), 255-260.
<https://doi.org/10.1126/science.aaa8415>ejournal.upsi.edu.my+1researchgate.net+1pubmed.ncbi.nlm.nih.gov+9science.org+9bibsonomy.org+9
- Mshelia, A. G. (2019). Assessment of employable skills acquisition for self-reliance in business studies curriculum among government junior secondary schools in Biu, Borno State. *Nigerian Journal of Business Education*, 6(2), 260-273.
- Nassazi, A. (2013). *Effects of training on employee performance: Evidence from Uganda* [Master's thesis, University of Applied Sciences].
- Oguejiofor, C. S., & Ezenwanne, C. R. (2020). Training and retraining programme as a strategy for improving the quality of business education lecturers in public tertiary institutions in Anambra State. *Global Journal of Education, Humanities and Management Sciences*, 2(1), 144-153.
- Ogunode, N. J., & Olowonefa, J. A. (2023). AI education in Nigerian schools. *International Journal of Human Computing Studies*, 5(10), 47-56.
- Ogunode, N. J., Agbade, O. P., & Bassey, U. O. (2023). Barriers to effective usage of artificial intelligence in tertiary institutions in north-central Nigeria. *Web of Semantics: Journal of Interdisciplinary Science*, 1(1), 38-43.
- Okonkwo, C. W., & Ade-Ibijola, A. (2021). Chatbots applications in education: A systematic review. *Computers and Education: Artificial Intelligence*, 2, 100033.
<https://doi.org/10.1016/j.caeai.2021.100033>
- Okute, A. L. (2013). Ensuring quality training and effective selling skills for sales personnel in an ICT-based economy. *Association of Business Education of Nigeria Book of Reading*, 3(1), 27-32.
- Ombugus, D. A., & Umaru, R. I. (2017). Entrepreneurship skill acquisition for wealth creation of youths in Agidi Development Area, Nasarawa State. *International Journal of Academia*, 4(1).
- Ondáš, S., Pleva, M., & Hládek, D. (2019, November). How chatbots can be involved in the education process. In *2019 17th International Conference on Emerging eLearning Technologies and Applications (ICETA)* (pp. 575-580). IEEE.
- Pérez, J. Q., Daradoumis, T., & Puig, J. M. M. (2020). Rediscovering the use of chatbots in education: A systematic literature review. *Computer Applications in Engineering Education*, 28(6), 1549-1565.
- Ramasamy, N., Velasquez, J., & Tanaka, M. (2025). *AI-augmented decision-making in Jupyter notebooks: Experimental insights on user adoption*. *Journal of Data Science and AI Ethics*, 8(1), 22-41.
- Sandu, N., & Gide, E. (2019, September). Adoption of AI-chatbots to enhance student learning experience in higher education in India. In *2019 18th International Conference on Information Technology Based Higher Education and Training*, 1-5.
- Shmueli, G., Bruce, P. C., Gedeck, P., & Patel, N. R. (2017). *Data mining for business analytics: Concepts, techniques, and applications* in R. Wiley.
- Sung, M. C. (2020). Pre-service primary English teachers' AI chatbots. *Language Research*, 56(1), 97-115.
<http://dx.doi.org/10.30961/lr.2020.56.1.97>
- Yang, S., & Evans, C. (2019, November). Opportunities and challenges in using AI chatbots in higher education. In *Proceedings of the 2019 3rd International Conference on Education and E-Learning*, 79-83.
- Zheldibayeva, D. (2025). *AI-assisted academic writing: A survey of postgraduate researchers using CGScholar in Kazakhstan*. *International Journal of Academic Writing and Technology*, 12(2), 87-103.



ETHICAL CONSIDERATION FOR INTEGRATION OF ARTIFICIAL INTELLIGENCE IN BUSINESS EDUCATION CURRICULUM DEVELOPMENT IN TERTIARY INSTITUTIONS IN BAUCHI STATE

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Abstract

This study determined ethical consideration for integration of Artificial Intelligence in business education curriculum development in tertiary institutions in Bauchi state of Nigeria. The study employed a cross-sectional research design, the population of the study comprised 104 business educators, total population sample was used. Structured questionnaire was used as the instrument for data collection which was validated by experts. The reliability of the instrument obtained was 0.82. Data was analyzed using simple linear regression. The findings revealed that there is no significant relationship between AI bias and fairness, data privacy and policy and ethical students' data usage ethical consideration and business education curriculum development in tertiary institutions in Bauchi state. The study concluded that AI can improve educational outcomes in Business education programme when it is integrated, developed and implemented with transparency and ethical considerations in the curriculum. It was recommended that the tertiary institutions should establish and enforce comprehensive ethical guidelines with respect to how AI is used within educational settings, more so regarding the ethical use of AI bias and fairness, data privacy and policy, and ethical students' data usage in business education curriculum development for and integrity in business education programme.

Keywords: *Ethics, Artificial Intelligence, Business Education, Curriculum Development.*

Introduction

Artificial intelligence (AI) is the simulation of human intelligence in machines which enable them to perform tasks that typically require human that typically require human intelligence on learning, problem solving, reasoning among other tasks. The use of the tasks in education generally, create intelligent machines that can assist, augment, and automate human capabilities, improving efficiency, accuracy, and decision making if its ethics are properly used. Integration of AI into business education programme has emerged as a transformative force, fundamentally reshaping how curricula are developed, managed, and delivered.

AI technologies, such as machine learning, natural language processing, and data analytics, can personalize learning experiences, smoothen administrative work, and bring efficiency into the decision-making processes of institutions of learning (UNESCO, 2020). With the development of AI, its application in business education programme and other programme in tertiary institutions located in Bauchi state was no longer an option; it became a requirement for those institutions interested in remaining competitive in an increasing digital world. According to Cantú-Ortiz, et al., (2020), Artificial Intelligent analyzes all educational and non-educational needs, identifies gaps and align content with the trends of the industry and job market needs.

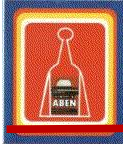


Additionally, it also involved in content creation and recommendation with suggestions for materials and resources based on explicit learning outcomes in relation to curriculum development, implementation and management. However, at the speed by which AI is being infused into corporate and social sectors, it also opens a host of ethical concerns that have to be taken care of if people are going to have the responsible and fair use of AI technologies in curriculum development and management (Selwyn, 2019; Aithal & Maiya, 2023). According to World Economic Forum (WEF, 2019), the potential effect of AI on education generally, are huge, as it can bring an overall improvement in the learning experience through the analysis of large amounts of data and provide recommendations that are tailored whereas, on the other way round, there are also paramount ethical concerns that need to be heeded. AI systems can perpetuate existing biases if trained on biased data, potentially exacerbating educational inequalities, it also raises concerns about student data privacy and security, most especially in curriculum development in tertiary institutions (WEF, 2019).

In addition, key ethical concerns identified with respect to these are multifaceted and entail issues surrounding bias, transparency, accountability, and privacy, along with broader social implications from AI technologies (Shiohira, 2021). Almost without exception, these AI systems are trained on historical data, duplicating and amplifying biases that lead to potential discriminatory outcomes in such important spheres as student admission, grading, and job placement recommendations (Chinta, et al., 2024). This bias could be further propagated during the curriculum development process in what the AI recommends in terms of content and the paths students take, thus putting some sets of students at a disadvantage. More specifically, the ethical issues in most cases are exacerbated by the fact that many AI systems are "black box" in nature, meaning that decision-making processes are not defined clearly (Wischmeyer, 2020).

This can lead to a lack of transparency, which truly challenges accountability and trust, since educators and administrators are unable to understand how AI-driven decisions are reached or make sure of their compliance with educational values and standards (Al-Zahrani, 2024). Moreover, the integration of AI into business education curricula must account for issues related to the protection of privacy and raising the security level in data treatment. Sometimes, the development of AI-driven curricula requires the collection and analysis of huge amounts of data, including personal information about students and faculty (Luan, et al., 2020). This raises questions of data privacy, potential breaches, and ethical uses of student data. Strong frameworks and guidelines are required to protect this information and that AI tools shall be responsibly used.

This naturally flows into a challenge of how business education institutions can adequately attend to these ethical considerations. There is a sparse problem of comprehensive frameworks guiding the ethical use of AI in educational settings (Borenstein, & Howard, 2021). While several bodies, like UNESCO, have attempted to give ethical guidelines in the area of AI, most of the time, these frameworks remain very general and do not embrace specific difficulties encountered in a business education context (Stine, et al., 2019). Resolving these ethical considerations is critical to ensuring that the integration of AI in the development and management of business education curricula is conducive to fairness, protection of privacy, efficiency, transparency, and ethical standards; and developing general strategies on how to master these challenges will become particularly relevant to foster the responsible and effective use of AI technologies in curriculum development and education generally. Hence, there is the need to ascertain the relationship between the use of ethical consideration for the integration of artificial intelligence in business education curriculum development among business educators in tertiary institutions within Bauchi state, Nigeria.



Self-Determination Theory was developed by Edward Deci and Richard Ryan (1985). The theory is a psychological framework that explains human motivation, development, and well-being. It provides a framework to understand the different baseline psychological needs of autonomy, relatedness, and competence that underpin motivation in education. SDT proposes that people have an inherent tendency to pursue intrinsic motivation, which is motivated by genuine interest and enjoyment. Self-Determination Theory provides a framework to understand the different baseline psychological needs of autonomy, relatedness, and competence that underpin motivation in education. It offers insight, concerning the integration of AI technologies for the development and management of a business education curriculum, with ethical challenges and implications that threaten the autonomy of educators by decision-making, limited by the AI system, potentially leading to resistance and a diminished sense of control (Porayska-Pomsta & Rajendran, 2019).

The emphasis of this theory on relatedness would, therefore, be very essential in creating a collaborative and trustworthy educational setting, which the privacy concerns and obscurity of AI-driven decisions could undermine (Kayyali, 2024). Another important element in SDT is competence, and that is also affected, for educators will need to be introduced to more complex AI tools, therefore risking losing some confidence and feelings of effectiveness (Chiu, et al., 2024). Such supportive environments, by addressing psychological needs, would be able to allow for the ethical integration of AI in educational settings. Notably, it would seek to ensure that such technologies do enhance, not diminish, human-centric aspects of curriculum development and management within business education (Vistorte, et al., 2024).

AI Bias and Fairness of Educational Opportunities and Curriculum Development; integrating AI into curriculum development runs the risk of perpetuating biases already present in historical data. AI systems are trained with datasets that often reflect the biases and inequalities of society and history (Schwartz, et al., 2022). Such algorithms may continue to bias the design of curricula by emphasizing content that reflects biases, thus possibly inadvertently favoring some demographic segments in a class over others (Mutiga, 2024).

This process may further deepen entrenched inequities and decrease educational opportunities for underrepresented groups. To avoid this, AI systems should be regularly audited for biases, diversity included in data collection, and have a wide stakeholder audience involved in the processes of curriculum development and decision-making. By doing so, these institutions of learning will have managed to come up with more inclusive and fair curricula that give equal opportunities to all their students (Schwartz, et al., 2022).

AI Data Privacy and Security and Business Education Curriculum Development; the design and deployment of AI-driven curricula for business education require gathering, storing, and analyzing sensitive data about students, which gives rise to a number of substantial concerns about privacy and protection of data (Ahmad, et al., 2023). AI systems can use personal information to adapt curricula and learning experiences; hence, institutions should develop strict mechanisms in charge of protecting such data. This shall entail compliance with laws to guarantee secure handling and processing of students' data (Luan, et al., 2020). The mandate of institutions also includes the need to acquire informed consent from students and parents regarding the usage of their data and to make sure that this data is protected against unauthorized access or breaches (Mouawad, 2020). It is of prime importance to take up these challenges in privacy issues as much as it is to ensure that AI-driven curriculum development upholds protection of the students' privacy and personal information.

Ethical Student Data Usage in AI Systems; one of the major concerns associated with AI-driven decision-making in curriculum management is the lack of transparency and explainability



associated with too many AI systems (Khosravi, et al., 2022). Most AI algorithms are very complex and opaque, and in many instances exert a "black box" effect on the rationale for curriculum-related decisions, making it far from understandability to educators, students, and administrators (Mupaikwa, 2023).

This can then lead to mistrust, in that stakeholders may begin to query the legitimacy and fairness of AI-influenced curricular decisions. opening up algorithmic explanations and increasing the auditability of decision-making procedures might become important steps toward the enhancement of trust and ensuring accountability (Cheong, 2024). There is a great need to focus on the transparency and explain ability of AI systems for curriculum management in order to gain the set-up of a trustable and accountable educational environment.

It's the ethical handling of student data, however, that comes to bear on questions of integrity and trustworthiness in AI technologies applied for business education programs (Saaida, 2023).

AI systems could provide valuable insights into curriculum development in line with student needs in terms of learning content and experiences. However, this shall be done with stringent ethical standards in data utilisation, ensuring student data is only used for educational purposes and shielded from possible unauthorized access; stringent data governance policies, together with parental consent in using their data and anonymization of such data, are quite important in guarding ethical standards and privacy considerations (Reidenberg& Schaub, 2018). The hypothesis underscores the importance of ethical data management in the preservation of credibility and effectiveness of AI-driven curriculum development.

The main aim of the study is to find out the relationship between ethical consideration for the integration of AI and business education curriculum development in tertiary institutions within Bauchi state, Nigeria. Specifically, the study sought to:

1. Determine the relation between bias and fairness consideration and business education curriculum development
2. Find out the relationship between data privacy and policy consideration and business education curriculum development
3. Ascertain the relationship between ethical student data usage and business education curriculum development

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant relationship between bias and fairness consideration and business education curriculum development
2. There is no significant relationship between data privacy and security consideration and business education curriculum development
3. There is no significant relationship between ethical student data usage consideration and business education curriculum development.

Methodology

The study adopted the cross-sectional survey research design. The study was conducted in Bauchi state. The target population of the study was the entire 104 Business educators in tertiary institutions within Bauchi state. Total population sample was used where the entire population was considered in the study. Structured questionnaire was used as the instrument for data collection. The structured questionnaire was validated by experts. A reliability coefficient of 0.82 was found. Simple linear regression was used for data analysis with the aid of the Statistical Package for Social Science (SPSS) version 23. In making decision, if $p \geq 0.05$, the null hypothesis was accepted, and if $p \leq 0.05$, the null hypothesis was rejected.



Results

Null Hypothesis One

There is no significant relationship between AI bias and fairness ethical consideration and business education curriculum development in tertiary institutions in Bauchi state

The statistical evidence documented in Table 1 revealed that the variable AI bias and fairness consideration had a standardized coefficient beta value of .001, $p = .987$. This indicated that there is no significant relationship between AI bias and fairness ethical consideration and business education curriculum development in tertiary institutions in Bauchi state. This result therefore, support the prediction of null hypothesis one.

Table 1: simple linear regression analysis on the relationship between AI bias and fairness ethical consideration and business education curriculum development in universities within North-east, Nigeria.

Variable	Standardized Coefficients Beta	t-value	p-value	Decision
AI Bias and Fairness Ethical Consideration	.001	.016	.987	Accepted

Source: field survey (2024).

Null Hypothesis Two

There is no significant relationship between AI data privacy and security ethical consideration and business education curriculum development in tertiary institutions in Bauchi state

The result documented in Table 2 revealed that the AI data privacy and security ethical consideration had a standardized coefficient beta value of .111, $p = .228$. This showed that there is no significant relationship between AI data privacy and security ethical consideration and business education curriculum development in tertiary institutions in Bauchi state. Null hypothesis two was therefore, accepted.

Table 2: simple linear regression analysis on the relationship between AI data privacy and security ethical consideration and business education curriculum development in tertiary institutions in Bauchi state.

Variable	Standardized Coefficients Beta	t-value	p-value	Decision
AI Data Privacy and Security ethical Consideration	.111	1.212	.228	Accepted

Source: field survey (2024).

Null Hypothesis Three

There is no significant relationship between AI ethical students' data usage consideration and business education curriculum development in tertiary institutions in Bauchi state.

The result documented in table 3 revealed that the AI ethical students' data usage consideration had a standardized coefficient beta value of .127, $p = .167$. This showed that there is no significant relationship between AI ethical students' data usage consideration and business education curriculum development in tertiary institutions in Bauchi state. Therefore, null hypothesis three was accepted.

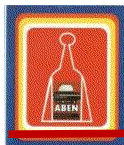


Table 3: simple linear regression analysis on the relationship between AI ethical students' data usage consideration and business education curriculum development in tertiary institutions in Bauchi state.

Variable	Standardized Coefficients Beta	t-value	p-value	Decision
AI Ethical Students Data Usage Consideration	.127	1.390	.167	Accepted

Source: field survey (2024).

The result of null hypothesis one revealed that there is no significant relationship between AI bias and fairness ethical consideration and business education curriculum development in tertiary institutions in Bauchi state. Statistical evidence from null hypothesis two indicated that there is no significant relationship between AI data privacy and security ethical consideration and business education curriculum development in tertiary institutions in Bauchi state. Also, the result of null hypothesis three showed that there is no significant relationship between AI ethical students' data usage consideration and business education curriculum development in tertiary institutions in Bauchi state.

Discussions of the Findings

The study's findings present significant insights into the ethical implications of AI in business education curriculum development.

H₁ posited that AI bias and fair ethical consideration has no significant relationship with business education curriculum development. The results revealed a non-significant relationship. This does not align with the broader discourse on AI's potential to democratize education by relating ethical consideration and curriculum development (Ayeni, et al., 2024). The findings also agree with that of Schwatz et al., (2022) and Mutiga (2024) who found that there is no significant relationship between AI bias and fairness and curriculum development.

H₂ posited that AI data privacy and security ethical consideration has no significant relationship with business education curriculum development. The findings indicated a significant negative relationship. This reflects concerns in the literature about AI's potential to erode trust due to perceived opacity and lack of human judgment in critical decisions (Grimmelikhuijsen, et al., 2023; Omrani, et al., 2022). The finding also agreed with Ahmed et al., (2023) and Luan et al., (2020) that indicated that there is no relationship between AI data privacy and security and curriculum development.

H₃ revealed that ethical use of student data consideration has no significant relationship with business education curriculum development. These findings demonstrate the high stakes that data governance plays in artificial intelligence applications for student privacy and ethical practice considerations, aligning concerns raised by (Díaz-Rodríguez, et al., 2023; Olateju, et al., 2024). The research supports prior studies that found no significant relationship between ethical data usage and curriculum development in tertiary institutions (Khosrabi et al., 2022; Saaida, 2023; Cheong, 2024).

Conclusion

The findings of the study indicated a significant relationship between the use of ethical consideration in the application of AI systems in the development of business education curriculum in these tertiary institutions, thus showing that AI can provide equal chances for using



resources and ensure integrity in business education programs if the proper ethical use of data in the AI system is considered in the curriculum development. The institutions will increase efficiency in great magnitude in Business education curriculum development, and generally improve students' performance. The institutions are thus encouraged to foster transparency with stakeholders, together with the implementation of stringent AI ethical guidelines. By so doing, it shall be able to leverage the benefits associated with AI integration in curriculum development.

Recommendations

From the conclusion, the study recommended that:

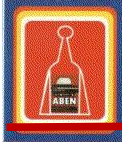
- i. Institutions should establish and enforce comprehensive ethical guidelines with respect to how AI is used within educational settings, more so regarding the ethical use of AI bias and fairness in business education curriculum development for transference and integrity in business education programme curriculum.
- ii. Institutions should establish monitoring and evaluation processes to enable business education programme ensure the consideration of ethical guidelines on the use of AI's data privacy and security for integration in business education curriculum development for fairness, trust, and integrity.
- iii. The institutions should ensure AI ethical students' data usage in business education curriculum development and also, regular audits and feedback mechanisms should be instrumental in pointing out areas for improvement so that AI systems are oriented to ethical standards and educational goals.

Reference

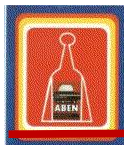
- Ahmad, K., Iqbal, W., El-Hassan, A., Qadir, J., Benhaddou, D., Ayyash, M., & Al-Fuqaha, A. (2023). Data-driven artificial intelligence in education: A comprehensive review. *IEEE Transactions on Learning Technologies*.
- Al-Zahrani, A. M. (2024). Unveiling the shadows: Beyond the hype of AI in education. *Heliyon*, 10(9).
- Ayeni, O. O., Al Hamad, N. M., Chisom, O. N., Osawaru, B., & Adewusi, O. E. (2024). AI in education: A review of personalized learning and educational technology. *GSC Advanced Research and Reviews*, 18(2), 261-271.
- Borenstein, J., & Howard, A. (2021). Emerging challenges in AI and the need for AI ethics education. *AI and Ethics*, 1, 61-65.
- Bulathwela, S., Pérez-Ortiz, M., Holloway, C., Cukurova, M., & Shawe-Taylor, J. (2024). Artificial intelligence alone will not democratise education: On educational inequality, technosolutionism and inclusive tools. *Sustainability*, 16(2), 781.
- Cantú-Ortiz, F. J., Galeano Sánchez, N., Garrido, L., Terashima-Marin, H., & Brena, R. F. (2020). An artificial intelligence educational strategy for the digital transformation. *International Journal on Interactive Design and Manufacturing (IJIDeM)*, 14, 1195-1209.
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *Ieee Access*, 8, 75264-75278.
- Cheong, B. C. (2024). Transparency and accountability in AI systems: safeguarding wellbeing in the age of algorithmic decision-making. *Frontiers in Human Dynamics*, 6, 1421273.
- Chinta, S. V., Wang, Z., Yin, Z., Hoang, N., Gonzalez, M., Quy, T. L., & Zhang, W. (2024). FairAIED: Navigating Fairness, Bias, and Ethics in Educational AI Applications. *arXiv preprint arXiv:2407.18745*.
- Deci, E. L., & Ryan, R. M. (1985). Self-determination theory. *Handbook of theories of social psychology*, 1(20), 416-436.



- Díaz-Rodríguez, N., Del Ser, J., Coeckelbergh, M., de Prado, M. L., Herrera-Viedma, E., & Herrera, F. (2023). Connecting the dots in trustworthy Artificial Intelligence: From AI principles, ethics, and key requirements to responsible AI systems and regulation. *Information Fusion*, 99, 101896.
- Grimmelikhuijsen, S. (2023). Explaining why the computer says no: Algorithmic transparency affects the perceived trustworthiness of automated decision-making. *Public Administration Review*, 83(2), 241-262.
- Igbokwe, I. C. (2023). Application of artificial intelligence (AI) in educational management. *International Journal of Scientific and Research Publications*, 13(3), 300- 307.
- Kayyali, M. (2024). Future possibilities and challenges of AI in education. In *Transforming education with generative AI: Prompt engineering and synthetic content creation* (pp. 118-137). IGI Global.
- Khosravi, H., Shum, S. B., Chen, G., Conati, C., Tsai, Y. S., Kay, J., ... & Gašević, D. (2022). Explainable artificial intelligence in education. *Computers and Education: Artificial Intelligence*, 3, 100074.
- Luan, H., Geczy, P., Lai, H., Gobert, J., Yang, S. J., Ogata, H., ... & Tsai, C. C. (2020). Challenges and future directions of big data and artificial intelligence in education. *Frontiers in psychology*, 11, 580820.
- Mouawad, G. P. (2020). *Students' Privacy in a Digital Age* (Doctoral dissertation, University of La Verne).
- Mupaikwa, E. (2023). The Use of Artificial Intelligence in Education: Applications, Challenges, and the Way Forward. In *Emerging Technology-Based Services and Systems in Libraries, Educational Institutions, and Non-Profit Organizations* (pp. 26-50). IGI Global.
- Mutiga, A. N. (2024, July). AI in Education: Mapping NIST AI Biases to Understand and Mitigate them in Teaching and Learning Applications. In *EdMedia+ Innovate Learning* (pp. 248-257). Association for the Advancement of Computing in Education (AACE).
- Olateju, O., Okon, S. U., Olaniyi, O. O., Samuel-Okon, A. D., & Asonze, C. U. (2024). Exploring the concept of explainable AI and developing information governance standards for enhancing trust and transparency in handling customer data. *Available at SSRN*.
- Oluyemisi, O. M. (2023). Impact of Artificial intelligence in Curriculum Development in Nigerian Tertiary Education. *International Journal of Educational Research*, 12(2), 192-211.
- Omrani, N., Riveccio, G., Fiore, U., Schiavone, F., & Agreda, S. G. (2022). To trust or not to trust? An assessment of trust in AI-based systems: Concerns, ethics and contexts. *Technological Forecasting and Social Change*, 181, 121763.
- Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). Artificial intelligence in education: Challenges and opportunities for sustainable development.
- Porayska-Pomsta, K., & Rajendran, G. (2019). Accountability in human and artificial intelligence decision-making as the basis for diversity and educational inclusion. *Artificial intelligence and inclusive education: Speculative futures and emerging practices*, 39-59.
- Reidenberg, J. R., & Schaub, F. (2018). Achieving big data privacy in education. *Theory and Research in Education*, 16(3), 263-279.
- Saaida, M. B. (2023). AI-Driven transformations in higher education: Opportunities and challenges. *International Journal of Educational Research and Studies*, 5(1), 29-36.
- Selvyn, N. (2019). *Education and Artificial intelligence; an introduction*. City press



- Schwartz, R., Schwartz, R., Vassilev, A., Greene, K., Perine, L., Burt, A., & Hall, P. (2022). *Towards a standard for identifying and managing bias in artificial intelligence* (Vol. 3, p. 00). US Department of Commerce, National Institute of Standards and Technology.
- Shiohira, K. (2021). Understanding the Impact of Artificial Intelligence on Skills Development. Education 2030. *UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training*.
- Stine, J., Trumbore, A., Woll, T., & Sambucetti, H. (2019). Implications of artificial intelligence on business schools and lifelong learning. *Final Report at Academic Leadership Group*.
- Vinichenko, M. V., Melnichuk, A. V., & Karácsony, P. (2020). Technologies of improving the university efficiency by using artificial intelligence: Motivational aspect. *Entrepreneurship and sustainability issues*, 7(4), 2696.
- UNESCO. (2020). The feature of education; how can enhance teaching and learning. *Journal of education data and mining*. 10 (2).
- Vistorte, A. O. R., Deroncele-Acosta, A., Ayala, J. L. M., Barrasa, A., López-Granero, C., & Martí-González, M. (2024). Integrating artificial intelligence to assess emotions in learning environments: a systematic literature review. *Frontiers in Psychology*, 15, 1387089.
- Wischmeyer, T. (2020). Artificial intelligence and transparency: opening the black box. *Regulating artificial intelligence*, 75-101.
- World Economic Forum (2019). *Impact of AI on education*. Report.



ARTIFICIAL INTELLIGENCE FOR CREATIVITY AND INNOVATION IN BUSINESS EDUCATION AND ENTREPRENEURSHIP PRACTICE

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Abstract

The research examined the use of Artificial Intelligence in fostering creativity and innovation in the field of Business Education and Entrepreneurship, specifically focussing on tertiary institutions in Bayelsa State. The research included a total population of 649 students specialising in Business Education and Entrepreneurship Studies. A sample of 194 students, representing 30% of the total population, was chosen as the participants for the investigation. The data collection instrument used was a precisely crafted questionnaire comprising of 30 enquiries, which had been validated by experts in the respective domain. The instrument's reliability was assessed using the Cronbach Alpha reliability method, yielding a reliability value of 0.863. Out of the 194 copies of questionnaires that were sent, 187 were filled out and mailed back, yielding a return rate of 96.4%. The data were examined using descriptive statistics, which included measures of central tendency (mean) and variability (standard deviation), as well as t-test statistics. The study employed gathered and analysed data to identify 30 distinct approaches through which the utilisation of Artificial Intelligence (AI) tools and techniques can enhance the creativity, innovation, critical thinking, and problem-solving skills of students in Business Education and Entrepreneurship programs at tertiary institutions in Bayelsa State. The findings of the hypothesis suggest that there was no statistically significant impact ($p < 0.05$) of gender on the average evaluations provided by the participants. Nevertheless, the students' class had a statistically significant impact ($p < 0.05$) on their average scores. The research found that using AI tools and approaches in education would significantly enhance the creativity, originality, critical thinking, and problem-solving abilities of students in Business Education and Entrepreneurship programs. The study's results and conclusion propose a change towards AI-assisted instructions in Nigerian tertiary institutions to effectively administer Business Education and Entrepreneurship programs.

Keywords: Artificial intelligence, Creativity, Innovation, Business education, Entrepreneurship.

Introduction:

The incorporation of Artificial Intelligence (AI) into business education and entrepreneurial practice marks the beginning of a new era with vast potential for profound change. This integration is expected to reshape conventional paradigms and stimulate innovation in several sectors. With the rapid progress of technology, educators, academics, and practitioners are increasingly relying on AI-driven solutions to improve learning outcomes, stimulate creativity, and develop entrepreneurial attitudes in future business leaders. This paper aims to examine the diverse role of artificial intelligence (AI) in promoting creativity and innovation in the fields of



business education and entrepreneurship. It will analyse existing research, best practices, and emerging trends to offer insights that can guide future educational strategies, business models, and policy frameworks in the age of AI-driven entrepreneurship.

The use of AI technology in business education has the capacity to entirely revolutionise teaching techniques by transcending the limitations of conventional instructional methodologies. Learners are able to enjoy personalised, captivating, and flexible learning experiences (Clark et al., 2020; Yang & Cornelius, 2021). By employing AI-driven tools such as intelligent tutoring systems, natural language processing, and machine learning algorithms, educators can offer students opportunities to explore complex business scenarios, experiment with different strategies, and receive personalised feedback tailored to their individual needs and learning preferences (Lee & Wu, 2019; Zhou et al., 2020). These activities not only increase student involvement and memory retention but also foster analytical thinking, problem-solving aptitude, and a profound comprehension of current business obstacles (Li & Sun, 2018; Cheng & Lu, 2021). Moreover, AI has significant potential to cultivate an entrepreneurial attitude and augment the proficiencies of business students. It equips individuals with the essential information, skills, and tools to successfully traverse the uncertainties and complexity of the modern corporate environment (Zhao & Chen, 2020; Mitra & Gupta, 2019). AI-driven platforms that use advanced algorithms enable prospective entrepreneurs to effectively find profitable prospects, minimise risks, and enhance decision-making processes in areas like as ideation, market analysis, and predictive modelling (Shi et al., 2021; Rasmussen & Saeed, 2020). By integrating students into AI-driven entrepreneurial ecosystems, educational institutions may cultivate an environment that promotes innovation and encourages taking risks, hence stimulating the development of scalable businesses with the potential for sustained growth (Bouncken et al., 2021; Zeng et al., 2018).

However, the integration of AI into business education and entrepreneurial practice poses some challenges and ethical considerations. The increasing significance of AI algorithms in decision-making processes has generated apprehensions about bias, transparency, and algorithmic responsibility (Mittelstadt et al., 2016; Zhang et al., 2020). Moreover, the rapid pace of technology advancement necessitates ongoing professional development for educators and practitioners to ensure effective utilisation of AI technologies and ethical management of data (Kulkarni & Saini, 2020; Vosburg et al., 2021).

The introduction of AI in business education and entrepreneurship has initiated collaborations across several disciplines and partnerships across different sectors, with the goal of fully utilising the potential of AI-driven innovation. Partnerships among academia, business, and government have resulted in the creation of AI-driven learning ecosystems, incubators, and accelerators that promote cooperation, the sharing of information, and the transfer of technology (Bouncken et al., 2021; Zhao & Chen, 2020). These efforts assist students in acquiring practical experience, interacting with industry professionals, and using advanced technology. This, in turn, improves their chances of finding employment and enhances their potential to start their own businesses (Mitra & Gupta, 2019; Rasmussen & Saeed, 2020).

The accessibility of AI tools and resources has enabled educators and entrepreneurs from many backgrounds to use AI in creative ways, making knowledge and possibilities more accessible to a wider range of people (Shi et al., 2021; Zeng et al., 2018). Open-source AI platforms, online courses, and community-driven initiatives empower aspiring entrepreneurs by equipping them with the necessary tools and resources to create AI-driven solutions for urgent societal problems. This process democratises innovation and promotes inclusive economic growth (Zhou et al., 2020; Zhang et al., 2020).



However, it is essential to recognise and deliberate upon the ethical, social, and economic ramifications of using AI in the realms of business education and entrepreneurship. As AI technology becomes more integrated into our everyday lives, there are notable worries around data privacy, algorithmic bias, and the possibility for employment displacement (Mittelstadt et al., 2016; Kulkarni & Saini, 2020). In order to guarantee that AI-driven innovation helps society and minimises possible damage, it is crucial to have ethical frameworks, regulatory procedures, and responsible AI practices in place. These measures also help to build confidence in AI systems (Vosburg et al., 2021; Zhang et al., 2020).

AI may enhance critical thinking and problem-solving abilities by providing tailored learning experiences. According to Johnson and Estrada (2020), AI-driven educational systems has the potential to adjust to individuals' unique learning styles and preferences. Through the use of algorithms that examine students' interactions and performance data, these platforms have the capability to tailor learning materials and activities to match the unique needs of each learner. This tailored method guarantees that students are adequately stimulated, therefore fostering their ability to analyse and innovate as they engage with personalised instructional material.

AI-powered interactive educational tools are essential for giving students practical problem-solving experiences. Li and Zhang (2019) state that AI-based simulations and virtual environments provide students with a risk-free setting to apply theoretical knowledge to real-world settings. Through the use of interactive simulations, students have the opportunity to explore several solutions, get instant feedback on their choices, and continuously improve their problem-solving approaches. This repeated approach not only improves their capacity to think critically but also fosters resilience and flexibility when confronted with intricate obstacles. Artificial intelligence enables instructors to get profound understanding of students' learning processes via advanced data analysis approaches. According to Wang et al. (2021), AI algorithms have the capability to analyse extensive educational data, which includes measures of students' achievement, their learning behaviours, and cognitive processes. Through the analysis of significant patterns and connections in this data, instructors may pinpoint areas where students may be encountering difficulties or excelling in their critical thinking and problem-solving skills. Equipped with this understanding, teachers may customise their teaching methods to target certain learning requirements, skilfully supporting students' progress in these fundamental abilities.

Natural language processing (NLP) technologies provide an alternative method for artificial intelligence (AI) to enhance its capacity for critical thinking and problem-solving. By using chatbots and virtual assistants powered by Natural Language Processing (NLP), students may engage in dialogue-based learning experiences that promote active inquiry and reflection. According to the findings of Smith and Jones (2020), engaging in conversations with AI-powered tutors helps students to express their opinions, challenge assumptions, and provide justifications for their thinking. These discussions allow students to enhance their comprehension of intricate subjects while also refining their skills in analysing material critically and expressing their thoughts effectively.

Moreover, AI-facilitated collaborative learning settings enhance students' cooperation, communication, and collective problem-solving abilities. Through the use of artificial intelligence, students acquire the ability to successfully cooperate with peers from various backgrounds and viewpoints throughout group interactions and project-based tasks. According to Chen et al. (2018), collaborative problem-solving assignments motivate students to use their combined knowledge and talents to address intricate issues together. During this cooperative process, students develop crucial interpersonal skills, including attentive listening, negotiation, and conflict resolution, which are vital for successful problem-solving in professional environments. AI-



powered collaboration platforms are crucial in fostering collaborative creativity among male and female students. Chen et al. (2018) found that using AI technology to promote collaborative problem-solving activities motivates students to collaborate and come up with creative solutions for real-world problems. Through the use of AI-driven communication tools and project management systems, both male and female students may efficiently cooperate on entrepreneurial endeavours, exchange ideas, and jointly develop solutions, irrespective of their physical location or availability. This cooperative method not only amplifies ingenuity but also cultivates collaboration and mutual esteem among students from all backgrounds.

AI can promote creativity and innovation in male and female students by providing personalised learning experiences. According to Johnson and Estrada (2020), AI-powered educational platforms can adapt learning materials and activities to meet the specific needs and preferences of individual learners. By using algorithms that assess students' learning styles, interests, and performance data, these platforms may provide customised suggestions and adaptable learning paths that promote creativity and innovation. Artificial intelligence may aid students in formulating and verifying novel business concepts. Li and Zhang (2019) emphasise the significance of artificial intelligence (AI) in examining market trends, consumer behaviour, and competitive environments to discover entrepreneurial prospects and evaluate their feasibility. Through the use of AI-driven predictive analytics and natural language processing algorithms, both male and female students may get vital knowledge on prospective market voids, customer requirements, and developing patterns. This knowledge empowers them to create creative company ideas with significant development prospects.

Furthermore, AI has the potential to encourage ethical and inclusive entrepreneurial practices, while also nurturing creativity and innovation. Smith and Jones (2020) highlight the significance of integrating concepts of diversity, equality, and inclusion into AI algorithms and decision-making processes. In order to foster a learning environment that is inclusive and appreciates many perspectives, educators may guarantee that AI technologies are developed and used in a manner that promotes equal opportunities for both male and female students. This inclusive strategy not only enhances the educational experience but also cultivates a climate of creativity that accepts variety and acknowledges individual contributions.

In the ever-evolving realm of entrepreneurship and business education, it is essential to cultivate critical thinking and problem-solving skills to equip students with the necessary abilities to address complex challenges and seize opportunities in the dynamic corporate environment. Artificial intelligence (AI) offers innovative techniques to enhance the skills of both senior and junior students. It achieves this through personalised learning experiences, interactive simulations, data-driven analysis, adaptive assessments, natural language processing (NLP) tools, and collaborative learning platforms. This article explores the capacity of artificial intelligence (AI) to improve critical thinking and problem-solving abilities in entrepreneurship and business education for students across different academic levels.

Artificial intelligence has the potential to enhance critical thinking and problem-solving skills by offering tailored learning experiences. AI-driven educational platforms use sophisticated algorithms to analyse students' performance data and learning behaviours, enabling personalised learning experiences that respond to the specific requirements and skills of both older and younger pupils (Johnson & Estrada, 2020). AI guarantees that both senior and junior students are suitably challenged by tailoring learning materials and activities to align with their learning styles and proficiency levels. This promotes deeper engagement and skill development in critical thinking and problem-solving. AI-powered interactive simulations and case studies provide students immersive learning experiences that replicate real-world business settings. Li and Zhang



(2019) state that AI-powered simulations allow students to use theoretical knowledge in actual situations, make strategic choices, and resolve intricate issues in a safe setting. These interactive experiences enhance students' comprehension of fundamental topics and promote critical thinking and problem-solving abilities by motivating them to investigate various approaches and predict potential consequences.

Artificial intelligence enables students to use data analysis and insights to inform and direct their decision-making processes. Artificial intelligence algorithms can analyse large amounts of data to identify and understand patterns, trends, and opportunities that are relevant to entrepreneurship and business education. Senior students have the ability to use AI-powered data analytics tools for the purposes of doing market research, carrying out competitive analysis, and formulating business plans based on data (Wang et al., 2021). Similarly, AI-generated insights may be used by younger pupils to develop critical thinking abilities and problem-solving tactics rooted on evidence and analysis. Artificial intelligence enables the implementation of adaptive evaluations and feedback systems that enhance students' learning and promote the growth of their skills. AI-driven evaluations adapt the degree of difficulty depending on students' performance, guaranteeing that both advanced and beginner students are appropriately challenged (Chen et al., 2018). In addition, AI algorithms provide immediate feedback on students' answers, pinpointing their strengths and areas for development in their analytical reasoning and problem-solving methods. This prompt feedback not only directs students' learning but also fosters metacognitive abilities and self-reflection.

Ultimately, the incorporation of artificial intelligence into business education and entrepreneurial practice signifies a fundamental change in thinking that has significant consequences for education, industry, and society as a whole. By using artificial intelligence to cultivate creativity, innovation, and entrepreneurial mindset, we can design a future in which human capacity is fully realised, and social issues are tackled via collaborative, technology-based resolutions. By engaging in multidisciplinary cooperation, practicing responsible innovation, and upholding ethical AI principles, we may effectively use the revolutionary capabilities of AI to create a future that is fair, environmentally conscious, and economically successful for everyone.

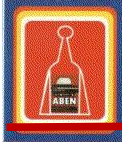
This article analysed the correlation between artificial intelligence (AI), creativity, and innovation in the realms of business education and entrepreneurial activity. Through a thorough analysis of up-to-date research, established methods, and developing patterns, our objective is to offer valuable knowledge that will guide future educational approaches, business structures, and policy frameworks in the age of AI-powered entrepreneurship. Ultimately, our aim is to shape a future where AI acts as a driving force for human creativity, innovation, and entrepreneurial achievement.

Statement of the Problem:

The UK Association of Graduate Recruiters (2007) has found a deficiency in the skills of university graduates. Moses (2015) reported that a study conducted by the National Universities Commission (NUC) revealed that Nigerian university graduates were deficient in fundamental work skills such as creativity, innovation, and critical thinking. Platstrik, Seitzer, and Taylor (2008) observed that if educational performance is not improved, the gap between the skill demands of firms and the capabilities of graduates would continue to grow.

Therefore, incorporating artificial intelligence (AI) into business education and entrepreneurship practice has the potential to greatly enhance creativity, innovation, and the entrepreneurial attitude of students and practitioners.

It is essential to identify and evaluate the most effective Artificial Intelligence (AI) strategies and technologies for enhancing creativity and innovation in the curriculum of business schools.



Gaining a comprehensive understanding of how artificial intelligence (AI) may be smoothly incorporated into educational settings to improve student engagement, foster critical thinking skills, and boost problem-solving abilities is crucial for maximising learning outcomes and equipping future business leaders with the necessary capabilities to tackle the demands of the digital era.

It is necessary to investigate how firms use AI technology to enhance creativity and innovation in their entrepreneurial activities. It is essential to comprehend the critical aspects that lead to success, the obstacles faced, and the consequences of using AI in entrepreneurial endeavours. This knowledge is vital for making informed strategic decisions, allocating resources effectively, and developing policies in the quickly changing field of entrepreneurship.

The democratisation of AI technologies and resources presents advantageous prospects for students, educators, businesses, and policymakers. It is crucial to prioritise fair access to AI education and resources, as well as to encourage diversity and inclusion in AI-driven innovation ecosystems. Additionally, it is important to address and minimise potential risks and disparities in order to fully leverage the creative and innovative potential of AI in business education and entrepreneurship practice. By using these tools, we can unleash the revolutionary capabilities of artificial intelligence to stimulate creativity, foster innovation, and achieve entrepreneurial triumph in the 21st century.

Purpose of the Study:

The main aim of this study is to investigate the influence of artificial intelligence (AI) on fostering creativity and innovation in the domains of business education and entrepreneurial practice. More precisely, the research investigates;

1. The application of AI technologies that enhance creativity and innovation among students in entrepreneurship and business education programmes.
2. The application of AI technologies that enhance critical thinking and problem solving skills among students in entrepreneurship and business education programmes.

The following research questions guided the study.

1. How does the application of Artificial Intelligence (AI) tools and techniques enhance creativity and innovation among students in entrepreneurship and business education programme?
2. How does the application of Artificial Intelligence (AI) tools and techniques enhance critical thinking and problem solving skills among students in entrepreneurship and business education programmes?

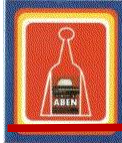
The following hypotheses was formulated and tested at 0.05 level of significance.

Ho₁: There is no significant difference in the mean responses of male and female students in the application of artificial intelligence tools and techniques in enhancing creativity and innovation in entrepreneurship and business education programme.

Ho₂: There is no significant difference in the mean responses of senior and junior students in the application of artificial intelligence tools and techniques in enhancing critical thinking and problem solving skills in entrepreneurship and business education programme.

Method

The study used a descriptive survey methodology. The study was conducted at three tertiary institutions in Bayelsa State (Niger Delta University, Wilberforce Island, Federal University Otuoke and Isaac Jasper Boro College of Education Sagbama) that provide business education programs. The research population included 649 students pursuing business education across the three institutions. The sample size of 194 business education students was selected using the



approach of simple random selection. This specific sample constituted 30% of the whole population. The data collection instrument used was a validated questionnaire with a 4-point Likert scale, encompassing choices for strongly agree (SA), agree (A), disagree (DA), and severely disagree (SD). The instrument's reliability was evaluated by a pilot test, and the collected data was examined using Cronbach alpha, yielding an internal consistency score of 0.863. Of the 194 questionnaires provided to the participants by the researcher and three research assistants, 187 questionnaires (96.4% of the total) were completed correctly and used for data analysis. The data was examined using the mean and standard deviation to answer the study objectives. In addition, the t-test statistic was used to evaluate the hypotheses with a significance threshold of 0.05.

The selection of each individual questionnaire item was determined by the specific numerical limitations. Individuals with a mean score of 2.5 or above showed improvement, whereas those with a mean score lower than 2.5 did not show improvement. The null hypotheses will be accepted if the computed t-value is less than the critical t-value, and will be rejected if the calculated t-value is equal to or greater than the critical t-value.

Results

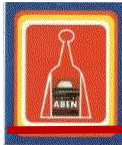
Research Question One

How do the application of Artificial Intelligence (AI) tools and techniques enhance creativity and innovation among students in entrepreneurship and business education programme?

The data for answering research question one are presented in table 1 below.

Table 1: Mean ratings of the respondents on how the application of Artificial Intelligence tools and techniques enhance creativity and innovation in Entrepreneurship and Business Education (n = 187)

SN	How the application of AI tools and techniques enhance creativity and innovation among students in entrepreneurship & Business education	$\bar{X}$	SD	Rmk
1	AI-powered teaching systems foster students' ability to think innovatively when faced with business dilemmas.	3.65	0.64	A
2	AI-driven simulations and case studies provide practical insights that foster creative thinking among students.	3.64	0.50	A
3	AI-powered personalised learning experiences enable students to fully realise their creative potential in the fields of entrepreneurship and business education.	3.44	0.45	A
4	Artificial intelligence algorithms that analyse market data and trends play a role in the creation of novel business concepts by students.	3.46	0.52	A
5	AI-powered feedback mechanisms provide useful insights that motivate students to create and enhance their business ideas.	3.58	0.48	A
6	Artificial intelligence (AI)-enabled collaboration tools enhance cooperation and the sharing of ideas, promoting a culture of creativity in entrepreneurship education.	3.59	0.52	A
7	AI-augmented problem-solving tasks motivate students to engage in critical and innovative thinking around company prospects and challenges.	3.76	0.49	A
8	Artificial intelligence-powered natural language processing technologies enhance communication and information exchange, resulting in inventive solutions in the field of business education.	3.48	0.50	A
9	AI technologies provide students a wide array of resources and views, stimulating creative and forward-thinking in the field of entrepreneurship.	3.32	0.44	A
10	AI-driven analytics assist students in recognising new industry trends and identifying chances for innovation in commercial initiatives.	3.50	0.47	A



11	Artificial intelligence-powered technologies aid students in creating and improving creative business concepts.	3.46	0.51	A
12	AI-powered learning environments promote experimentation and inspire individuals to take risks, hence cultivating an innovative culture in entrepreneurship education.	3.60	0.55	A
13	The use of AI algorithms to analyse user interactions and feedback plays a significant role in the ongoing enhancement of entrepreneurship education programs.	3.43	0.68	A
14	AI-driven recommendation systems provide pertinent educational materials and tools that motivate students to delve into novel ideas and concepts.	3.54	0.48	A
15	AI-powered evaluation tools efficiently measure students' capacity for creative thinking and problem-solving in entrepreneurship and business education.	3.57	0.47	A
Grand Mean		3.53	0.61	A

Key: $\bar{X}$ = Mean, SD = Standard Deviation, A = Agreed; n = number of respondents.

The mean ratings of the respondents' responses on the 15 items included in Table 1 ranged from 3.32 to 3.76, all of which surpassed the benchmark value of 2.50 on a 4-point rating scale. The table comprises 15 prominently identified factors that have been mutually acknowledged by the participants as mechanisms via which the use of Artificial Intelligence (AI) technology and methodologies might enhance creativity and innovation among students in entrepreneurship and business education programs. The standard deviation values of the 15 items in the table ranged from 0.44 to 0.68, indicating that the responses of the participants were comparable to both the average and to each other.

Hypothesis One

There is no significant difference in the mean responses of male and female students in the application of artificial intelligence tools and techniques in enhancing creativity and innovation in entrepreneurship and business education programme.

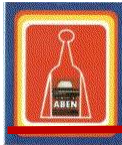
The data for testing hypothesis one are presented in table 2 below.

Table 2: Test of no significant difference in the mean ratings of male and female students in the application of artificial intelligence tools and techniques in enhancing creativity and innovation in Entrepreneurship and Business education programme.

Variables	N	$\bar{X}$	SD	DF	Std. Error	t- Cal	t- Critical	Level of Sig.	Rmks
Male Students	84	3.56	0.62	185	0.033	1.82	1.96	0.05	NS
Female Students	103	3.50	0.71						

Note: NS = NotSignificant at 0.05.

The t-test findings in Table 2 show that the calculated t-value (t-cal) of 1.82 is less than the critical t-value (t-tab) of 1.96 at 185 degrees of freedom. This finding indicates that there is no statistically significant disparity ($p < 0.05$) in the mean ratings of male and female students' responses concerning the utilisation of artificial intelligence tools and techniques to augment creativity and innovation in entrepreneurship and business education programs. Hypothesis one supports the null hypothesis, indicating that there is no statistically significant ($p < 0.05$) disparity in the average ratings of the responses between male and female students.



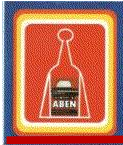
Research Question Two

How do the application of Artificial Intelligence (AI) tools and techniques enhance critical thinking and problem solving skills among students in entrepreneurship and business education programmes?

The data for answering research question two are presented in table 3 below.

Table 3: Mean ratings of the respondents on how the application of Artificial Intelligence tools and techniques enhance critical thinking and problem solving skills among students in Entrepreneurship and Business education (n = 187)

SN	How the application of AI tools to enhance critical thinking and problem solving skills among students in entrepreneurship & Business education programme	$\bar{X}$	SD	Rmk
1	AI-driven teaching platforms stimulate students to engage in critical thinking around business challenges and potential prospects.	3.55	0.68	A
2	Artificial intelligence-powered simulations and case studies provide authentic situations that stimulate students to analyse, assess, and resolve intricate business dilemmas.	3.64	0.47	A
3	AI technologies provide personalised learning experiences that foster students' ability to approach problem-solving assignments with innovation.	3.26	0.55	A
4	Artificial intelligence algorithms analyse data and trends to assist students in cultivating analytical thinking abilities essential for proficient problem-solving in the fields of entrepreneurship and business.	3.67	0.50	A
5	AI-powered feedback systems provide students practical insights that help them reflect on and improve their problem-solving strategies.	3.69	0.46	A
6	AI-driven collaborative tools facilitate students' collaboration in generating solutions, promoting cooperation and collective problem-solving abilities.	3.40	0.45	A
7	AI-augmented problem-solving tasks compel students to scrutinise business issues from several angles and devise inventive resolutions.	3.65	0.49	A
8	Artificial intelligence-powered natural language processing technologies improve communication and the exchange of ideas, hence boosting students' capacity to explain and defend their problem-solving solutions.	3.73	0.43	A
9	AI technologies provide students the ability to access a wide range of information and viewpoints, enabling them to approach problem-solving challenges with creativity.	3.68	0.70	A
10	Artificial intelligence (AI) driven analytics assist students in recognising patterns and trends within data, enabling them to make well-informed choices and resolve intricate business issues.	3.52	0.62	A
11	Artificial intelligence-powered tools for supporting creativity aid students in producing and assessing novel solutions to business problems.	3.56	0.54	A
12	AI-powered learning environments cultivate a climate of curiosity and exploration, encouraging students to develop flexible problem-solving abilities.	3.44	0.49	A
13	Artificial intelligence algorithms that analyse user interactions and feedback play a significant role in enhancing problem-solving tactics in entrepreneurship education programs.	3.47	0.50	A
14	Recommendation systems powered by artificial intelligence suggest problem-solving methodologies and techniques that are relevant, assisting students in approaching business challenges in a systematic manner. Assessment tools driven by AI effectively evaluate students' critical thinking and problem-solving abilities, offering valuable feedback to enhance their skills.	3.56	0.49	A
15	AI-driven teaching platforms stimulate students to engage in critical	3.62	0.52	A



thinking around business challenges and potential prospects.
Grand Mean

3.56 0.49 A

Key: $\bar{X}$ = Mean, SD = Standard Deviation, **A** = Agreed; n = number of respondents.

The mean ratings of the respondents' responses on the 15 items in Table 3 ranged from 3.26 to 3.73, all of which exceeded the reference value of 2.50 on a 4-point rating scale. The table presents a list of 15 themes that respondents have identified as ways in which the use of Artificial Intelligence (AI) technology and techniques enhance critical thinking and problem-solving skills among students in entrepreneurship and business school programs. The standard deviation values of the 15 items in the table ranged from 0.43 to 0.70, indicating that the responses of the participants are both close to the average and to each other.

Hypothesis Two

There is no significant difference in the mean responses of senior and junior students in the application of artificial intelligence tools and techniques in enhancing critical thinking and problem solving skills among students in entrepreneurship and business education programme.

The data for testing hypothesis two are shown in table 4.

Table 4: Test of no significant difference in the mean ratings of Senior and Junior students in the application of artificial intelligence tools in enhancing critical thinking and problem solving skills in Entrepreneurship and Business Education programme.

Variables	N	$\bar{X}$	SD	DF	Std. Error	t- Cal	t- Critical	Level of Sig.	Rmks
Senior Students	90	3.68	0.50	185	0.021	11.43	1.96	0.05	S*
Junior Students	97	3.44	0.76						

Note: **S*** = Significant at 0.05.

The results from the t-test in Table 4 shows that the calculated t-value (t-cal) of 11.43 is greater than the crucial t-value (t-tab) of 1.96 at 185 degrees of freedom. The data suggests a significant disparity ($p < 0.05$) in the mean ratings between Senior and Junior students. Senior students exhibit a stronger inclination towards utilising artificial intelligence tools and techniques to enhance critical thinking and problem-solving abilities in entrepreneurship and business education programs. Thus, hypothesis two rejects the null hypothesis that there is no statistically significant difference ($p < 0.05$) in the average ratings of the answers between Senior and Junior students.

Discussion of Findings

This research investigated the capacity of using Artificial Intelligence (AI) technologies and approaches to augment creativity and innovation among students. The findings suggest that AI-driven educational platforms can encourage students to think creatively and stimulate innovative thinking. These platforms provide practical insights and help students explore their creative potential. Additionally, they contribute to the generation of innovative business ideas and offer valuable insights that inspire students to innovate and refine their business concepts. Furthermore, AI platforms facilitate teamwork and idea exchange, fostering a culture of innovation in entrepreneurship education. Lastly, they challenge students to think critically and creatively



about business opportunities and obstacles. In line with the findings of this research, Marrone et al. (2022) found that students who had a higher level of understanding of artificial intelligence (AI) had more positive views about integrating AI into their courses. The students exhibited a thorough grasp of how artificial intelligence may promote creativity and enable the creation of novel ideas via instructional techniques. Cropley and Marrone (2021) shown that instruction in artificial intelligence using convolutional neural networks may significantly augment learners' inventiveness. Beaty and Johnson (2021) and Olson et al. (2021) have shown that incorporating artificial intelligence into education improves students' ability to provide creative ideas for a traditional alternative uses exercise. Furthermore, this study's findings support the conclusions of Belpaeme et al. (2018), who showed that current research suggests that artificial intelligence has the potential to improve skills often associated with creativity, such as curiosity, resolve, persistence, and focus, in students. Furthermore, the results of this research support the findings of Ryu and Han (2018), who examined the opinions of Korean school teachers about artificial intelligence in education. They found that instructors who had leadership experience acknowledged that AI may enhance students' creativity.

Artificial intelligence tools and techniques can enhance students' critical thinking and problem-solving skills in the following ways: by prompting students to think critically about business problems and opportunities, presenting realistic scenarios that require analysis, evaluation, and solution of complex business challenges, providing actionable insights that help students reflect on and improve their problem-solving approaches, facilitating collaborative brainstorming sessions to foster teamwork and collective problem-solving skills, encouraging students to analyse business problems from various perspectives and generate innovative solutions, and granting students access to diverse resources and perspectives, empowering them to approach problem-solving tasks creatively. According to the results of this study, Tubb, et al (2020) discovered that contemporary education supports teaching methods that focus on problem-solving. These approaches emphasise the cultivation of children's creative cognitive abilities, which may be augmented by the integration of artificial intelligence in educational practices. Marrone, et al (2022) argue that the main goal of artificial intelligence in education is to promote and enable the growth of abilities such as problem-solving, collaborative creativity, and critical thinking, rather than solely concentrating on the acquisition of specific knowledge in a particular field. Moreover, the results of this research confirmed the conclusions of the International Society for Technology Education (2024) that artificial intelligence has a wide-ranging beneficial impact on pupils. This includes tailored instruction, improved abilities in critical thinking and problem-solving, and better readiness for the changing requirements of the digital era. As a result, it contributes to a more dynamic and adaptable educational experience. Consistent with the results of this study, Robert, Potter, and Frank (2024) asserted that incorporating artificial intelligence into education has the capacity to transform the learning process for students by enhancing critical thinking, fostering the creation of innovative ideas, and developing problem-solving abilities.

Conclusion

The study examined the use of Artificial Intelligence in promoting creativity and innovation in the domains of Business Education and Entrepreneurship. The study aimed to examine the potential impact of utilising Artificial Intelligence (AI) tools and techniques on enhancing the cultivation of creativity, innovation, critical thinking, and problem-solving skills in students enrolled in Business Education and Entrepreneurship programs at tertiary institutions in Bayelsa State. Data was collected from the participants and analysed. The research found that incorporating Artificial Intelligence tools and approaches into training can greatly improve the creativity,



originality, critical thinking, and problem-solving abilities of students in Business Education and Entrepreneurship programs.

Recommendations

The study's recommendations are based on its findings and conclusion.

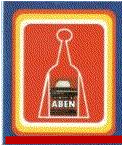
- i. Implementation of Artificial Intelligence aided instructions in Nigerian tertiary institutions to facilitate the successful execution of Business Education and Entrepreneurship programs, among other initiatives, represents a paradigm change.
- ii. Ensuring the supply of sufficient equipment and facilities that would support the implementation of Artificial Intelligence aided teachings in Nigerian schools.
- iii. Enhancing the training and retraining of Nigerian educators in the proficient use of Artificial Intelligence to facilitate the instruction and learning process for students in Business Education and Entrepreneurship programs, among other subjects.
- iv. The implementation of Artificial Intelligence centres in every tertiary institution in Nigeria, including Bayelsa State, to enhance the integration and utilisation of Artificial Intelligence in teaching and learning processes.

References

- Beaty, R. E., & Johnson, D. R. (2021). Automating creativity assessment with SemDis: An open platform for computing semantic distance. *Behavior Research Methods*, 53(2), 757-780. <https://doi.org/10.3758/s13428-020-01453-w>
- Belpaeme, T., Kennedy, J., Ramachandran, A., Scassellati, B., & Tanaka, F. (2018). Social robots for education: A review. *Science Robotics*, 3(21), eaat5954. <https://doi.org/10.1126/scirobotics.aat5954>
- Bouncken, R. B., Fredrich, V., & Ritala, P. (2021). Artificial intelligence in entrepreneurship: A systematic literature review and research agenda. *Small Business Economics*, 1-20. <https://doi.org/10.1007/s11187-020-00448-x>
- Chen, J., Chen, Y., Xu, J., & Zhu, X. (2018). Collaborative problem solving: A study on solving physics problems collaboratively with a networked computer. *Computers & Education*, 120, 102-116. <https://doi.org/10.1016/j.compedu.2018.02.003>
- Cheng, M. Y., & Lu, M. T. (2021). Enhancing English vocabulary learning via mobile game-based learning and AI tutor learning support: A quasi-experimental study. *Interactive Learning Environments*, 1-17. <https://doi.org/10.1080/10494820.2021.1875000>
- Clark, R. C., Mayer, R. E., & Paivio, A. (2020). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning* (4th ed.). John Wiley & Sons.
- Cropley, D. H., & Marrone, R. L. (2021). Automated scoring of figural creativity using a convolutional neural network. *Psychology of Aesthetics, Creativity, and the Arts*. <https://doi.org/10.1037/aca0000510>
- International Society for Technology Education. (2024, February 5). What is the impact of artificial intelligence on students? *eSchool News*. <https://www.eschoolnews.com/digital-learning/2024/02/05/what-is-the-impact-of-artificial-intelligence-on-students/>
- Johnson, A., & Estrada, A. (2020). Personalized learning and artificial intelligence: Challenges and opportunities for education. *International Journal of Artificial Intelligence in Education*, 30(3), 375-393. <https://doi.org/10.1007/s40593-020-00195-2>
- Lee, W. H., & Wu, C. H. (2019). Implementing an artificial intelligence (AI) conversation agent into an e-learning system to develop English speaking skills. *Education and Information Technologies*, 24(1), 449-465. <https://doi.org/10.1007/s10639-018-9780-0>
- Li, L., & Sun, Y. (2018). Adaptive learning approach to improving students' motivation, engagement, and learning performance in online discussions. *Computers & Education*, 122, 287-305. <https://doi.org/10.1016/j.compedu.2018.03.005>
- Li, Y., & Zhang, L. (2019). Enhancing problem-solving skills through artificial intelligence: The case of interactive simulations. *IEEE Transactions on Learning Technologies*, 12(3), 375-388. <https://doi.org/10.1109/TLT.2018.2856805>



- Marrone, R., Taddeo, V., & Hill, G. (2022). Creativity and artificial intelligence: A student perspective. *Journal of Intelligence*, 10(3), 65. <https://doi.org/10.3390/jintelligence10030065>
- Mittelstadt, B. D., Allo, P., Taddeo, M., Wachter, S., & Floridi, L. (2016). The ethics of algorithms: Mapping the debate. *Big Data & Society*, 3(2), 1-21. <https://doi.org/10.1177/2053951716679679>
- Mitra, J., & Gupta, N. (2019). Artificial intelligence (AI) based models for retailing: A review. *International Journal of Information Management*, 44, 194-210. <https://doi.org/10.1016/j.ijinfomgt.2018.10.011>
- Moses, C. L. (2015). Entrepreneurship education and action oriented pedagogical approaches. *International Journal of Education, Science and Research*, 5(5), 53-60.
- Olson, J. A., Nahas, J., Chmoulevitch, D., Cropper, S. J., & Webb, M. E. (2021). Naming unrelated words predicts creativity. *Proceedings of the National Academy of Sciences*, 118(13), e2022340118. <https://doi.org/10.1073/pnas.2022340118>
- Plastrik, P., Seitzer, M. B., & Tilor, T. C. (2008). *Changing labor market: A system approach to reform just for the jobs for the future*. Boasting MA Press.
- Rasmussen, L., & Saeed, S. (2020). Digital entrepreneurship in the fourth industrial revolution: Challenges and opportunities. *Journal of Business Research*, 122, 120-126. <https://doi.org/10.1016/j.jbusres.2020.08.042>
- Robert, A., Potter, K., & Frank, L. (2024). The impact of artificial intelligence on students' learning experience. *Wiley Interdisciplinary Reviews: Computational Statistics*. <https://doi.org/10.2139/ssrn.4716747>
- Ryu, M., & Han, S. (2018). The educational perception on artificial intelligence by elementary school teachers. *Journal of the Korean Association of Information Education*, 22(3), 317-324. <https://doi.org/10.14352/jkaie.2018.22.3.317>
- Shi, L., Li, S., Chen, L., & Qiao, Y. (2021). AI entrepreneurship learning model based on cognitive learning. *International Journal of Emerging Technologies in Learning (iJET)*, 16(3), 4-20. <https://doi.org/10.3991/ijet.v16i03.19205>
- Smith, T., & Jones, R. (2020). Conversational AI in education: Current status and future directions. *Journal of Educational Technology & Society*, 23(1), 133-147.
- Tubb, A. L., Cropley, D. H., Marrone, R. L., Patston, T., & Kaufman, J. C. (2020). The development of mathematical creativity across high school: Increasing, decreasing, or both? *Thinking Skills and Creativity*, 35, 100634. <https://doi.org/10.1016/j.tsc.2020.100634>
- Vosburg, T., Kim, Y., Rhoades, N., & Mennecke, B. E. (2021). AI literacy as an essential component of future business education. *Journal of Education for Business*, 96(1), 39-48. <https://doi.org/10.1080/08832323.2020.1757591>
- Wang, H., Zhu, C., Song, Y., & Cai, Y. (2021). Utilizing educational big data analytics and artificial intelligence to support problem-based learning. *Computers in Human Behavior*, 124, 106891. <https://doi.org/10.1016/j.chb.2021.106891>
- Yang, D., & Cornelius, F. (2021). The effects of educational technology use on student outcomes in higher education: A meta-analysis. *Educational Technology Research and Development*, 69(3), 1107-1139. <https://doi.org/10.1007/s11423-021-09984-3>
- Zeng, Z., Xu, X., & Shi, X. (2018). Developing entrepreneurial competencies for entrepreneurship education through digital game-based learning. *Journal of Educational Computing Research*, 56(6), 819-843. <https://doi.org/10.1177/0735633117733992>
- Zhang, C., Li, X., Sun, J., & Chen, Y. (2020). Opportunities and challenges of artificial intelligence in education. *Information Processing & Management*, 57(2), 102173. <https://doi.org/10.1016/j.ipm.2019.102173>
- Zhao, M., & Chen, H. (2020). The influence of AI applications on service innovation: Evidence from the hospitality industry. *International Journal of Hospitality Management*, 91, 102672. <https://doi.org/10.1016/j.ijhm.2020.102672>
- Zhou, W., Zhang, H., Zhong, B., & Qiao, L. (2020). Effect of web-based intelligence education on learning motivation and creativity: Mediating role of intelligence quality. *Frontiers in Psychology*, 11, 3004. <https://doi.org/10.3389/fpsyg.2020.03004>



IMPACT OF ARTIFICIAL INTELLIGENCE IN TEACHING AND LEARNING OF BUSINESS EDUCATION IN UNIVERSITIES IN EDO AND DELTA STATES, NIGERIA

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Abstract

The study sought to examine the impact of Artificial Intelligence in teaching and learning of Business Education in universities in Edo and Delta State, Nigeria. Survey research design was adopted. Two research questions and two null hypotheses were tested at 0.05 level of significant. Population comprised of 365 Business Education lecturers and students from Universities in Edo and Delta States. The sample size was 180 Business Education lecturers and students and the sampling techniques adopted were census sampling and simple random sampling techniques. A 25-item questionnaire validated by three experts was used and the reliability of the instrument was ascertained using Pearsons Product Moment Correlation (PPMC) and a reliability of 0.81 was obtained. In answering the research questions mean and standard deviation were used while t-test statistics was used in testing the null hypotheses at 0.05 level of significant. The findings revealed that Artificial Intelligence (AI) is applied to teaching and learning of Business Education in universities in Edo and Delta States to a high extent. The findings also revealed that there was no significant variation in the mean rating of Business Education lecturers and students on extent to which Artificial Intelligence have Impact in teaching and learning of Business Education in universities in Edo and Delta States hence the null hypothesis was retained. It was concluded that AI has high impact in teaching and learning of Business Education as it can arrange learning experience to specific individual abilities and needs, lessen lecturers' workload and enhance grading accuracy. Hence, it was recommended among others that Business Education students should be encouraged to make adequate use of AI in learning of Business Education courses as AI can help to personalize content to individual students' needs and abilities.

Keywords: *Impact, Artificial Intelligence, Teaching and Learning, Business Education, Universities*

Introduction

Artificial intelligence (AI) has rapidly grown around us, so it is very essential to glimpse how it functions. AI can process enormous volumes of data using algorithms, and after iterations



and training loops, it begins to discover patterns, deduce relationships, and make predictions. With the growing use of smartphones and other technologies, artificial intelligence has become a part of our daily life. It is well known, that AI is undergoing a revolution. It is gradually taking over the academic landscape as the technological world expands and changes. Organizations, notably educational institutions, have adopted AI globally and used it in a range of contexts and scenarios (Alam, 2021). It is a matter of fact that artificial intelligence provides enormous opportunities for automating and accelerating administrative work for educational institutions and instructors (Timms, 2016).

Apparently, artificial intelligence is a fascinating topic that is seen as the next significant technological enhancement. Intelligence is the capacity to integrate computers, artificial intelligence (AI), and embedded systems, such as robotics, that exhibit advanced cognitive functions, intelligence, learning, flexibility, and decision-making skills (Devedic, 2004). Apparently, AI's abilities and accuracy improve with access to data sources and feedback. Subsequently, the act of adjusting and refining allows AI to learn. AI's adaptive techniques provide a few basic enhancements in executing difficult tasks effectively and teaching concepts in ways that are tailored to the learners' comprehension levels. When used intelligently, correctly, and ethically, it has enormous potential.

According to Sharma et al. (2019) the use of artificial intelligence in education has the potential to fundamentally alter a wide range of educational fields. In this regard, AI has lessened the paperwork and workload for teachers, especially when it comes to carrying out different teaching and instructing activities. This has freed up more time for instructors to focus on other important responsibilities in addition to their primary duty of teaching (Chassignol, 2018). According to Rowe, (2011) there is evidence of a better and enhanced learning experience for students as a result of the usage of AI in education. It is clear that artificial intelligence (AI) has the potential to drastically alter how academics collaborate, publish papers, do research, and think, teach, and learn. As a result, scientists everywhere are becoming increasingly interested in AI due to its immersive benefits. Furthermore, according to Pokrivcakova (2019), artificial intelligence facilitates the creation and use of intelligent training systems and adaptive content that is tailored to each student's particular learning requirements and skills. Examples of this include intelligent virtual reality and its use in simulation-based teaching and learning. By adopting artificial intelligence (AI) to automate hard tasks, academics can also focus on more challenging issues.

Furthermore, by utilizing AI-powered technology, academics can review data, find patterns in large datasets, and generate facts. AI is also capable of producing forecasts and insights that would be difficult for humans to produce. For instance, AI-based predictive analytics can be used to predict students' performance and identify areas that can benefit from further assistance. Pokrivcakova (2019) claims that in recent years, artificial intelligence has been widely utilized by academics and that AI helped scholars at universities write more productively and successfully. Recent innovations in AI and AI-powered writing aides assisted researchers in detecting and correcting grammar and spelling problems, as well as providing appropriate citations. By employing AI to summarize lengthy materials, academics can swiftly scan through them and get to the important parts of research papers or articles. AI has the potential to enhance scholarly collaboration as well. Since lecturers and students can work together in real time on projects utilizing AI-powered tools, sharing ideas, keeping track of project progress, and offering feedback is made simpler. AI has the potential to improve academic teaching and learning as well since it allows lecturers to tailor their instruction to the needs of their students by utilizing AI-powered educational tools to help with individualized training. Furthermore, AI has attracted



significant attention from academics in the last few years as they begin to use it to automate grading, providing students with more accurate and timely feedback (Pokrivcakova, 2019).

Another benefit of AI for researchers is that it can make collaboration easier. AI applications can help with communication within teams as well as task and project coordination. Additionally, AI can be used to automate document review and exchange, which facilitates academic collaboration on projects. AI may additionally be utilized to link academics with the resources they require to finish their work, making it simpler for them to locate and access the information they require to complete their research work. Furthermore, using AI to generate new ideas and insights can help academic research. Additionally, new theories and concepts can be generated with AI, as well as novel patterns in data. This can give academics fresh perspectives and enable them to conduct their studies with more knowledge (Alam, 2021).

However, Kimondo et al. (2023) conducted a study on impact of AI on teaching and learning and found that AI and machine learning intensify the learning interactions of all students world-wide. While Adiguzel, et al. (2023) stated that the introduction of adaptive teaching strategies and the creation of automated and intelligent systems by teachers through AI-powered Chatbots enable teachers to analyze and assess a student's learning ability. Also, the same vein, Vincent-Lancrin et al. (2020) reported the effectiveness of AI in assisting those students with special needs to gain from education.

In addition, Muresan (2023) carried out a study on impact of artificial intelligence on education and found in the study that AI can lead to personalize learning and that it can also allow content pace and teaching style to be custom-made to specific students' needs and preferences. The author also stated that AI expedite personalized learning and make available instant feedback and enhance efficacy in the assessment process.

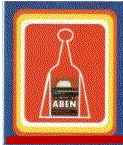
Again, Surugiu et al. (2024) found in their studies that AI assist teachers in administrative tasks, personalize learning plans and save time. Equally, numerous researchers such as Zhang and Aslan (2021); Southworth et al. (2023); Hopcan et al., (2022) affirmed in their studies that AI improve learners' participation and performance and that AI help in proficiency based task assignment. While Hopcan et al., (2022) further agreed that customized learning materials are tailored based on students' assessment focusing on their strengths and weaknesses.

Despite the obvious advantages of AI for academics, applying it to research and cooperation may have drawbacks. According to Chassignol (2018), the potential for data manipulation or inaccurate results due to AI is one potential drawback. The possibility for AI to be utilized to avoid ethical problems when doing research is another possible drawback. Also, there is a chance that AI will be utilized to automate tasks that should be completed by humans, including peer review and proofreading.

Statement of the Problem

Knowledge has to do with the amount of information possessed by an individual and an individual can only possess a limited amount of knowledge at any given time. Hence, advancement in computing power, data storage, machine learning algorithms and the deep learning technique emergence such as convolutional neural networks (CNNs) and recurrent neural networks (RNNs) and their applications in computer vision, natural language processing, robotics and more in modern times has led to the continuous advancement in AI research and application.

Modern teaching and learning seems to depend much on use of AI as AI-power Chatbots which are mostly use in modern times by different professionals, researchers and students. The traditional method of using textbooks, magazines periodic and journal to acquire knowledge seems to be outdated as these modern technologies of AI seems to have taken over the world of



power of knowledge of which universities is seen as the citadel of knowledge a place for teaching and learning having lecturers and students.

However, several problems led to the development and application of AI in teaching and learning. The researchers in a quest to identify these problems observed that many real-world problems are complex, making it difficult for human beings to solve them efficiently. It was also observed that as data and tasks increase, human capabilities become limited. Consequently, AI has been reported to help analyze large amount of data sets, provide insight into decision making and used to enhance academic teaching and learning, as academics adapt their teaching to the needs of their students by using AI-powered educational tools to aid personalized training.

The need to find out whether AI is being applied to teaching and learning of Business Education and to determine the impact of the application of AI to teaching and learning of Business Education becomes paramount. Hence, the researchers decided to carry out this study which is impact of Artificial intelligence in teaching and learning of Business Education in universities in Edo and Delta States - Nigeria.

Purpose of the study

The main purpose of the study is to examine the impact of artificial intelligence in teaching and learning of Business Education in universities in Edo and Delta States. Specifically, the study sought to determine the extent to which:

1. Artificial intelligence is applied to teaching and learning of Business Education in universities in Edo and Delta States.
2. Artificial intelligence have impact in teaching and learning of Business Education in universities in Edo and Delta States.

Research Questions

The following research questions guided the study.

1. To what extent is artificial intelligence applied to teaching and learning of Business Education in universities in Edo and Delta States?
2. To what extent does artificial intelligence have impact in teaching and learning of Business Education in universities in Edo and Delta States?

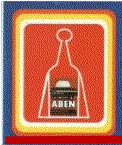
Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance to guide the study.

1. There is no significant variation in the mean rating of Business Education lecturers and students on extent of application of artificial intelligence in teaching and learning of Business Education in universities in Edo and Delta States.
2. There is no significant variation in the mean rating of Business Education lecturers and students on extent to which artificial intelligence have impact in teaching and learning of Business Education in universities in Edo and Delta States.

Methodology

The study adopted the survey research design. This was considered most appropriate since it was to collect and describe data without manipulation. The population of the study is three hundred and sixty-five Business Education lecturers and students (sixty Business Education lecturers and three hundred and five 300 level Business Education students) from four public universities in Edo and Delta States – University of Benin, Benin City (120 students and 13 lecturers), Ambrose Alli University, Ekpoma (90 and 8 lecturers), Delta State University, Abraka (87 and nineteen lecturers) and University of Delta, Agbor (8 and 20 lecturers) (Source: Office of Heads of Department). While the sample size is one hundred and



eighty respondents made up of sixty Business Education lecturers and one hundred and twenty 300 level students.

The census sampling technique was used for the lecturers while the simple random technique was utilized in sampling for the students. A 25-item structured questionnaire was used for data collection. The questionnaire was divided into two parts. Part A and B. Part A contained the bio-data of the respondents. While part B has two sections that dealt with the various variables of the study. A 4-point modified Likert Type rating scale of Very High Extent (VHE) = 4, High Extent (HE) = 3, Low Extent (LE) = 2, and Very Low Extent (VLE) = 1 was utilized. The instrument was validated by 3 experts. Two from Department of Vocational and Technical Education (Business Education Unit), University of Benin and one from Measurement and Evaluation Unit of Guidance and Counseling Department, Delta State University, Abraka.

A pilot study was conducted on 25 respondents from Niger Delta University, Amasomma, Bayelsa State. The researcher with the help of two research assistants administered the instrument twice with two weeks interval on the respondents. Pearson's Product Moment Correlation Coefficient was employed to analyze the data collected in order to determine the reliability of the instrument. The reliability obtained was 0.81. The Mean and Standard Deviation was used to answer the research questions while the t-test statistics was used to test the null hypotheses at 0.05 level of significant. Any calculated Mean value of 2.49 and below was regarded as Low extent while any calculated Mean value of 2.50 and above was regarded as High extent. For the hypotheses, any calculated p-value that was less than 0.05 was rejected while any calculated p-value that is greater than 0.05 was retained.

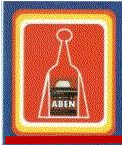
Presentation of Results

Research Question One

To what extent is artificial intelligence applied to teaching and learning of Business Education in universities in Edo and Delta States?

Table 1: Mean responses of Business Education lecturers and students on extent to which artificial intelligence is applied to teaching and learning of Business Education in universities (N=180)

S/N	ITEM STATEMENT	X_L	SD_L	X_S	SD_S	X_G	SD_G	Remark
	Extent to which:							
1.	AI is use to customize learning experiences to individual students' needs and abilities.	3.58	0.56	3.52	0.60	3.55	0.58	VHE
2.	AI accurately grades assignments, freeing lecturers to focus on teaching students.	3.14	0.65	3.08	0.57	3.11	0.61	HE
3.	AI-powered virtual instructors and enable students to learn by provide one-on-one support and feedback.	3.10	0.46	3.30	0.36	3.20	0.41	HE
4.	The use of AI assist academic researchers and students in writing more successfully and effectively. When it comes to academic teaching and learning,	3.45	0.78	3.24	0.76	3.35	0.77	HE
5.	The use of AI-powered writing tools help scholars and students find and fix grammatical and spelling errors as	3.47	0.54	3.38	0.48	3.43	0.51	HE

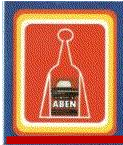


	well as provide proper citations.							
6.	By employing AI to summarize lengthy documents, educators and learners can swiftly scan through them and get to the important parts of a research paper or article.	3.73	0.62	3.78	0.88	3.76	0.75	VHE
7.	AI is used to enhance collaboration among academics.	3.19	0.85	2.80	0.89	3.00	0.87	HE
8.	Academics and students can rapidly skim through extensive materials by using AI to summarize them, allowing them to quickly get to the core of an article or a research paper.	3.16	0.78	3.14	0.93	3.15	0.86	HE
9.	AI is being used to improve education in academic settings as lecturers are able to more effectively customize their instruction to the needs of their students by utilizing AI-powered instructional resources.	3.15	0.86	2.96	0.78	3.06	0.82	HE
10.	AI is used to automate document review and exchange, which facilitates academic collaboration on projects.	3.32	0.87	3.10	0.46	3.21	0.67	HE
11.	AI is used to find novel patterns in data and provide fresh theories and concepts	2.73	0.98	2.56	0.92	2.65	0.95	HE
12.	AI is applied to adapt content that are personalized to each student's unique learning needs and abilities, such as intelligent virtual reality and its application in simulation teaching and learning.	3.20	0.84	3.45	0.88	3.33	0.86	HE
WEIGHTED AVERAGE		3.24	0.73	3.16	0.71	3.23	0.72	HE

Source:Fieldwork 2024

Note: X_L = Mean of Lecturers; X_S = Mean of Students; SD_L = Standard Deviation of Lecturers; SD_S = Standard Deviation of Students; X_G = Mean Grand; VHE = Very High Extent; HE = High Extent, N=No. of respondents

The data on Table 1 showed the grand mean score for items 1 and 6 are 3.55 and 3.76. These two AI applications were applied to a very high extent in teaching and learning of Business Education in universities in Edo and Delta States. Also, from the Table 1, items 2, 3, 4, 5, 7, 8, 9, 10, 11, and 12 have mean score ranging from 2.65 to 3.43. These mean are all above the criterion mean of 2.50. Hence these 10-items are applied to a High extent in teaching and learning of Business Education in universities in Edo and Delta States. Therefore, the extent of application of AI in teaching and learning of Business Education in universities in Edo and Delta States is high. While the standard deviation of the 12-items in the scale vary from 0.41 to 0.95. This indicated that the respondents were not far apart in their responses.



The weighted average of 3.23 indicated that Business Education lecturers and students of universities in Edo and Delta States agree to a high extent that AI are applied to teaching and learning of Business Education in universities in Edo and Delta States.

Hypothesis One

There is no significant variation in the mean rating of Business Education lecturers and students on extent of application of artificial intelligence in teaching and learning of Business Education in universities in Edo and Delta States.

Table 2: *t*-test Analysis of mean rating of Business Education lecturers and students on extent of application of artificial intelligence in teaching and learning of Business Education in universities

Variable	N	Mean	SD	df	α	t	p-value	Decision
Lecturers	60	3.24	0.73	178	0.05	0.86	0.46	Not Significant
Students	120	3.16	0.71					

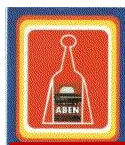
Data presented in Table 2 revealed that the t-value of 0.86 at 178 degree of freedom on extent of application of artificial intelligence in teaching and learning of Business Education in universities with a p-value of 0.46 is greater than the criterion value of 0.05 ($p\text{-value } 0.46 > 0.05$). Since p-value is greater than the significant value, the null hypothesis was retained. This signifies that there is no significant variation in the mean rating of Business Education lecturers and students on extent of application of artificial intelligence in teaching and learning of Business Education in universities in Edo and Delta States.

Research Question Two

To what extent does artificial intelligence have impact in teaching and learning of Business Education in universities in Edo and Delta States?

Table 3: Mean responses of Business Education lecturers and students on extent to which artificial intelligence have impact in teaching and learning of Business Education in universities (N=180)

S/N	ITEM STATEMENT	X_L	SD_L	X_S	SD_S	X_G	SD_G	REMARK
Extent to which:								
1.	AI can arrange learning experience to specific individual abilities and needs	3.12	0.88	3.34	0.64	3.23	0.76	HE
2.	AI-driven simulations, games and interactive content can enhance students engagement	3.36	0.52	3.39	0.34	3.23	0.43	HE
3.	AI lessen lecturers' workload and enhance grading accuracy	3.57	0.76	3.76	0.83	3.67	0.80	VHE
4.	AI can offer one on one assistance and response to students and lecturers.	3.28	0.91	3.45	0.67	3.37	0.79	HE
5.	AI can make available real-world examples and case studies to illustrate business concepts during teaching and learning process.	3.68	0.75	3.72	0.78	3.70	0.77	VHE
6.	AI can create immersive, interactive learning spaces	3.47	0.94	3.34	0.92	3.41	0.93	HE
7.	AI can assist students to develop	3.15	0.48	3.20	0.56	3.18	0.52	HE



	skills and abilities required for the modern labour force							
8.	AI can help scrutinize large datasets to update instruction and improve student outcomes.	2.93	0.98	3.05	0.83	2.99	0.91	HE
9.	AI can expedite ongoing skill development and upskilling.	3.36	0.57	3.48	0.50	3.42	0.54	HE
10.	AI can ensure the significance of curriculum to industry demands and trends.	2.64	0.76	2.88	0.68	2.76	0.72	HE
11.	AI can support large students' population and provide equal access to quality education.	3.58	0.86	3.70	0.93	3.64	0.90	VHE
12.	AI can aid in research and data analysis for Business Education.	3.52	0.43	3.63	0.54	3.58	0.49	VHE
13.	AI tailors learning experiences to individual students' needs, abilities and learning styles.	2.77	0.91	2.63	0.84	2.70	0.88	HE
WEIGHTED AVERAGE		3.27	0.75	3.35	0.70	3.30	0.73	HE

Source: Fieldwork 2024

Note: X_L = Mean of Lecturers; X_S = Mean of Students; SD_L = Standard Deviation of Lecturers; SD_S = Standard Deviation of Students; X_G = Mean Grand; VHE = Very High Extent; HE = High Extent, N=No. of respondents

The data on Table 2 showed that the grand mean score for items 3, 5, 11 and 12 are 3.7, 3.70, 3.64 and 3.58 respectively. These four items on the scale revealed a very high impact of application of AI in teaching and learning of Business Education in universities in Edo and Delta States. While items 1, 2, 4, 6, 7, 8, 9, 10, and 13 have mean score ranging from 2.70 to 3.42. These mean are all above the criterion mean of 2.50. Hence these 9-items of AI have a High impact in teaching and learning of Business Education in universities in Edo and Delta States. Therefore, the extent to which AI have impact in teaching and learning of Business Education in universities in Edo and Delta States is high. While the standard deviation of the 13-items in the scale vary from 0.43 to 0.93. This indicated that the respondents were close in their responses to the criterion mean.

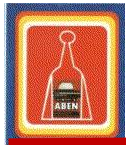
The weighted average of Mean Grand of 3.30 indicated that Business Education lecturers and students of universities in Edo and Delta States agree to a high extent that AI have impact in teaching and learning of Business Education in universities in Edo and Delta States to a high extent.

Hypothesis Two

There is no significant variation in the mean rating of Business Education lecturers and Business Education students on extent to which artificial intelligence have Impact in teaching and learning of Business Education in universities in Edo and Delta States.

Table 4: t-test Analysis of mean rating of Business Education lecturers and students on extent of application of artificial intelligence in teaching and learning of Business Education in universities

Variable	N	Mean	SD	df	α	t	p-value	Decision
Lecturers	60	3.27	0.75	178	0.05	1.03	0.62	Not Significant
Students	120	3.35	0.70					



Data presented in Table 4 showed that the t-value of 1.03 at 178 degree of freedom on extent to which artificial intelligence have Impact in teaching and learning of Business Education in universities with a p-value of 0.62 is greater than the criterion value of 0.05 (p-value $0.62 > 0.05$). Since p-value is greater than the significant value, the null hypothesis was retained. This signifies that there is no significant variation in the mean rating of Business Education lecturers and students on extent to which artificial intelligence have Impact in teaching and learning of Business Education in universities in Edo and Delta States.

Discussion of Findings

The finding of the study on research question one and hypothesis one showed that the extent of application of AI in teaching and learning of Business Education in universities in Edo and Delta States is high. The finding is in agreement with Adiguzel, et al. (2023) that the introduction of adaptive teaching strategies and the creation of automated and intelligent systems by teachers through AI-powered Chatbots enable teachers to analyze and assess a student's learning ability. This implied that the extent of application of AI will assist teachers to analyze and assess students learning abilities. Furthermore, the finding corroborate the findings of Pokrivcakova (2019) who found that academics use AI to automate grading, providing students with more accurate and timely feedback. Again, the finding is in harmony with Sharma et al. (2019) who found that the use of artificial intelligence in education has the potential to fundamentally alter a wide range of educational fields.

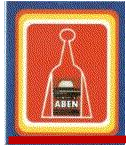
The finding of hypothesis one showed that there was no significant variation in the mean rating of Business Education lecturers and students on extent of artificial intelligence in teaching and learning of Business Education in universities in Edo and Delta States.

The finding of research question two indicated that the extent to which AI have impact in teaching and learning of Business Education in universities in Edo and Delta States is high. This finding is in agreement with the finding of Kimondo et al. (2023) who found that AI and machine learning intensify the learning interactions of all students world-wide. The finding is in consonant with that of Vincent-Lancrin et al. (2020) who found the effectiveness of AI in assisting those students with special needs to gain from education. Also in agreement with the study of Muresan (2023) who found that AI can lead to personalize learning and that it can also allow content pace and teaching style to be custom-made to specific students' needs and preferences. The author also stated that AI expedite personalized learning and make available instant feedback and enhance efficacy in the assessment process. Also, the study support that of Surugiu et al. (2024) who found in their studies that AI assist teachers in administrative tasks, personalize learning plans and save time.

The finding of hypothesis two revealed that there was no significant variation in the mean rating of Business Education lecturers and Business Education students on extent to which artificial intelligence have Impact in teaching and learning of Business Education in universities in Edo and Delta States.

Conclusion

Based on the outcomes of the study, it was concluded that AI is applied to teaching and learning of Business Education in universities in Edo and Delta States to a high extent. Also, that AI has high impact in teaching and learning of Business Education as it can arrange learning experience to specific individual abilities and needs, lessen lecturers' workload and enhance grading accuracy. Also, that AI aid in research and data analysis for Business Education. While it was also concluded that there was no significant variation in the mean rating of Business Education lecturers and students on extent to which AI have impact in teaching and learning of Business Education in universities in Edo and Delta States.

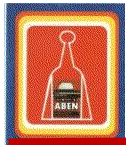


Recommendations

1. Business Education lecturers should continue to make use of AI-power Chatbots in teaching and learning of Business Education as its application has high positive impact on the students.
2. Business Education students should be encouraged to make adequate use of AI in learning of Business Education courses as AI can help to personalize content to individual students' needs and abilities.
3. Both Business Education lecturers and students should make use of AI in their research as it will help them to properly structure their work, correct their grammar and spellings

References

- Adiguzel, T., Kaya, M.H. & Cansu, F.K. (2023). "Revolutionizing education with AI: Exploring the transformative potential of ChatGPT". *Contemporary Educational Teaching*, 15(3), ep429. Retrieved from <https://doi.org/10.30935/cedtech/13152>.
- Alam, A. (2021). Should Robots Replace Teachers? Mobilization of AI and learning Analytics in Education. *International Conference on Advances in Computing, Communication and Control (ICAC3)*, Mumbai, India, 1-6.
- Chassignol M., Khoroshavin, A., Klimova, A. & Bilyatdinova, A. (2018). Artificial Intelligence trends in education: A narrative overview. *Procedia Computer Science*, 136, 16-24.
- Hopcan, S. Polat, e. Ozturk, M. E. & Ozturk, L., (2022). Artificial intelligence in special education: A Systematic Review. *Interactive Learning Environments. E-journal*. Retrieved from: <http://doi.org/10.1080/10494820.2022.2067186>
- Kimondo, C., Wandeto, L., Indimuli, D. & Erctin, A. (2023). The impact of AI on teaching and learning. *London Journal of Social Science*, 6, 124-129.
- Muresan (2023). Impact of artificial intelligence on education. *Research Association for Interdisciplinary Studies Conferences Proceedings*, 81-85.
- Pokrivcakova, S. (2019). Preparing teachers for the applications of AI-powered technologies in foreign language education. *Journal of Language Cultural Education*, 7(3), 135-153.
- Rowe, J.P., Shores, L.R., Mott, B.W., & Lester J.C. (2011). Integrating learning problem solving and engagement in narrative-centred learning environments. *International Journal of Artificial Intelligence Education*, 21(1-2), 115-133.
- Sharma, R.C., Kawachi, P., & Bozkurt, A. (2019). The landscape of artificial intelligence in open online and distance education: Promises and Concerns. *Asian Journal of Distance Education*, 4(2), 1-8.
- Southworth, J. Migliaccio, K. Glover, J.M., Reed, D., McCarty, C., Brendemuhl, J. & Thomas, A. (2023). Developing a model for across the curriculum: Transforming the Higher Education Landscape via Innovation in AI literacy. *Computers and Education: Artificial Intelligence*, 4(100127), 1-10.
- Surugiu, C., Gradinaru, C. & Surugiu, M.R. (2024). Artificial intelligence in Business Education: Benefits and Tools, *Amfiteatru Economics*, 26(65), 241-258.
- Timms, M.J. (2016). Letting artificial intelligence in education out of the box: Educational Robots and Smart Classrooms. *International Journal of Artificial Intelligence Education*, 26(2), 701-712.
- Vincent-Lancrin, S. & Van der Viles, R. (2020). "Trustworthy artificial intelligence (AI) in education: Promises and Challenges." *OECD Education Working Papers*, 218. Retrieved from: <https://doi.org/10.1787/abc90faq-en>
- Zhang, K. & Aslan, A.B. (2021). AI technologies for education: Recent Research and Future Directions. *Computers and Education: Artificial Intelligence*, 2(100025), 1-11



BENEFIT OF ARTIFICIAL INTELLIGENCE AND ETHICAL IMPLICATIONS FOR BUSINESS EDUCATION PROGRAMMES IN TERTIARY INSTITUTIONS IN DELTA STATE NIGERIA

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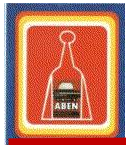
Abstract

The study explored the benefit of artificial intelligence and ethical implications for Business Education Programmes in tertiary institutions in Delta State, Nigeria. Two research questions guided the study and two null hypotheses were formulated and tested. The study adopted the descriptive survey design. The population of the study consisted of two thousand six hundred and fifty (2,650) business education students registered for 2021/2022 academic session from colleges of education and universities in Delta State. Simple random sampling technique was used to obtain a sample size of 350, comprising 150 college students and 200 university students. A 20 item statement questionnaire that was validated by three research experts was used for data collection. The reliability of the instrument was ensured using test re-test technique and data obtained were analyzed using Cronbach alpha statistics. The analysis yielded a reliability coefficient of 0.79 which was suitable for the study. Data collected from the research questions were analyzed using mean and standard deviation while the independent sample t-test was used to test the hypotheses at a significance level of 0.05. The findings of the study revealed that AI-empowered systems facilitate personalized-learning, enable adaptive learning and real-time feedbacks on learning progression. However, AI ethical concerns in education were identified to include but not limited to: data privacy and security, algorithmic bias, unfairness, among others. Based on the findings, the study recommends that AI- technology developers and regulatory bodies should ensure that viable data privacy policies are established to protect and safeguard personal information and that surveillance mechanism embedded in AI's predictive systems should be automated for prompt identification of learning patterns and areas of improvement, also that AI-algorithmic systems should be carefully designed for equitable access to data, avoid inequalities that could cause socio-economic disparities and educational gap.

Keywords: Artificial Intelligence, Personalized learning platforms, Adaptive learning Algorithms, Ethical Implications and Education

Introduction

Artificial intelligence has become significantly important in transforming various industries, shaping of individual lifestyle and work habit in today's world of work. In recent times the field of education has witnessed a rapid transformation, largely driven by advanced Artificial Intelligence (AI) technology. This technology has the potential to revolutionize every aspect of education ranging from personalized learning experiences to effective administrative system. The rapid update of AI technology and its continuous innovation and application in institutions has come with increased convenience providing innovative solutions and improved access to quality information. AI is remarkably a substantial technology that has recently tried to mop off the traditional pedagogical approach in academic and administrative processes with the introduction of machine learning systems designed to display very high level of human intelligence in an

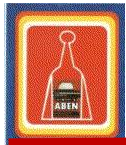


astonishing velocity. As noted by Cox and Mazumdar (2022), Artificial Intelligence is a collection of technologies with broad applicability in various fields of the human endeavor. AI deals with simulation of intelligence and behaviour in computers with capacity to mimic and virtually improve human conduct. According to Piano (2020), AI technology involves computers performing action or achieving desired result without human intervention. On a general note, especially as regards education sector, the emergence of Artificial Intelligence tools and its integration and application into learning situations has attracted significance with revolutionized teaching and learning, bringing about on the learning outcomes. AI-empowered learning tools involve machine learning system that uses algorithm to empower personalized and adaptive learning, facial recognitions among others.

Machine learning is concerned with the use of data and algorithms to perform tasks. Adewale and Akintola (2018) noted that Machine learning aims at building systems that make predictions based on data. It also involves drilling algorithms to identify learning styles and improve performance over time. These applications have expanded the digital possibilities in education by introducing new approaches and pedagogies in teaching-learning situations. Algorithms are rules designed to undertake a specific task or solve a particular problem. Algorithmic system provides a clear step-by-step strategy in achieving desired learning experience. According to Dignuim (2018), algorithmic systems are the core element of Artificial Intelligence, they consist of instructions that computers obey in finding solution to a problem. The algorithmic applications have featured prominently on various social media platforms and have contributed immensely to the overall improvement of education by providing timely solution to major challenges in education. The introduction and application of algorithmic systems in learning environment facilitate personalized-learning, enable adaptive learning and real-time feedbacks.

Personalized learning platforms are educational technologies that use AI tools to tailor learning experiences to individual learner's needs, performance and abilities. The platform influence AI- algorithms to analyze students' data and adapt instructional content, feedbacks and resource materials in optimizing learning outcomes. AI-Personalized learning platforms increase motivation and engagement of learners by aligning content with students' interest and learning pattern. This learning approach addresses specific gap in knowledge and adapt to varying learning needs. The personalized learning pattern supports diversity in learning patterns which accordingly result in instructional effectiveness. The platform leverages at advance AI technologies to adapt to learning environment of each learner. The adaptive learning platform powers AI to personalize educational experience. It uses algorithms to analyze students' learning styles and dynamically adjust content resources and at the same provides instant feedback to guide students in real-time. According to Bulger (2016), the transformative learning experiences through the personalized learning platforms, adapt to each learner's personal strengths, weaknesses, and preferences, providing a nurturing way to achieve superior learning outcomes. More importantly, these learning tools support and quicken responses to learners' questions, improving performance and other learning experiences. AI learning tools lessen the burden of both teachers and students through the automated learning assessment management systems that facilitate evaluation processes and facial recognition systems' insight into learners' behavior and other educational activities.

Education is a key to solving all life problems, it does not just prepare the individual for life but it is life itself. Education is dynamic process that emphasizes critical thinking, creativity and development of skills that allow individuals thrive in a complex society. Education involves discovery and talent development for capacity building. Education in its multifaceted nature aims at preparing individuals for active participation in the global world. According to Duckworth (2023),

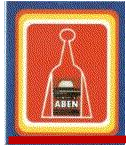


education is the systematic cultivation of intellectual and emotional resilience through a lifelong learning experience. The integrating of AI into the education system has fostered learning activities with transformative experiences. Adewale, & Akinola (2018) noted that AI-driven educational tools help to identify and nurture individual talents, provides innovative and learning opportunities that suits the learners' interest and strengths. The adaptive learning platforms allow learners to learn at their own pace, providing timely feedback to individual learners. The personalized learning tools are adaptive in nature that help in addressing individual learning styles by providing variety of instructional materials based on individual learning needs and progression. The learning platforms identify gaps in previous knowledge by accommodating learners' strength, weakness and providing adaptive support to students (Chu, Tu, & Yang 2022). Furthermore AI learning tools like the virtual classroom enhances collaborative learning and participation. These platforms are social learning outlets that facilitate interaction and ability to respond naturally with a conversational tone. Social networking learning platform allows for students-teachers connectivity and expands learning opportunities beyond the classroom. AI technological advancements has brought potential benefits to the education sector, although certain ethical issues have been identified to be associated with Artificial Intelligence integration in education

Ethical implication of Artificial intelligence in education extends beyond technical considerations but encompasses issues related to AI algorithmic biases. For instance, when algorithms are created, they collect a large set of data that are always accompanied by systemic biases that automatically transform into algorithms biases. AI applications often require the collection, analysis and storage of large amounts of data. Given the volume of data generated, the greatest ethical concern is related to data privacy and security, fairness, transparency, accountability having greater impact on learning outcomes. The widespread collection and analysis of data by AI system, raises concerns about how that data is used, stored, and protected, particularly in protecting student data. According to Black, Bolsoven, and Daboise (2014), privacy violation occurs when individual information is accessed online without the owner's consent. AI systems that perpetuate bias and unfairness could result to educational disparities, thus creating gap and learning exclusion, especially among the disadvantaged learners. The amplification of AI systems has resulted in unfairness among learners and has broadened the possibility of less privileged learners having equal access to resources. Consequently, these wide range of ethical concerns in education that are not just limited to data privacy, unequal access, transparency and accountability could be tackled if the systems are carefully designed and monitored by AI technology developers and policy regulatory bodies in their established measures that enhance data privacy and security. Clearly Baker (2023) asserted that there is need for data protection regulations so as to safeguard against unauthorized access or misuse of students' personal information. Furthermore, algorithms and machine-learning model tracking systems need to be largely engaged in monitoring activities of users and determine their actions. Surveillance mechanism should also be embedded into AI's predictive systems to foresee students' outcomes, strengths, weaknesses and learning patterns. Mario and Ayala (2023) clearly noted that, a subtle technique is required to balance the benefits and ethical issues of artificial intelligence integration in education, essentially by applying principles of equity and fairness in AI learning platforms for optimal learning outcomes.

Statement of the Problem

One of the major aims of AI in education is to foster learning activities. With the transformative capacity of AI learning platforms, it presents opportunity for individualized learning experiences. The education sector is expected to fully explore the potentials in AI technologies



through AI-driven learning activities. But observation reveals that the education sector especially some tertiary institutions seem not to have adequate access to AI- empowered learning platforms. Further observations also reveal that most learners especially the disadvantaged are deprived access to learning materials and timely feedback required in determining their learning progression. These setbacks could be attributed to the ethical concerns associated with the integration of AI technology in education. These ethical issues as identified in this study, include: data privacy and security, algorithm bias, unfairness, lack of transparency and accountability among others. The complexity of these hurdles in AI application in education if not contained may result in partial or non-accomplishment of learning objectives and consequently resulting in poor learning experiences, academic gap and unfruitful learning outcomes. In order to checkmate these learning anomalies, there is the need for a balanced approach in AI applications by ensuring an inclusive education system that is free of biases and inequalities if the maximum learning experience expected is to be attained. It is on this premise that the study examined the benefits of Artificial intelligence and ethical implications for business education programme in tertiary institutions especially in Delta State Nigeria.

Research Questions

- 1 What are the benefits of AI integration in business education programme in tertiary institutions in Delta State?
- 2 What are the ethical implications of AI integration for business education programme in tertiary institutions in Delta State?

Hypotheses

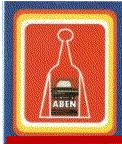
Two null hypotheses were formulated and tested at alpha level of 0.05.

Ho1: There is no significant difference in the mean responses of business education students in colleges of education and universities on the benefits of AI integration in business education programme in tertiary institutions in Delta State.

Ho2: There is no significant difference in the mean responses of business education students in colleges of education and universities on the ethical implications of AI integration for business education programme in tertiary institutions in Delta State.

Methodology

The study adopted descriptive survey design. The researcher considered this design suitable for this study since it elicits information from respondents regarding the benefits and ethical implications of AI integration for business education programme in tertiary institutions in Delta State. Two research questions guided the study and two null hypotheses formulated and tested at alpha level of 0.05. The population of the study was made up of two thousand six hundred and fifty (2,650) business education students of the 2021/2022 academic session from colleges of education and universities where business education is offered in Delta State. Simple random sampling technique was employed to obtain a sample size 350, composed of 150 college students and 200 university students. A structured questionnaire with the title "Benefits and Ethical Implications of Artificial Intelligence for Business Education Programme Questionnaire" (BEIAIBEPQ) was used for the study. The instrument was made up of twenty (20) item statements and was graded on a four point rating scale of Strongly Agreed (4points), Agreed (3points), Disagreed (2points) and Strongly Disagreed (1point) which was validated by three research experts. The reliability of the instrument was determined using test-retest technique. Data obtained from the administrations were analyzed with Cronbach alpha statistics and it yielded a reliability coefficient of 0.79. The value was considered reliable and appropriate



for the study. Data collected from respondents as regards the research questions were analyzed using Mean and Standard Deviation while Independent t-test was used to test the null hypotheses at a significance level of 0.05.

Decision rule for the research questions was based on an average mean score of 2.50 while the null hypotheses were based on t-critical value. If the t-calculated is less than the t-critical, the null hypothesis was accepted and if otherwise, rejected.

Results

Research Question 1:What are the benefits of AI integration in business education programme in tertiary institutions in Delta State?

Table 1:Mean and Standard Deviation of responses on the benefits of AI integration in business education programme in tertiary institutions in Delta State?

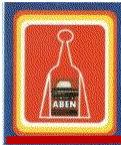
S/N	Item Statements	(x)	SD	Remark
1	I always utilize AI personalized learning platform	3.19	0.64	Agreed
2	Relevant resource materials are provided in the learning platforms based on learning needs	2.45	0.45	Disagreed
3	The adaptive learning platform fits into my learning preference	2.32	0.56	Disagreed
4	The learning platforms effectively identifies and address my learning strengths and weaknesses	3.65	0.54	Agreed
5	I am not satisfied with the feedbacks gotten from the AI learning platforms	2.28	0.55	Disagreed
6	I don't always access AI-generated recommendations for additional learning materials	2.23	0.43	Disagreed
7	I am motivated in my career due to the help of AI applications	3.45	0.45	Agreed
8	AI provides individualized performance progress	2.67	0.24	Agreed
9	I gets timely feedback from AI learning platforms	2.73	0.36	Agreed
10	Evaluating my learning progress is made easy through AI assessment platforms	2.65	0.38	Agreed
Grand Mean		2.76	0.46	Agreed

The analysis in research question one as shown in Table 1 indicates that the mean response of respondents ranged from 2.23 – 3.65. The result reveals that business education students in tertiary institutions in Delta State do access AI-empowered learning platforms. With an aggregate mean score of 2.76 above the criterion mean of 2.50, it implies that personalized and adaptive learning platforms are often utilized and enhances learning outcomes of business education programme in tertiary institutions in Delta State.

Research Question 2: What are the ethical implications of AI integration in business education programme in tertiary institutions in Delta State?

Table 2:Mean and Standard Deviation of responses on the ethical implications of AI integration in business education programme in tertiary institutions in Delta State

S/N	Item Statements	(x)	SD	Remark
11	I have limited access to AI learning resources due to digital divide	3.29	0.54	Agree
12	There is no transparency and accountability in AI learning platforms	2.25	0.56	Disagree



13	AI algorithms perpetuate unfairness in learning outcome	2.42	0.43	Disagree
14	I do have full access to AI- learning tools	3.35	0.55	Agree
15	I have neveraccessed AI learning platforms	2.27	0.64	Disagree
16	AI-algorithms prioritize security of data	2.63	0.47	Agreed
17	personally manage my privacy setting to control the use of data by others	2.17	0.78	Disagree
18	There are potential risks of data privacy and security in AI learning platforms	3.42	0.56	Agree
19	I don't share sensitive information online due to data insecurity	3.56	0.68	Agree
20	My school has some measures put in place to ensure AI-driven data privacy	2.23	0.57	Disagree
Grand Mean		2.76	0.58	Agree

The analysis in research question two as shown in Table 2 indicates that the mean responses ranged from 2.17 – 3.56. The result reveals that there are ethical challenges in AI integration in business education programme in tertiary institutions. With an aggregate mean score of 2.76 above the criterion mean of 2.50, this signifies that issues such as: data privacy and security, algorithm bias, unfairness among others are associated with AI integration in business education programme in tertiary institutions in Delta State.

Test of Hypotheses

Ho1: There is no significant difference in the mean responses of business education students in colleges of education and universities on the benefits of AI integration in business education programme in tertiary institutions in Delta State.

Table 3: Summary of t-test analysis on the significant difference in the mean responses of business education students in colleges of education and universities on the benefits of AI integration in business education programme in tertiary institutions in Delta State

Institutions	NXSDdft-calt-critical	Decision

Colleges	1503.560.54348	-28.081.96	Not Significant
Universities	2003.450.49		

Data in Table 3 reveals a t-calculated value of -28.06 which is less than the t-critical value of 1.96 at alpha level of 0.05. The analysis depicts a null hypothesis of no significance. Therefore the null hypothesis which states that there is no significance difference in the mean responses of business education students in colleges of education and universities on the benefits of AI integration in business education programme in tertiary institutions in Delta State is retained. It therefore implies that the mean responses of business education students in colleges and universities do not significantly differ on the benefits of AI integration in business education programme in tertiary institutions in Delta State, Nigeria.

H02: There is no significant difference in the mean responses of business education students in colleges of education and universities on the ethical implication of AI integration in business education programme in tertiary institutions in Delta State.

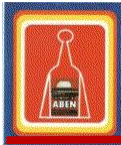


Table4: Summary of t-test analysis on the significant difference in the mean responses of business education students in colleges of education and universities on the ethical implication of AI integration in business education programme in tertiary institutions in Delta State.

Institution	N	XSD	dft-cal	t-critical	Decision
Colleges	1503	680.722	73-26.04	1.96	Not Significant
Universities	2003	260.56			

Table 4 analysis shows a t-calculated value of -26.04 which is less than the t-critical value of 1.96 at alpha level of 0.05. The result depicts a null hypothesis of no significance. Therefore the null hypothesis which states that there is no significant difference in the mean responses of business education students in colleges of education and universities on the ethical implication of AI integration in business education programme in tertiary institutions in Delta State is retained and accepted. The result implies that the mean responses of business education students in colleges of education and universities do not significantly differ on the ethical implications of AI integration in business education programme in tertiary institutions in Delta State, Nigeria.

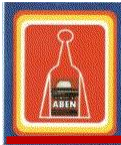
Discussion of Findings

The findings of the study were discussed in line with the research questions and the tested hypotheses. The result of research question one as shown in Table 1 reveals the mean and standard deviation of respondents on benefits of AI integration in business education study in tertiary institutions in Delta State. With an aggregate mean score of 2.76 above the criterion mean of 2.50, it implies that AI is beneficial in education through the personalized and adaptive learning platforms that enhance individualized learning experiences. This is in agreement with Loeck (2022) who affirm that the transformation of learning experiences through AI- personalized platforms has contributed greatly to the overall improvement in learning processes by identifying areas of improvement and profile timely solution.

The analysis in research question two as shown in Table 2 reveals that there are ethical implications associated with AI integration in learning. With an aggregate mean score of 2.76 above the criterion mean of 2.50, it signifies that the integration of AI technologies in education is associated with issues of data privacy, algorithmic bias and unfairness which are barriers to the learning experiences with AI learning platforms According to Mario and Ayala (2023), the issue of unequal access to AI educational tools could cause socio-economic disparities, thus creating educational gaps especially among the disadvantaged learners.

The data analysis in Table 3 shows a t-calculated value of -28.06 which is less than the t-critical value of 1.96 at alpha level of 0.05. The result depicts a null hypothesis of no significance. Therefore the null hypothesis which states that there is no significance difference in the mean responses of business education students in colleges of education and universities on the benefits of AI integration in business education programme in tertiary institutions is retained. This implies that AI-empowered learning platforms are beneficial to business education students in tertiary institutions in Delta State.

The analysis in Table 4 reveals a t-calculated value of -26.04 which is less than the t-critical value of 1.96 at alpha level of 0.05. The result signifies a null hypothesis of no significance. It therefore depicts that the null hypothesis which states that there is no significant difference in the mean responses of business education students in colleges of education and



universities on the ethical implication of AI integration in business education programme in tertiary institutions in Delta State is accepted. This suggests that ethical issues are associated in AI integration in business education study in tertiary institutions in Delta State. In corroboration with the above analysis, Black, Bolsoven, and Daboise (2014) affirm that AI-algorithms perpetuate bias and inequalities that lead to the exclusion of learners, especially if the systems are not carefully designed and monitored for equitable access.

Conclusion

Based on the findings, the researcher concluded that: AI-personalized and adaptive learning platforms are of utmost importance in education because these platforms adapt to individual learning capability, providing learning materials according to individual learning needs and subject areas. More importantly the AI-interactive learning tools, promote critical thinking and collaborative learning thus facilitating lifelong learning experiences. Algorithm bias and unequal access to data were revealed to be associated with AI integration in education. The most worrisome concerns were the issue of data privacy and security, lack of transparency among others

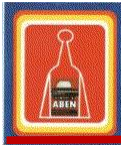
Recommendations

The following recommendations were made by the researcher based on the findings of the study.;

- 1 AI technology developers and regulatory bodies should ensure that viable data privacy policy regulations are maintained to regularly protect and safeguard personal information.
- 2 Surveillance mechanism embedded in AI's predictive systems and AI- personalized platforms should be actively automated for prompt identification of learning patterns and areas of improvement and profile timely solution for the overall contribution and improvement in learning processes
- 3 AI-algorithmic systems should be carefully designed and monitored for equitable access to avoid inequalities that could cause socio-economic disparities, thus creating educational gaps that may lead to the exclusion of learners

References

- Adewale, A..A., & Akinola, T.O. (2018). Transforming Nigeria State University curriculum with artificial intelligence and machine learning integration: In Proceedings of the International Conference on Educational Technology (ICET), Lagos Nigeria
- Baker, M. (2023). Data protection day-key developments: Special Edition. *Update Of Key Data Protection and Privacy Developments and Trends across the Globe*. bakermckenzie.com
- Black, G., Bolsoven, G., & Duboise E. (2014). *A new policy paradox: Young people privacy on social network site*. Oxford Internet Institution.
- Borenstein, J., Howand, A. (2020). Emerging challenges in AI and the need for AI ethicseducation: AI Ethics 2020.1, 61-65, doi:10.1007/s43681-020-0002-9. (Cross (Ref)(Google Scholar).
- Bulger, M. (2016). Personalized learning, the conversation we're not having. *Data and Security Research Institution*.
- Chan, L., Chan, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*. 8, 75264-75278, <https://doi.org/10.1109/ACCESS.2020.2988510>
- Chu, H., Tu, Y., & Yang, K. (2022). Roles of research trends of artificial intelligence in higher education: A systematic review of the top 50 most-cited articles. *Australasia Journal of Educational Technology*. 38(3), 22-42, <https://doi.org/10.14742/ajet.7526>



- Cox, A. & Mazumdar, S. (2022). Defining artificial intelligence for librarian: *Journal of Librarianship and Information Science*. ISSN 0961-0006, <https://doi.org/10.1177/09610006221142029>
- Cristianini, N. (2016). Intelligence reinvented: *New scientist*, 23293097), 37-41, [https://doi.org/10.1016/so262-4079\(16\)31992-3S](https://doi.org/10.1016/so262-4079(16)31992-3S)
- Dignuin, V. (2018). *Ethics in artificial intelligence introduction to the special issue*: <http://datasecurity.net/library/personalized-learning-theconversation-were-not-having>.
- Mario, F., & Ayala, P. (2023). Artificial intelligence in education: exploring the potential benefits and risk: *593 Digital Publisher CEIT*, 8(3), 892-899, <https://orcid.org/0000-0002-3344-8931>
- Piano, S.L. (2020) Ethical principles in machine learning and artificial intelligence: case from the field and possible ways forward: *Humanities Soc. Sci. Commun.* 2020: 7(9), 1-7. (Goggle Scholar)
- UNESCO. (2021). Principles for the ethical use of artificial intelligence in the United Nations' Systems: *HLCP Inter- Agency Working Group on Artificial Intelligence: UNESCO General conference, 41st session*



LEVEL OF AWARENESS AND APPLICATION OF ARTIFICIAL INTELLIGENCE AMONG BUSINESS EDUCATORS IN FEDERAL COLLEGES OF EDUCATION IN SOUTH-WEST, NIGERIA

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Abstract

The study examined the level of awareness and application of Artificial Intelligence among Business Educators in Federal Colleges of Education in South-West, Nigeria. Two research questions guided the study and one hypothesis was formulated and tested at 0.05 level of significance. Descriptive survey research design was adopted for the study. The population comprised 85 lecturers from the four Federal Colleges of Education offering Business Education programme in South-West, Nigeria. The entire population was studied hence there was no sampling. A self structured questionnaire was the instrument used for data collection. The instrument was validated by three experts in business education and the reliability test conducted showed a reliability coefficient of 0.86 which was deemed to be reliable. Mean and standard deviation were used to answer the research questions. Findings of the study revealed that there is high level of awareness of artificial intelligence among business educators in tertiary Federal Colleges of Education in South-West, Nigeria. Findings of the study also revealed that there is low level of application of artificial intelligence among business educators in Federal Colleges of Education in South-West, Nigeria. The result of the hypothesis shows a significant relationship between the current level of awareness and the current level of application of artificial intelligence technologies among business educators in Federal Colleges of Education in South-West, Nigeria. Consequent upon the findings of the study, it was recommended among others that tertiary institution administrators and the government should collaborative with AI experts and sponsor business educators to attend seminars/workshops to create more awareness of artificial intelligence.

Keywords: Awareness, Application, Artificial Intelligence, Business Educators

Introduction

Artificial intelligence (AI) is one of the technologies of the 21st century that has emerged with its awareness and application cutting across different fields of human endeavour. AI seems to be currently the most prominent technique in the world of technology, and it is based on enabling computer systems to perform tasks that usually require human intelligence. It is a branch of science which deals with helping machines find solutions to complex problems in a more human-like fashion. This generally involves borrowing characteristics from human intelligence, and applying them as algorithms in a computer friendly way. Artificial intelligence (AI) refers to computer systems capable of performing complex tasks that historically only a human could do, such as reasoning, making decisions, or solving problems. Gaber (2023) opines that artificial intelligence (AI) is a field of science seeking to develop computer systems with a level of efficiency similar to that of an expert human. In the field of education, artificial intelligence is defined as a means to improve education in an individualized, flexible, inclusive and interesting way by processing real-time data (UNESCO, 2017). The integration of artificial intelligence (AI) in



education has garnered significant attention in recent years. This interest is driven by the transformative potential of AI technologies to enhance teaching methodologies, streamline administrative processes, and improve student learning outcomes. The purpose of artificial intelligence in education is to improve classroom education and enhance the capacity of teachers to augment such a process.

Artificial intelligence is likely to change education in the coming decades, both in the classroom and at the system level (Organization for Economic Co-operation and Development [OECD], 2020). For example, when it comes to personal learning, AI can provide learning based on the individual needs of the learner and identify educational resources and methods within the framework of the student's learning pace. Holmes et al. (2022) state that the use of AI in education consists of four levels: (a) learning with AI, in which AI provides supportive resources for the learner, teacher, and educational administration; (b) using AI to learn how to learn through data analysis, identify students' academic level and effective learning methods, and make decisions about the learning process and educational plans; (c) learning about AI, which concerns learners' knowledge of AI techniques; and (d) preparing for AI, in which all citizens are prepared for the possible effects of AI on their lives and are made aware of some of the issues associated with it, such as ethics of AI, databases, monitoring, and the potential impact on jobs in the future.

Awareness plays a vital role in the adoption of AI technology in higher education (Kour & Karim, 2020). Awareness means to have knowledge of the existence and usefulness of artificial intelligence (Amadi-Iwai et al., 2024). Educators cannot utilize or apply AI in their teaching practices except they are aware of the different applications in education. Its applications range from student learning and evaluation to teacher development, highlighting the multifaceted role AI can play in enhancing educational outcomes. The integration of AI into educational management systems can facilitate more personalized learning experiences, allowing educators to tailor their teaching strategies to meet the diverse needs of students. The research findings of Rahiman&Kodikal (2023) indicate that the awareness of faculty members regarding the application of AI-based technology in their regular academic activities significantly influenced their work engagement which, in turn, contributed to the integration of AI into higher education. Lecturers need to be aware, well-prepared and confident in their ability to use AI-based applications to support their teaching methods (Amadi-Iwai et al., 2024).

As tertiary institutions across the globe are increasingly adopting AI tools, it is crucial to assess the level of awareness and application of these technologies among business education lecturers. Business education lecturers or business educators are professionally trained teachers of business courses who are engaged and are teaching business related subjects in universities, polytechnic and colleges of education. They teach business education courses with options in accounting, entrepreneurship, marketing and office technology management. Some of the objectives of teaching business education courses in colleges of education, according to the National Commission for Colleges of Education (2012) include production of well qualified and competent Nigeria Certificate in Education (NCE) graduates who will be able to teach business subjects in secondary schools and other related educational institutions, and equip students with the right skills that will enable them to engage in a life of work in the office as well as for self-employment.

The awareness of AI among business educators is critical, as it will directly influence the adoption and effective integration of AI tools in the business education curriculum. The level of awareness and application of AI among business education lecturers becomes increasingly critical because it is not merely a trend but a necessary evolution in teaching and learning

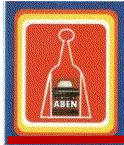


methodologies that can enhance educational outcomes and prepare students for a technology-driven workforce. The potential of AI to personalize learning experiences, automate administrative tasks, and provide real-time feedback is reshaping the educational landscape, making it imperative for educators and students alike to understand and leverage these technologies effectively (Fahimirad&Kotamjani, 2018; Chouhan, 2023; Lin, 2022). Research indicates that AI applications can significantly enhance the teaching and learning process by facilitating adaptive learning environments tailored to individual student needs (Huang et al., 2021). Moreover, the use of AI in educational settings can streamline administrative functions, allowing educators to focus more on pedagogical strategies rather than bureaucratic tasks (Barakina et al., 2021). These benefits underscore the importance of fostering a culture of AI literacy among business education lecturers and students, ensuring they are equipped to navigate and utilize these technologies effectively (Pham, 2023). Therefore, as AI technologies continue to evolve, it is imperative for business educators to stay informed and adept at utilizing these tools to enhance teaching and learning.

Molnar (2019) revealed that majority of teachers lack knowledge on the use of artificial intelligence in classroom delivery and emphasized on the need for teachers to be ready and competent in utilizing artificial intelligence tools effectively. Similarly, Amadi-Iwai et al., (2024) found out that Business Education Lecturers have low level awareness that artificial intelligence can be used to design course module, develop and implement new methods of teaching, set continuous assessments, and programme customized lesson plan. They also found out that business education lecturers have low level of awareness that artificial intelligence can be used to programme personalized tutorial, and automated assessment, for improved learning, and to prepare and develop teaching materials for improved job performance. Gaber et al. (2023) revealed that faculty members had a medium level of awareness of AI technologies and that there was no statistically significant relationship between AI awareness and technology adoption among faculty members. In contrast, the study found a direct and statistically significant positive relationship between AI awareness and digital competences among faculty members. A study by Jabali and Al-Qahtani (2022) indicated a high level of awareness of AI skills among faculty members while Gaber et al. (2023); Ukeh and Anih (2024) findings showed a relatively low adoption of AI tools among lecturers for teaching and research. In summary, available literature suggests that while AI applications in higher education are expanding there is a gap in both awareness and application that needs to be addressed to fully harness the potential of AI in education and business education in particular.

Statement of the Problem

The advancement of artificial intelligence (AI) technologies has transformed various sectors, including education. In tertiary institutions (Universities, Polytechnic and Colleges of Education) in Nigeria, the integration of AI presents both opportunities and challenges for lecturers. Despite the potential benefits of AI in enhancing teaching and learning experiences, there remains a notable gap in the awareness and application of these technologies among educators of which business educators are not exempted. Firstly, the awareness of AI technologies among lecturers is crucial for their effective implementation in educational practices. Research indicates that many business educators in tertiary institutions have low level awareness of AI and its potential applications in their teaching (Amadi-Iwai, 2023). This lack of awareness can lead to missed opportunities for enhancing student engagement and improving learning outcomes through AI-driven tools. For instance, AI can facilitate personalized learning experiences, automate administrative tasks, and provide data-driven insights into student performance (Barakina et al., 2021). However, the researchers observed that without adequate



awareness, lecturers may be hesitant to adopt these technologies, resulting in a disconnect between the potential of AI and its actual use in educational settings. As educational institutions continue to evolve in response to technological advancements, it is imperative to assess and address the current levels of awareness and application of AI technologies among lecturers to determine whether they are equipped to meet the demands of modern education, coupled with perceived gap in awareness and application of AI. Hence this study.

Research Questions

The following research questions guided the study:

1. What is the current level of awareness of artificial intelligence technologies among business educators in Federal Colleges of Education in South-West, Nigeria?
2. What is the current level of application of artificial intelligence technologies in the teaching practices of business educators in Federal Colleges of Education in South- West, Nigeria?
3. What challenges do business educators face in adopting and applying artificial intelligence technologies for teaching in Federal Colleges of Education in South-West, Nigeria?

Hypothesis

Ho: There is no significant relationship between the current level of awareness and the current level application of artificial intelligence technologies among business educators in Federal Colleges of Education in South-West, Nigeria.

Method

Descriptive survey research design was adopted for the study. The population of the study comprised 85 lecturers from four Federal Colleges of Education offering Business Education in South-west, Nigeria. The entire population was studied because it was manageable, hence there was no sampling. Questionnaire was the instrument used for data collection. The questionnaire was developed by the researchers using a modified four-point rating scale to measure level of awareness and application. The questionnaire was structured in the following rating scale Very High Level (VHL) – 4 points, High Level (HL) – 3 points, Low Level (LL) – 2 points and Very Low Level (VLL) – 1 point; Rating for challenges: Strongly Agree (SA) – 4 points, Agree (A) – 3 points, Disagree (D) – 2 points and Strongly Disagree (SD) – 1 point. The instrument was validated by three experts in business education and the reliability test was conducted using Cronbach alpha which showed a reliability coefficient of 0.86 which was deemed to be reliable. Data Analysis was through descriptive statistics of Mean and standard deviation to answer the research questions while Pearson Product Moment Correlation (PPMC) statistical method was used to test the hypothesis at 0.05 level of significance.

Results

Research Question 1

What is the current level of awareness of artificial intelligence technologies among business educators in Federal Colleges of Education in South-West, Nigeria?

Table 1: Respondents' Ratings on the current level of awareness of artificial intelligence technologies among business educators.

S/N	Level of Awareness of Artificial Intelligence Technologies Among Business Educators	Mean	SD	Remarks
1	I am aware of what artificial intelligence (AI) is and its	2.52	0.65	High level



	applications in education			
2	I am aware of various AI tools and software that can enhance teaching and learning in business education	2.46	0.61	Low Level
3	I am aware that artificial intelligence can be used to design and plan a course	2.38	0.59	Low Level
4	I am aware that artificial intelligence can be used to prepare and develop teaching materials	3.22	0.87	High level
5	I believe that AI can enhance the teaching effectiveness of business education lecturers	3.10	0.83	High level
6	I am aware of ethical considerations related to the use of AI in education	2.24	0.69	Low Level
7	I am aware that artificial intelligence is used to set continuous assessments	2.50	0.77	High level
8	I am aware that artificial intelligence can be used to mark and moderate examinations questions	2.12	0.63	Low Level
9	I am aware of the impact of AI on future job prospects for business education graduates.	3.48	0.76	High level
10	AI-based technology like a chatbot quickly provides information and answers queries about academic affairs	3.06	0.85	High level
Grand Mean		2.71		High level

Source: Researchers' Computation, 2024

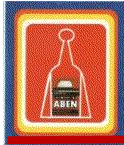
The results from Table 1 showed the current level of awareness of artificial intelligence technologies among business educators in Federal Colleges of Education in South-West, Nigeria. The results revealed that mean scores of all the items range from 3.48 - 2.12 with a grand mean of 2.71. This implies that Business Educators in Federal Colleges of Education possess a high level of awareness of Artificial Intelligence Technologies for teaching.

Research Question 2

What is the current level of application of artificial intelligence technologies in the teaching practices of business educators in Federal Colleges of Education in South-West, Nigeria?

Table 2: Respondents' rating of the Current Level of Application of Artificial Intelligence in the teaching practices of Business Educators.

S/N	Level of Application of Artificial Intelligence Technologies Among Business Educators	Mean	SD	Remarks
1	I apply AI technology to create teaching material and content development	3.10	0.82	High Level
2	I apply AI tools to review homework, tests, and other written assignments, monitor student achievement, and provide feedback	2.36	1.08	Low Level
3	I apply AI tools to detect plagiarism in student papers and courses works	1.78	1.02	Low Level
4	The application of AI in my higher education academic journey is cost-effective	1.96	0.94	Low level
5	I am using AI technologies and tools in my teaching and learning activities	2.44	0.85	Low Level



6	I utilize AI to create personalized learning experiences for my students.	2.46	1.10	Low Level
7	I integrate AI into the design of my courses to enhance curriculum delivery	2.43	0.86	Low Level
8	I implement AI technologies to enhance student engagement during lectures and discussions	2.52	0.98	High level
9	I collaborate with AI systems in developing course materials and resources	2.48	0.87	Low Level
10	I encourage students to interact with AI-based platforms as part of their learning experience	2.45	1.04	Low Level
Grand Mean		2.40		Low Level

Source: Researchers' Computation, 2024

The results from Table 2 showed the current level of application of artificial intelligence technologies in the teaching practices of business educators in Federal Colleges of Education in South-West, Nigeria. The results reveal that mean scores of all the items range from 3.10 - 1.78 with a grand mean of 2.40. This implies that Business Educators in Federal Colleges of Education in South-West, Nigeria apply Artificial Intelligence Technologies in their teaching practices at a low level.

Research Question 3

What challenges do business educators face in adopting and applying artificial intelligence technologies for teaching in Federal Colleges of Education in South-West, Nigeria?

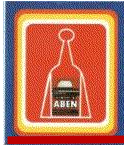
Table 2: Respondents' Ratings of Challenges Business Educators Face in Adopting and Applying Artificial Intelligence Technologies For Teaching.

S/N	Challenges Business Educators Face in Adopting and Applying Artificial Intelligence	Mean	SD	Remarks
1	High Cost of AI Implementation in teaching	3.46	0.69	Agreed
2	Insufficient AI skills and expertise	3.54	0.67	Agreed
3	Lack of technical infrastructure in Colleges	3.10	0.46	Agreed
4	AI-based scoring or assessment may sometimes improperly evaluate performance	2.84	0.53	Agreed
5	AI systems sometimes fall short of meeting the needs of lecturers for effective feedback	2.56	0.80	Agreed
6	AI facilitates technology addiction among teachers and students.	3.68	1.08	Agreed
Grand Mean		3.19		Agreed

Source: Researchers' Computation, 2024

The results from Table 3 showed the challenges business educators face in adopting and applying artificial intelligence technologies for teaching in Federal Colleges of Education in South-West, Nigeria. The results revealed that mean scores of all the items range from 3.68 - 2.56 with a grand mean of 3.19. This implies that Business Educators agreed that all the items are challenges business educators in Federal Colleges of Education in South-West, Nigeria face in adopting and applying artificial intelligence technologies for teaching.

Test of Hypothesis



Ho: There is no significant relationship between the current level of awareness and the current level application of artificial intelligence technologies among business educators in Federal Colleges of Education in South-West, Nigeria.

Table.4: Relationship between lecturers' level of awareness and level of application of artificial intelligence

Variables	N	Mean	SD	Df	α -level	r-cal	P-value	Decision
Awareness	85	2.71	0.64					
				83	0.05	1.933	0.000	Reject Null Ho
Application	85	2.40	0.71					

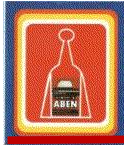
Researchers' Computation, 2024.

Table 4 shows the number of participants (n) = 85, and a correlation value (r) = 1.933 and P-value of 0.000. Testing the hypothesis at alpha level = 0.05 the p value is less than the alpha value, $0.000 < 0.05$. Therefore, the null hypothesis is rejected. This indicates that there is significant relationship between the current level of awareness and the current level of application of artificial intelligence technologies among business educators in Federal Colleges of Education in South-West, Nigeria. This implies that awareness drives adoption. Business educators who are more aware of AI technologies are more likely to apply them in their teaching practices. However, awareness may not guarantee adoption because lecturers may be aware of AI technologies, but factors such as lack of resources, technical support, availability of infrastructure, motivation and others might influence their decision to apply them.

Discussion of Findings

Findings of the study showed the current level of awareness of artificial intelligence technologies among business educators in Federal Colleges of Education in South-West, Nigeria. The results reveal that mean scores of the items range from 3.48 - 2.12 with a grand mean of 2.71. This implies that Business Educators possess a high level of awareness of Artificial Intelligence Technologies for teaching. The findings of this study align with Jabali and Al- Qahtani's (2022) findings, which indicated a high level of awareness of AI skills among faculty members. However, this finding contradicts Gaber et al. (2023) who revealed that lecturers possess a medium degree of awareness of AI, and Amadi-Iwai et al. (2024) who found out that business education lecturers have a low level of awareness that artificial intelligence can be used to design course module, develop and implement new methods of teaching, set continuous assessments, and programme customized lesson plan. They also found out that business education lecturers have a low level of awareness that artificial intelligence can be used to programme personalized tutorial, and automated assessment, for improved learning, and to prepare and develop teaching materials for improved job performance

Findings of the study revealed the current level of application of artificial intelligence technologies in the teaching practices of business educators in Federal Colleges of Education in South-West, Nigeria. The results reveal that mean scores of all the items range from 3.10 - 1.78 with a grand mean of 2.40. This showed that Business Educators in Federal Colleges of Education in South-West, Nigeria apply Artificial Intelligence Technologies in their teaching



practices at a low level. This finding agrees with Amadi-Iwai (2024) that business education lecturers to a low extent integrate artificial intelligence to mark and moderate examinations questions, update students' admissions and induction programmes, and to programme automated assessment for improved job performance. The findings slightly agree with Gaber et al. (2023) and Ukeh and Anih (2024) who found out that the use of AI by lecturers is at a relatively low level. Also, Molnar (2019) findings revealed that majority of teachers lack knowledge on the use of artificial intelligence in classroom delivery and emphasized on the need for teachers to be ready and competent in utilizing artificial intelligence tools effectively.

The results from the analysis showed the challenges business educators face in adopting and applying artificial intelligence technologies for teaching in Federal Colleges of Education in South-West, Nigeria. The results revealed that mean scores of all the items range from 3.68 - 2.56 with a grand mean of 3.19. This implies that Business Educators agreed that all the items are challenges business educators in Federal Colleges of Education in South-West, Nigeria face in adopting and applying artificial intelligence technologies for teaching. The results of this study align with the results obtained by Al-Subhy (2020), Jantakun et al. (2021) and Badawi (2022) who found that there are several challenges to the use of AI in teaching and concluded that there are a set of challenges facing the application of AI on university campuses, including the need to train faculty and develop their skills to be compatible with AI.

Findings of the study revealed that there is a significant relationship between the current level of awareness and the current level of application of artificial intelligence technologies among business educators in Federal Colleges of Education in South-West, Nigeria. The results showed the number of participants (n) = 85, and a correlation value (r) = 1.933 and P-value of 0.000. Testing the hypothesis at alpha level = 0.05 the p value is less than the alpha value, $0.000 < 0.05$. Therefore, the null hypothesis is rejected. This finding aligns with the research by Musa and Madu (2024) and Gaber et al. (2023) who also found that there was positive relationship between AI awareness and digital competencies (DCs). This implies that awareness drives adoption. Business educators who are more aware of AI technologies are more likely to apply them in their teaching practices. However, awareness may not guarantee adoption because lecturers may be aware of AI technologies, but factors such as lack of resources, technical support, availability of infrastructure, motivation and others might influence their decision to apply them.

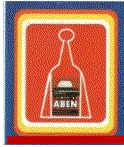
Conclusion

Based on the results of the current study, business educators in Federal Colleges of Education in South-West Nigeria possess a high level of awareness of AI technologies and a low level of application of AI technologies for teaching. The study concluded that there are several challenges to the application of AI in teaching which is revealed in the gap between awareness and application or utilization.

Recommendations

Based on the findings of this study, the following recommendations were made:

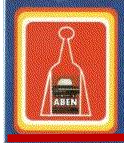
1. Tertiary institution administrators and the government should collaborative with AI experts and sponsor business educators to attend seminars/workshops to create more awareness of artificial intelligence.
2. Business educators should attend training and professional development programmes needed for the application of artificial intelligence tools into their teaching practices.



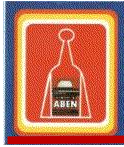
3. Government should provide business educators with adequate digital infrastructure and resources for effective adoption and application of artificial intelligence technologies into the classroom to enhance the teaching and learning process.

References

- Al-Subhy, A. (2020). The reality of artificial intelligence applications use in education by faculty members at Najran University. *Journal of the Faculty of Education, Ain Shams University*, 4 (44), 319-368.
- Amadi-Iwai, P. S., Williams, W. J., & Okiridu, O. S. F. (2024). Awareness, competence and utilization of artificial intelligence for improved job performance by Business Educators in universities in south-south Nigeria. *International Journal of Advance Research and Learning*, 3(1), 37-49.
- Barakina, E., Popova, A., Gorokhova, S., & Voskovskaya, A. (2021). Digital technologies and artificial intelligence technologies in education. *European Journal of Contemporary Education*, 10(2). <https://doi.org/10.13187/ejced.2021.2.285>
- Chouhan, D. (2023). A study on artificial intelligence in education. *International Journal of Engineering Technology and Management Sciences*, 7(1), 449-456. <https://doi.org/10.46647/ijetms.2023.v07i01.063>
- Fahimirad, M., & Kotamjani, S. (2018). A review on application of artificial intelligence in teaching and learning in educational contexts. *International Journal of Learning and Development*, 8(4), 106. <https://doi.org/10.5296/ijld.v8i4.14057>
- Gaber, S. A., Shahat, H. A., Alkhateeb, I. A., Al Hasan, S. A., Alqatam, M. A., Almughyirah, S. M., & Kamel, M. K. (2023). Faculty members' awareness of artificial intelligence and its relationship to technology acceptance and digital competencies at King Faisal University. *International Journal of Learning, Teaching and Educational Research*, 22(7), 473-496. <https://doi.org/10.26803/ijlter.22.7.25>
- Holmes, W., Persson, J., Chounta, I., Wasson, B., & Dimitrova, V. (2022). *Artificial intelligence and education: A critical view through the lens of human rights, democracy and the rule of law*. Council of Europe.
- Huang, J., Saleh, S., & Liu, Y. (2021). A review on artificial intelligence in education. *Academic Journal of Interdisciplinary Studies*, 10(3), 206. <https://doi.org/10.36941/ajis-2021-0077>
- Jabali, N., & Al-Qahtani, S. (2022). The degree of awareness among faculty members of artificial intelligence skills in education and its relationship to experience and training programs at King Khalid University. *Journal of the Association of Arab Universities for Education and Psychology*, 19 (3), 92-131
- Jantakun, T., Jantakun, K., & Jantakoon, T. (2021). A common framework for artificial intelligence in higher education (AAI-HE Mode). *International Education Studies*, 14(11), 94-103. <http://doi.org/10.5539/ies.v14n11p94>
- Kour, R., & Karim, R. (2020). Cybersecurity workforce in railway: Its maturity and awareness. *Journal of Quality in Maintenance Engineering*, 27(3), 453-464. <https://doi.org/10.1108/JQME-07-2020-0059>
- Lin, H. (2022). Influences of artificial intelligence in education on teaching effectiveness. *International Journal of Emerging Technologies in Learning (Ijet)*, 17(24), 144-156. <https://doi.org/10.3991/ijet.v17i24.36037>
- Molnar, C. (2019). Interpretable machine learning. A guide for making black box models explainable. *arXiv preprint arXiv:2007.04131*.



- Musa, A., & Madu, C. O. (2024). Lecturers' level of awareness of artificial intelligence as correlate of their digital competence at Federal University Wukari, Nigeria. *Journal of Educational Research in Developing Areas (JEREDA)*, 5(1), 59-67, <http://www.jeredajournal.com>
- Organization for Economic Co-operation and Development. (2020). Trustworthy AI in education: promises and challenges, *background paper for the g20 AI dialogue, digital economy task force meeting* Riyadh, 1-2 February 2020. <https://www.oecd.org/education/trustworthy-artificial-intelligence-in-education.pdf>.
- Pham, T. (2023). Digital transformation in engineering education: exploring the potential of ai-assisted learning. *Australasian Journal of Educational Technology*, 39(5), 1-19. <https://doi.org/10.14742/ajet.8825>
- Rahiman, H. U., & Kodikal, R. (2023). Revolutionizing education: Artificial intelligence empowered learning in higher education. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186X.2023.2293431>
- Ukeh, B. O., & Anih, A. A. (2024). Utilization of artificial intelligence based tools for teaching and research among lecturers in Federal University Otuoke, Bayelsa State Nigeria. *Sapientia Foundation Journal of Education, Sciences and Gender Studies (SFJESGS)*, 6(1) 153-159.
- UNESCO (2017). Data revolution to measure equity in education for SDGs #CIES2017. Retrieved from <http://www.iiep.unesco.org/en/data-revolution-measure-equity-educationsdgs-cies2017-3886>



APPLICATION OF ARTIFICIAL INTELLIGENCE IN BUSINESS EDUCATION PROGRAMME FOR ACADEMIC ACHIEVEMENTS IN PUBLIC UNIVERSITIES IN SOUTH-EAST NIGERIA

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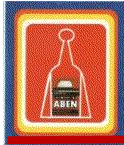
Abstract

This research work dwelt on application of artificial intelligence in Business Education programme for academic achievements in public universities in South-East Nigeria. Descriptive survey research design was used for the study. The population for the study consist of 81 Business Educators in public universities in South-East Nigeria. The entire population was used hence, no sampling was done. Three research questions and three null hypotheses guided the study. Self-structured questionnaire validated by three experts was the instrument for data collection. The instrument was subjected to reliability test and a coefficient of 0.81 was realized using Crombach Alpha formula. Mean and standard deviation were used to answer the research questions while t-test was used to test the null hypotheses at 0.05 level of significance. Only 76 copies of the instrument distributed were recovered (47 from federal universities, 29 from state universities) giving 93.83% return rate. The findings indicated that government related ($\bar{x}=3.27$), lecturers-related ($\bar{x}=3.19$) and students-related ($\bar{x}=3.19$) strategies are strategies for application of artificial intelligent in Business Education programme for academic achievements in public universities in South-East Nigeria. There was no significant difference between the mean scores of federal and state universities Business Educators with respect to government, lecturers' and students-related strategies for application of artificial intelligence for academic achievements in Business Education programme ($P = 0.158 > 0.05$, $P = 0.701 > 0.05$, $P = 0.348 > 0.05$). Based on the findings, it was suggested among others that government should map out strategies, provide funds and infrastructure for effective application of AI in universities and other higher institutions.

Key words: Artificial Intelligence, Business Education, Academic Achievements

Introduction

Business Education is a unique programme that aims at imparting saleable skills into the recipients for entry into and advancement within business. It is a programme for job occupations and sustainable living. Ezeabii (2017) defined Business Education as an aspect of Vocational Education which equips individuals with the necessary skills and theoretical knowledge needed for performance in the business world either for job occupations or for self-employment. Ezeabii, Ekoh-Nweke and Okwor (2020) affirmed that Business Education programme is a valuable programme for skills acquisition required by graduates in the 21st century that is highly



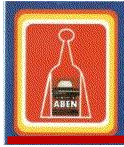
competitive and technology driven. In effect both students and faculty should be compliant with innovative approaches and move with trend of event in this technological age.

Business Education programme in universities is taught by Business Educators. These are people who read Business Education in tertiary institutions up to degree level and Masters Degree level. Some have Ph.D i.e. Doctor of Philosophy in the said field. They need to be acquainted with the application of new technologies, especially the application of artificial intelligence for instructional delivery. Business Education programme is offered in Nigeria public and private universities. The private universities are owned, run and controlled by private organizations and individuals while the public universities are owned, run and controlled by the Federal and State government. However, one is not sure whether university status influence the strategies for the application of artificial intelligence by lecturers and students for academic achievements. There are federal and state universities in South-East Nigeria. South-East is one of the six geopolitical zones in Nigeria and it is made up of five states. Thus: Abia, Anambra, Ebonyi, Enugu and Imo States. These states are known for their commercial activities as well as educational endeavours. Hence, many educational institutions including universities running Business Education programme abound in the zone.

The application of technology driven structural approaches in Business Education programme is paramount for academic achievements. Academic achievement can be seen as the outcome of educational endeavours. Academic achievement also can be attributed to the measurement of educational objectives through examinations or continuous assessments. Onyeso and Nnokam (2024) viewed academic achievement as the outcome of education, in essence, the extent to which a student, teacher or institution has achieved their educational goals. This implies that the academic achievements of Business Education students in South-East Nigeria depends on the extent the students achieve the educational objectives set out for them by lecturers and the institution. However, the achievement of the above depends on the capabilities of the students, instructional approaches applied by the faculties and the facilities made available for that by the institution. No wonder, Aribisala and Igweh (2024) observed that students' achievement needs adequate innovative techniques with more resilient evaluations.

Hence, innovative approaches as opposed to the conventional ones that are teacher centred and boring are needed for achievement of education goals in Business Education programme in this modern age. Ezeabii, Ekoh-Nweke and Okwor (2020) observed that for Business Education to remain relevant in providing the needs of individuals and that of the society, it must embrace current trends in the academic and economic demands of the society. One of the current trends is the application of artificial intelligence in educational programmes. Artificial Intelligence (AI) is the use of computer systems that can perform various tasks like humans. Alabi (2022) noted that artificial intelligence involves a collection of technologies that enable machines to act with a very high level of intelligence similar to humans. Oluyemisi (2023) defined artificial intelligence as an advanced technological frontier, stimulating human intelligence through machine learning algorithms, neural networks and natural language processing (NLP).

Artificial intelligence (AI) can be applied in all facets of the economy which include agriculture, energy, healthcare, transportation, education among others. AI has revolutionalized the whole educational system. It contributes to enhancing the learning process, elevating students' academic achievements and simplifying administrative tasks. AI can be applied in personalized learning, giving assignment to students, marking of scripts and grading. Feedback can be received from students with the use of AI. Subsequently, AI fosters critical and analytical thinking in students, fostering motivated and enthusiastic learning leading to better understanding of the subject matter. Ogunode and Adamu (2021) noted that AI has the ability to automate



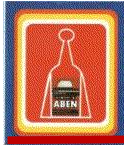
routine tasks such as lesson-planning, scheduling, attendance marking, grading and record-keeping. AI capabilities such as text-to-speech, visual recognition, speech recognition and more can be tailored to support learners with special needs for more inclusive education. Awofiranye (2024) highlighted the benefits of AI in include: creation of feedback for both students and teachers, accessing of real-time information anywhere in the world with just a smart phone and internet connection, time management for research work using creative tools, facilitation of learning process and development of AI-powered braille tutor applications to facilitate learning process for special students. In essence, AI empowers educators with the ability to construct dynamic and interactive learning environments that accommodate various learning styles and various students' capabilities.

Nevertheless the achievement of these benefits of artificial intelligence in education needs the cooperation of the stakeholders especially the government, lecturers and students themselves. The Nigerian government is supposed to formulate policies with respect to application of AI, establish regulatory bodies to monitor and supervise application of AI, provide the needed funds and facilities, train the academia to upgrade their skills in the use of AI and foster institution industrial partnership to promote utilizations of AI. In line with the submission, Okunade (2024) affirmed that government provision of policies for incorporation of AI in schools, financial assistance mechanisms, partnerships with non-governmental organizations and participatory decision-making procedures can facilitate a more thorough and substantial adoption.

In addition, lecturers should adopt strategies to make the application of AI workable. They are supposed to monitor and mentor students, utilize AI tools for personalized teaching, use AI tools for grading students and receiving feedback, collaborate with AI experts for coaching on AI utilization and update their knowledge in AI utilization through conferences, workshops and seminars. In confirmation of the above, Adeyemi (2020) stressed that it is necessary to execute extensive training programme, cooperate with educational institutions for ongoing professional growth, and create mentoring programmes to allow the exchange of information among educators. Okunade (2024) also concurred that there are several opportunities available for teacher training and professional development, such as workshops, seminars, and online learning platform that specifically focus on AI education. Further, Alabi (2022) opined that AI could be used by lecturers to personalize tutoring, receiving feedback, assess students and grade them. Honestly AI can be used by lecturers to engage students, make them overcome challenges of learning and record their progress.

Furthermore, students as stakeholders to education should also strategize in utilizing AI for academic achievements. They are expect to engage in AI literacy class, receive guidance on AI-related career, acquire hands-on experience with AI tools, receive mentorship from AI experts, intern with AI related companies for improved knowledge and engage in AI-related projects for knowledge acquisition. In support of the above, Nicholas (2023) noted that there is a pressing need for students to understand and use AI tools efficiently and effectively, it should be a guide to students in researching, writing papers and developing marketing plans. Sequel to that, Okunade (2024) advised that students should intern and partner with industries, listen to Guest lecturers on AI and participate in joint research for practical real-world and AI applications. This partnership the author noted will guarantee that skills being taught are in line with the demands of employers and make for academic achievement.

Nevertheless, despite the benefits of AI in education, it has been observed that faculties still adopt traditional approaches to teaching and learning. These may be as a result of some factors which may include laxity on the part the government in providing fund and infrastructure and non-possession of requisite skills by lecturers and students for application of AI in education.



Aina, Gbenga-Epebinu, Olofinbiyi, Ogidan and Ayedun (2023) found out that the major obstacle to application of AI in many institutions is infrastructural restriction. Ezeabii, Ekoh-Nweke and Okwor (2020) observed that lack of fund and facilities, and lack of skills and interest on the part of lecturers negate the use of innovative approaches in teaching and learning. The above scenario should not be left unattended hence, this research work was poised to determine the strategies for application of Artificial Intelligence in Business Education programme for academic achievements in public universities in South-East Nigeria.

Statement of the Problem

Business Education is skills acquisition programme and needs to be taught in universities in South-East Nigeria with innovative skills especially Artificial Intelligence to remain competitive in the global world. Artificial Intelligence (AI) has revolutionized teaching and learning making teaching personalized, students engaged and motivated. It is used in developing instructional content, receiving feedback from students, overcome learning challenges, give students assignment, mark scripts and grade students. AI can also be used to support learners with special needs. It is an innovative approach in teaching and learning making the educational process enthusiastic.

However, it has been observed that some of the academia including Business Education lecturers are still making use of the conventional approaches that does not make for enthusiasm in learning thereby negating academic achievements. This may be as a result of some factors that may not be unrelated to provision of funds and infrastructure by the government, non-possession of innovative skills and tools by Business Educators and students among others for application of AI in education especially Business Education programme of universities in South-East Nigeria. There is need to avert this negative scenario hence, determination of strategies for application of Artificial Intelligence in Business Education programme for academic achievements in public universities in South-East Nigeria.

Purpose of the Study

The main purpose of the study was to determine strategies for application of Artificial Intelligence in Business Education programme for academic achievements in public universities in South-East Nigeria. Specifically, the study sought to determine the:

1. Government-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.
2. Lecturers-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.
3. Students-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.

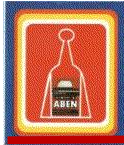
Research Questions

The following research questions guided the study:

1. What are the government-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria?
2. What are the lecturers'-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria?
3. What are the students-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria?

Null Hypotheses

The following null hypotheses tested at .05 level of significance guided the study.



1. There is no significant difference between the mean scores of federal and state universities Business Educators on government-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.
2. A significant difference does not exist between the mean scores of federal and state universities Business Educators on lecturers-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.
3. There is no significant difference between the mean scores of federal and state universities Business Educators on students'-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria

Method

The study adopted a survey research design. Survey research design according to Nworgu (2015) is on in which a group of people are studied by analyzing data from a few or the entire group and result got can be inferred to the entire population. This design is deemed fit for this study as data got from Business Educators from public universities in South-East Nigeria will be inferred to the entire population. The area of the study was public universities in South-East Nigeria. The population for the study was 81 Business Educators (Federal 52, State 29). The number was manageable, hence there was no sampling.

Data was collected using 24 itemed structured questionnaire developed from literature review. Four point rating scale of strongly agree (4), agree (3), disagree (2) and strongly disagree (1) was used. The instrument was validated by three experts. Their corrections and suggestion were used to produce the final copy. The instrument was trial tested using twenty Business Educators from South-South Nigeria. The reliability of the instrument was determined using Crombach Alpha formula and a coefficient of 0.81 was realized. Six research assistants helped in the distribution of the questionnaire 76 copies (federal 47, state 29) out of 81 copies distributed were filled correctly and returned representing 93.83% return rate.

Three research questions and three null hypotheses guided the study. The research questions were answered using weighted means and standard deviations while t-test was used to test the null hypotheses at .05 level of significance using SPSS version 23.0.

However, decisions were made using the upper and lower limits of the mean. Thus: Strongly Agree = 3.50-4.00, Agree = 2.50-3.49, Disagree 1.50-2.49, and Strongly Disagree = 0.50-1.49. For the test of hypothesis, the null hypothesis was not significant where the calculated p value was greater than .05 level of significance otherwise, it was significant.

Results

Research Question I

What are the government-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria?



Table I: Mean Scores and standard deviation of Business Educators for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria

S/No	Government-related strategies for application of AI in Business Education programme include:	Federal N=47		State N=29		Overall		Decision
		$\bar{x}_1$	SD ₁	$\bar{x}_2$	SD ₂	$\bar{x}_G$	SDG	
1.	Mapping out enough fund for AI-related researches in our institutions in Nigeria.	3.41	0.50	3.33	0.48	3.37	0.48	Agree
2.	Embarking on training the academia on digital literacy on AI for students' academic achievements.	3.20	0.84	2.81	0.87	2.98	0.87	Agree
3.	Providing the necessary infrastructure for utilization of AI in universities.	3.24	0.62	3.15	0.63	3.19	0.62	Agree
4.	Mapping out structures for promoting AI awareness among students in universities.	3.22	0.57	3.11	0.60	3.16	0.59	Agree
5.	Encouraging partnership between universities and AI industrial experts for students to be acquainted with AI and its benefits.	3.39	0.63	3.02	0.49	3.18	0.58	Agree
6.	Mapping out policies for the adoption of AI in our universities.	3.41	0.63	3.50	0.57	3.46	0.60	Agree
7.	Providing grants to university students for AI-related researches	3.51	0.51	3.50	0.50	3.51	0.51	Strongly agree
8.	Establishing regulatory bodies to monitor and supervise the application of AI in our universities.	3.29	0.60	3.33	0.70	3.32	0.66	Agree
Cluster Mean/SD		3.33	0.53	3.22	0.61	3.27	0.61	Agree

$\bar{x}$ = Mean, SD = Standard Deviation

The analysis of data presented in Table 1 above shows that all the items except item 7 has mean scores ranging from 2.98 to 3.46 indicating agree. Item 7 has mean score of 3.51 depicting strongly agree. The aggregate mean score is 3.27 depicting agree. This means that the respondents view the items as the government-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria. The overall standard deviation of 0.61 indicates that the respondents have similar opinion to the items.

Hypothesis 1

There is no significant difference between the mean scores of federal and state universities Business Educators on government-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.



Table 2: Summary of t-test analysis on mean scores of federal and state universities Business Educators on government-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.

Variables	N	t	df	Sig (2 tailed)	Mean Difference	Std. Error Difference	Decision
Federal	47	1.423	74	.158	.97742	.68689	NS
State	29						

The result of t-test analysis in Table 2 shows that the t-value at 0.05 level of significance and at 74 degree of freedom for the items is 1.423 with a significant value of 0.158. Since the significant value of 0.158 is more than the 0.05 level of significance, the null hypothesis is not significant. This means that there is no significant difference regarding the items on the mean scores of federal and state universities Business Educators on government-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.

Research Question 2

What are the lecturers'-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria?

Table 3: Mean scores and standard deviation of Business Educators on lecturers'-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.

S/N o	Lecturers-related strategies for application of AI in Business Education programme include:	Federal N=47		State N=29		Overall		Decision
		$\bar{x}_1$	SD ₁	$\bar{x}_2$	SD ₂	$\bar{x}_G$	SDG	
9.	Attending conferences on AI for knowledge update.	3.34	0.53	3.26	0.59	3.29	0.56	Agree
10.	Embarking on in-service training on AI for professional development.	3.44	0.50	3.22	0.42	3.32	0.47	Agree
11.	Collaboration with AI experts for coaching on AI utilization in teaching.	3.24	0.54	3.02	0.53	3.12	0.54	Agree
12.	Utilizing AI tools for personalized teaching.	3.44	0.78	2.87	0.73	3.12	0.80	Agree
13.	Liaising with industries on AI-related projects for expertise.	3.24	0.66	2.89	0.57	3.04	0.63	Agree
14.	Mentoring students on AI-related projects.	3.02	0.52	2.98	0.49	3.00	0.51	Agree
15.	Incorporating AI-related topics in existing curricula.	3.22	0.65	3.28	0.68	3.25	0.68	Agree
16.	Utilizing AI tools for grading students and receiving feedback	3.29	0.68	3.44	0.50	3.38	0.59	Agree
	Cluster Mean/SD	3.28	0.61	3.12	0.56	3.19	0.60	Agree

$\bar{x}$ = Mean, SD = Standard Deviation

The data presented in Table 3 shows that the mean scores for items 9 to 16 ranges from 3.00 to 3.38 depicting agree. The cluster mean of 3.19 concurs to that. This means that the itemized are lecturers-related strategies for application of AI in Business Education programme for academic



achievements in public universities in South-East Nigeria. The low overall standard deviation of 0.60 shows that the respondents' opinions do not differ remarkably to the itemized.

Hypothesis 2

A significant difference does not exist between the mean scores of federal and state universities Business Educators on lecturers'-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.

Table 4: Summary of t-test analysis of mean scores of federal and state universities Business Educators on lecturers'-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.

Variables	N	T	df	Sig (2 tailed)	Mean Difference	Std. Error Difference	Decision
Federal	47	1.021	74	0.701	1.94580	.46423	NS
State	29						

The result of t-test analysis in Table 4 shows that the t-value at 0.05 level of significance and at 74 degree of freedom for the items is 1.021 with a significant value of 0.701. As the significant value of 0.701 is more than the 0.05 level of significance, the null hypothesis is not significant. This means that a significant difference does not exist between the mean scores of federal and state universities Business Educators on lecturers'-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.

Research Question 3

What are the students'-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria?

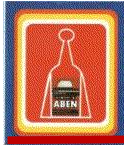
Table 5: Mean scores and standard deviation of Business Educators on students'-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria.

S/N o	Students-related application of AI in Business Education programme include:	Federal N=47		State N=29		Overall		Decision
		$\bar{x}_1$	SD ₁	$\bar{x}_2$	SD ₂	$\bar{x}_G$	SDG	
17.	Engaging in AI literacy class for application of AI in academic studies.	3.63	0.54	3.09	0.76	3.33	0.72	Agree
18.	Receiving guidance on AI-related career.	3.22	0.79	3.06	0.79	3.13	0.79	Agree
19.	Acquiring hands-on experience with AI tools.	2.73	0.67	2.78	0.66	2.76	0.66	Agree
20.	Engaging in AI-related projects for knowledge acquisition.	3.24	0.70	3.28	0.63	3.26	0.66	Agree
21.	Carrying out case studies on AI-related issues for practical experiences.	3.10	0.62	3.17	0.57	3.14	0.59	Agree
22.	Receiving mentorship from AI experts.	3.51	0.51	3.50	0.50	3.51	0.50	Strongly Agree
23.	Exploring AI applications across various business disciplines.	3.10	0.77	3.15	0.81	3.13	0.79	Agree
24.	Interning with AI-related companies for improved knowledge.	3.27	0.45	3.24	0.43	3.25	0.44	Agree



Variables	N			Sig.	Mean	Std. Error	Decision
		t	Df	(2 tailed)	Difference	Difference	
Federal	47	.943	74	.348	.95303	1.01098	
State	29						NS

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information among educators. It is also in agreement with Okunade(2024) who stressed that several opportunities are available for teacher training and professional development, such as workshops, seminars and online learning platforms that specifically focus on AI education.

Further, the findings of research question three revealed that for application of AI in Business Education programme for academic achievements, students should engage in AI literacy class, receive guidance in AI-related career, acquire hand-on experience with AI tools, engage in AI-related projects, receive mentorship from AI experts, intern with AI-related companies among others. This is in agreement with observations of Nicholas (2023) that there is a pressing need for students to understand and use AI tools efficiently and effectively, it should be a guide to students in researching, writing papers and developing marketing plans. The findings also concurs with opinions of Okunade (2024) who advised that students should intern and partner with industries, listen to guest lecturers on AI and participate in joint research for practical real-world and AI applications.

Subsequently, the null hypotheses results indicated no significant difference between the mean scores of federal and state universities Business Education on government, lecturers' and students'-related strategies for application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria. This implies that university status is not a determinant factor in employing strategies for application of AI in Business Education programme for academic achievements in universities.

Conclusion

Government, lecturers' and students'-related strategies can be used in application of AI in Business Education programme for academic achievements in public universities in South-East Nigeria. University status is not a determinant factor for the strategies to be applied. Hence, the strategies identified, when applied will help in personalizing learning, support special students, make for easy knowledge acquisition and overall academic achievements.

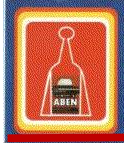
Recommendations

The following recommendations are hereby made:

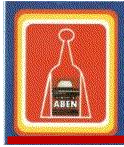
1. Government should map out policies, provide funds and infrastructure for effective application of AI in universities and other higher institutions.
2. Lecturers should avail themselves of the opportunities for further training on AI for professional growth.
3. Students should try and acquire hands-on experience with AI tools and receive mentorship with practical experiences from AI experts.

References

- Adeyemi, O.A. (2020). Integrating artificial intelligence in STEM Education in Nigeria Secondary Schools. *Journal of Educational Technology Research*, 15(2), 112-130.
- Aina, M.A., Gbenga-Epebinu, M.A., Olofinbiyi, R.O., Ogidan, O.C. and Ayedum, T.O. (2023). Perception and acceptance of medical chatbot among undergraduates in Ekiti State University, Nigeria. *British Journal of Education* 11(11), 1-14.
- Alabi, E.B. (2022). Adoption of artificial intelligence in Business Education and School administration. *Journal of Business Education, Management Science and Information Technology* 8(2), 106-115.
- Aribisala, O.O. & Igweh, A.O. (2024). Reading and study habits as predictors to academic achievement of Business Education students in university of Benin in affiliation with



- Federal College of Education (Tech), Lagos. *Multidisciplinary Journal of Engineering Sciences* 3(4), 1-9. DOI: 10.5281 /zenodo. 1 0651630.
- Awofiranye, M. (2024). The challenges of using AI in Education. Retrieved from <https://www.afterschoolafrica.com/article on 19/09/2024>.
- Ezeabii, I.C. (2017). Entrepreneurial planning and organizational skills needed by business education students in public universities in South-East Nigeria for self-employment. *Nigerian Journal of Business Education* 4(2), 195-204.
- Ezeabii, I.C., Ekoh-Nweke, A.C. and Okwor, N. (2020). Challenges to the utilization of new technologies in public universities in South-East Nigeria. *Nigerian Journal of Business Education* 7(1), 388-400. DOI: 10.13140/RG. 2. 2. 25130.02247.
- Nicholas, A.J. (2023). Capitalizing the use of artificial intelligence for Business Education. *Faculty and Staff-Articles & Papers* 89.
- Nworgu, B.G. (2015). *Educational Research: Basic Issues and Methodology*. Nsukka: University Trust Publishers.
- Ogunode, N.J. & Adamu, D.G. (2021). Implementation of sociology programme in Nigerian public universities: Problems and solutions. *Central Asian Journal of Innovations on Tourism Management and Finance*, 2(4), 33-40.
- Okunade, A.I. (2024). The role of artificial intelligence in teaching of Science Education in Secondary Schools in Nigeria. *European Journal of Computer Science and Information Technology* 12(1), 57-67. doi: <https://doi.org/10.37745/ejcsit.2013/vol12n15 767>.
- Oluyemisi, O.M. (2023). Impact of artificial intelligence in curriculum development in Nigeria tertiary institutions. *International Journal of Educational Research* 12(2), 192-211.
- Onyeso, T.O. & Nnokam, F.A. (2024). Perceived influence of project-based learning on academic achievement of Business Education students in Rivers State University. *Rivers State University Faculty of Education Conference Journal* 3(2), 218-233.



IMPACT OF ARTIFICIAL INTELLIGENCE ON TEACHING AND LEARNING OF BUSINESS EDUCATION COURSES IN TERTIARY INSTITUTIONS IN ADAMAWA STATE, NIGERIA

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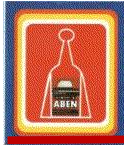
Abstract

The primary objective of this study was to determine the impact of artificial intelligence on the teaching and learning of business education in tertiary institutions in Adamawa State, Nigeria. The study had two specific objectives, from which two research questions were raised and two null hypotheses were formulated and tested. The design of the study was a survey design. The population of the study was 1,531 students and lecturers, which were drawn from three tertiary institutions in Adamawa State, Nigeria. A simple random sampling technique was used to determine the sample of 310 for the study. A structured questionnaire of 20 items was used to collect data, and the data collected were analysed using means and standard deviation, while the hypotheses were tested using t-test analysis at the 0.05 level of significance. The major findings of the study include the following: that there is no significant difference between the mean responses of lecturers and students regarding the positive and negative impact of artificial intelligence on teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria (the P values of $0.190 > 0.05$ and $0.195 > 0.05$, respectively). It was concluded that artificial intelligence has both positive and negative impact on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria. In line with the findings and conclusion, the study recommended, among others, that the lecturers and students should be exposed to the training and retraining in the use of artificial intelligence; this will help in equipping them with the technical knowledge on how they will use the artificial intelligence positively to facilitate and personalise their learning experiences.

Key Word: Impact, Business Education, Artificial Intelligence, Teaching, and Learning.

Introduction

Education is the total development of the individual child, through acceptable methods and techniques, according to his abilities and interests, as well as the needs of the society, to take his rightful place and contribute adequately to the advancement of his society. Education for any nation is believed to be veritable machinery for the development of a country. This is obvious because of the roles played by educated people in the development of science, social-economic, and political structures to improve individuals and families and make society a better place to live. In the light of these values, education today must prepare the child to function effectively as an adult, and these cannot be achieved without adequate means of enhancing the teaching and learning with the latest technology, like artificial intelligence (AI).

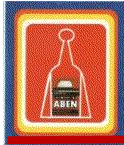


Artificial intelligence refers to computer systems capable of performing complex tasks that historically only a human could do, such as reasoning, making decisions, or solving problems. **Artificial intelligence** is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalise, or learn from past experience. Since the development of the digital computer in the 1940s, it has been demonstrated that computers can be programmed to carry out very complex tasks—such as discovering proofs for mathematical theorems or playing chess—with great proficiency. Still, despite continuing advances in computer processing speed and memory capacity, there are as yet no programs that can match full human flexibility over wider domains or in tasks requiring much everyday knowledge (Yushau & Nannim, 2020).

Artificial intelligence can be used and is being used in the educational sector. According to the 21st International Conference on Artificial Intelligence in Education held in 2020, AIED is one of the currently emerging fields in educational technologies. The use of artificial intelligence is still unclear for the educators as to how to make pedagogical advantage of it on a broader scale and how artificial intelligence can impact teaching and learning in higher education. The impact of artificial intelligence in education and its pros and cons are presented here. It also describes a specific way to develop an artificial intelligence-enabled platform for education and finally the aftereffects of artificial intelligence in education. The rapid development and application of artificial intelligence in various sectors, including education, has led to its immense potential for personalising learning, automating administrative tasks, and enhancing the overall teaching and learning experience (Pokrivcakova, 2019).

However, the effective integration of artificial intelligence faces several challenges, including a significant knowledge gap among lecturers. Studies globally, including in Nigeria, show that many lecturers lack sufficient knowledge about artificial intelligence and its potential applications, hindering its effective utilisation for pedagogical purposes (Gaber et. al., 2023). Kundariya (2023) identified the best artificial intelligence tools to empower academic research as Semantic Scholar, IBM Watson, Scholarcy, Elicit, Trinka, Google Scholar, Scite, Tableau, Mendeley, Consensus, and Zotero. Barua (2023) also identified AI tools such as SciSpace, Schoarlcly, Jenni artificial intelligence, ChatGPT, Paperpal, Casper, Grammarly, QuillBot, Elicit, Turnitin, Consensus, Search Smart, Mendeley, and Evidence Hunt. Mamela in Eiriemiokhale and Sulyman (2023) defined artificial intelligence as the advancement of computer systems capable of performing tasks that would ordinarily need human intellect, such as decision-making, object detection, solving complex issues, and so on. Therefore, artificial intelligence is the simulation/imitation of human beings by machines such as computer systems. Digital competence, which encompasses the skills and knowledge required to engage with digital technologies, has gained significant traction in teaching and learning.

Teaching involves many activities, behaviours, and processes. There are varied definitions of teaching. Teaching is the process of directing or guiding learning. It is the art of causing another to learn. Teaching can also be seen as the arrangement of situations that will lead to desirable and satisfying ends. Ifeagwu (2019) defined teaching as a two-way traffic system involving the exchange of ideas between the teacher and the students. Ifeagwu further defined teaching as a series of activities geared towards helping students “learn how to learn.” From the above definitions, it can be seen that teaching involves a teacher, learner(s), learning or teaching materials, learning activities, and effective communication between teacher and learner.

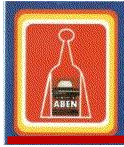


Aliyu (2020) said that conceptualised teaching is a process of facilitating, guiding, and generally moderating learners' behaviours through the provision of appropriate experiences so that the learner will achieve meaningful growth. According to Mohammed (2016), teaching is one with learning outcomes that effect changes in knowledge, abilities, skills, attitudes, and mindset. Teaching is an active process in which one person shares information with another to provide them with the information to make behavioural changes. The goal of teaching is to bring about desired learning in the students. If they learn what they are supposed to learn under your direction, then you have successfully taught. If not, then you have failed. Bello (2021) stated that the most important aspect of good teaching lies in discovering and applying the best ways of learning.

Learning, on the other hand, involves the application of what is taught in solving a problem. Learning is a change in behaviour that depends upon a special condition of stimulation. Learning is also a continuing process or system. It is a progressive change in the learner's behaviour and a potential weapon for development. Utoke (2020) states that learning is the apparent modification of a person's behaviour through his activities and experiences so that his knowledge, skills, and attitudes, including modes of adjustment towards his environment, are changed more or less permanently. Generally, learning can be defined as a relatively permanent change in behaviour that comes from reinforced practice. Business education prepares learners for more effective study in the fields of business and education beyond the secondary school education level.

Business education is an aspect of learning that prepares individuals for roles in business and offers them knowledge about business. Business education is a program geared towards the acquisition of knowledge and skills needed in the workplace. Osuala (2013) stated that business education is a comparatively new development in the educational delivery system in most developing countries of Africa, Asia, and Latin America. Okiridu (2017) defined business education as a tripartite (into three parts) program of instruction that prepares the recipient or the learner to be a teacher, an operator, or to be self-reliant. Modibbo (2023) perceived business education as a program of study that helps to provide opportunity in training of an individual with the right competency, knowledge, skills, and attitudes to prepare them to become self-reliant, rational consumers and producers of goods and services that business offers in the programs areas of accounting, entrepreneurship, marketing/distributive, and office technology management.

In the teaching and learning of business education, artificial intelligence has both positive and negative impacts. The artificial intelligence can help the learner tailor the learning experience to individual students' needs; it can reduce the business educators' workload by grading assignments and exams; it can help to analyse large amounts of data to improve teaching and learning of business education; and it can increase the student's engagement. All these are the positive impacts of artificial intelligence in the teaching and learning of business education. On the other hand, despite the positive impact of artificial intelligence in teaching and learning business education, it also has some negative impacts. These include: artificial intelligence may replace some teaching tasks, potentially displacing business educators; excessive artificial intelligence use can lead to diminished critical thinking skills; not all students may have equal access to artificial intelligence-powered tools and resources; and artificial intelligence can be prone to technical difficulties, disrupting learning (James, 2024). It is on the basis of this background that this study seeks to determine the impact of artificial intelligence on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeri



Statement of Problem

In this era of technological revolution and development, artificial intelligence plays both the positive and negative impact on the state and qualities of our teaching and learning, assessment, acquiring skills, communicating, sharing, creating, grading, analysing, and interacting with learning materials and tools. However, the researcher observed and learnt from group discussions with other business educators that most of our students used artificial intelligence by 70% to 95% in their thesis writings, claiming ownership of the work without or with no proper acknowledgement. These had contributed negatively to the realisation of the goals of business education at the tertiary level on the acquisition of both physical and intellectual skills that will enable self-reliant and useful members of society. And these, if continuous, unchecked, and tackled, may negatively affect the quality of our business education graduates at all levels of education.

Musa (2023) stated that the quality of our graduates, especially in technical writing skills, is dropping, and the utilisation of cognitive skills and knowledge is as well declining since the realisation of artificial intelligence. It is on the basis of the aforementioned challenges that this study wants to determine the positive and negative impact of artificial intelligence on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria.

Research Questions

The primary objective of the study was to determine the impact of artificial intelligence on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria. In line with the above, the study was guided by the following research questions:

1. What are the positive impact of artificial intelligence on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria?
2. What are the negative impact of artificial intelligence on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria?

Research Hypotheses

The following null hypotheses were tested at the 0.05 level of significant:

Ho₁ There is no significant difference between the mean responses of lecturers and students regarding the positive impact of artificial intelligence on teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria.

Ho₂ There is no significant difference between the mean responses of lecturers and students regarding the negative impact of artificial intelligence on teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria.

Methodology

This study employed a descriptive survey design. It involves the structured collection of data using a questionnaire from a sizable population. The population of the study was 1,531 students and lecturers, which were drawn from three tertiary institutions in Adamawa State, Nigeria. A simple random sampling technique was used to determine the sample of 310 for the study; this is in line with the position of Krejcie & Morgan in Modibbo (2023). The instrument for data collection was a 20-item structured questionnaire titled: Impact of Artificial Intelligence on Teaching and Learning of Business Education Courses Questionnaire (IAITLBECQ) and was validated by three experts from the Department of Business Education, Faculty of Education, Kwara State University, Malete. In order to determine the reliability, the instrument was administered to 20 *students and lecturers* at the Federal College of Education Technical Gombe, Gombe State, who were not part of the research study. Their responses were analysed using the Cronbach alpha method, which yielded the coefficient alpha value of 0.77. The instrument was further administered to respondents by the researchers, with the help of two trained research



assistants. The questionnaire was retrieved as soon as they were completed. A total of 301 out of 310 students and lecturers from the three tertiary institutions responded to the instrument. The data collected from the respondents were analysed using mean and standard deviation statistics. The mean and standard deviation were used to answer the research questions, and a t-test was used in the test of hypotheses. In the questionnaire, the items were based on a four-rating scale and weighed on the following scale: Very High Impact (VHI) 4 points, High Impact (HI) 3 points, Low Impact (LI) 2 points, and Very Low Impact (VLI) 1 point (4+3+2+1). $10/4 = 2.50$. Cut-off point for decision rule as to high impact or low impact. A weighted mean of 2.50 and above was considered as high impact, while a weighted mean of 2.49 and below was regarded as low impact. For the test of hypotheses, if the p-value was less than or equal to 0.05, the null hypothesis failed to be retained. However, where the p-value was greater or equal to 0.05 ($p > 0.05$), then the null hypothesis was retained. All the null hypotheses were tested at a significance level of 0.05.

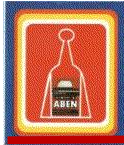
Results

Research Question One: What is the positive impact of artificial intelligence on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria?

To answer research question one, the responses obtained from respondents were analysed using mean and standard deviation as shown herein.

Table 1: Present the Means and Standard Deviation of responses on Positive Impact of Artificial Intelligence on Teaching and Learning of Business Education Courses, n = 301.

S/N	Items/Statements	$\bar{X}$	SD	Decision
1	The use of artificial intelligence can help the learners tailor their learning experience to individual students' needs.	3.49	1.87	High Impact
2	The use of artificial intelligence can reduce the business educators' workload by grading their assignments and exams.	3.06	1.74	High Impact
3	The use of artificial intelligence can help in analysing large amounts of data to improve the teaching and learning of business education.	2.76	1.66	High Impact
4	The use of artificial intelligence can increase the student's engagement.	3.11	1.76	High Impact
5	The use of artificial intelligence can offer real-time feedback and support.	2.92	1.71	High Impact
6	The use of artificial intelligence can supplement traditional classroom instruction.	2.81	1.68	High Impact
7	The use of artificial intelligence is making education more engaging and effective.	2.60	1.61	High Impact
8	The use of artificial intelligence can facilitate early intervention strategies.	3.74	1.93	High Impact
9	The use of artificial intelligence can enhance collaborative learning environments.	2.48	1.57	Low Impact
10	The use of artificial intelligence can collectively help in reshaping the educational landscape for a more adaptive and effective future.	2.55	1.60	High Impact
Grand Weighted Mean		2.95	1.71	High Influence



Source: Field Survey, 2024.

Data obtained in Table 1 reveal that all 10 items had mean ratings ranging from 2.48 to 3.74, with a grand mean of 2.95 and a standard deviation valued at 1.71. This indicates that artificial intelligence has a positive impact on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria.

Research Question Two: What is the negative impact of artificial intelligence on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria?

To answer research question two, the scores collected were summarized in Table 2.

Table 2: Present the Means and Standard Deviation of responses on Negative Impact of Artificial Intelligence on Teaching and Learning of Business Education Courses, n = 301.

S/N	Items/Statements	$\bar{X}$	SD	Decision
1.	Artificial intelligence is replacing some teaching tasks.	2.80	1.67	High Impact
2.	Artificial intelligence is potentially displacing business educators.	2.33	1.52	Low Impact
3.	Artificial intelligence is leading to diminishing critical thinking skills.	3.81	1.95	High Impact
4.	Not all students may have equal access to artificial intelligence-powered tools and resources.	2.77	1.66	High Impact
5.	Artificial intelligence is prone to technical difficulties.	2.96	1.72	High Impact
6.	Artificial intelligence is disrupting effective learning.	3.02	1.74	High Impact
7.	Artificial intelligence reduced the technical writing skills of students.	3.61	1.90	High Impact
8.	Artificial intelligence reduced the cognitive skills of students.	2.98	1.72	High Impact
9.	Most of our students subscribe to artificial intelligence in their complete thesis writings.	3.86	1.96	High Impact
10.	Most of our students used artificial intelligence in writing their assignments instead of utilising their school libraries.	3.11	1.76	High Impact
Grand Weighted Mean		3.12	1.77	High Impact

Source: Field Survey, 2024.

Data obtained in Table 2 reveal that all 10 items had mean ratings ranging from 2.33 to 3.86, with a grand mean of 3.12 and a standard deviation valued at 1.77. This indicates that artificial intelligence has a negative impact on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria.

Test of Research Hypotheses

The null hypotheses were tested at 0.05 level of significance. The summary of the test of research hypotheses are presented in Tables 3 and 4 as follows:

: There is no significant difference between the mean responses of lecturers and students regarding the positive impact of artificial intelligence on teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria. The test of this null hypothesis can be seen as summarise in table 3 below.

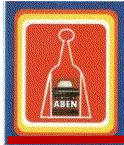


Table 3: Summary of T-Test Difference Between Mean Responses of Lecturers and Students Regarding the Positive Impact of Artificial Intelligence on Teaching and Learning of Business Education Courses.

Variable	N	Mean	Std. Dev.	Std. Err.	Df.	T-Cal.	T-Crit.	Sig. (P)
Lecturers	151	3.01	1.73	1.412	299	1.371	1.96	0.190
Students	150	2.99	1.72	1.311				

Calculated $T < 1.96$, Calculated $P > 0.05$.

Source: Field Study 2024.

Table 4 revealed that there is no significant difference between the mean responses of lecturers and students regarding the positive impact of artificial intelligence on teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria. This is because the calculated P-value of 0.190 is greater than the 0.05 alpha level of significance. The t-calculated value of 1.371 is lower than the t-critical value of 1.96 at Df. of 299. Thus, their calculated mean scores were 3.01 and 3.99, with the standard deviation valued at 1.73 and 1.72 for lecturers and students, respectively. Hence the null hypothesis that stated there is no significant difference between the mean responses of lecturers and students regarding the positive impact of artificial intelligence on teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria, is thereby accepted and retained.

: There is no significant difference between the mean responses of lecturers and students regarding the negative impact of artificial intelligence on teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria.

The test of this null hypothesis can be seen as summarise in table 4 below.

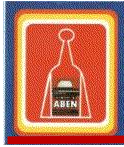
Table 4: Summary of T-Test Difference Between Mean Responses of Lecturers and Students Regarding the Negative Impact of Artificial Intelligence on Teaching and Learning of Business Education Courses.

Variable	N	Mean	Std. Dev.	Std. Err.	Df.	T-Cal.	T-Crit.	Sig. (P)
Lecturers	151	3.55	1.88	1.562	299	1.472	1.96	0.195
Students	150	3.21	1.79	1.401				

Calculated $T < 1.96$, Calculated $P > 0.05$.

Source: Field Study 2024.

Table 4 revealed that there is no significant difference between the mean responses of lecturers and students regarding the negative impact of artificial intelligence on teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria. This is because the calculated P-value of 0.195 is greater than the 0.05 alpha level of significance. The t-calculated value of 1.472 is lower than the t-critical value of 1.96 at Df. of 299. Thus, their calculated mean scores were 3.55 and 3.21, with the standard deviation valued at 1.88 and 1.79 for lecturers and students, respectively. Hence the null hypothesis that stated there is no significant difference between the mean responses of lecturers and students regarding the negative impact of artificial intelligence on teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria, is thereby accepted and retained.



Discussion of Findings

The study determines the impact of artificial intelligence on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria. The results of this study revealed that artificial intelligence has a positive impact on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria. This is found related to the work of Gaber et. al. (2023), who found that the use of artificial intelligence helps the learners tailor their learning experience to individual students' needs. In addition to the above, the use of artificial intelligence facilitates early intervention strategies (Barua, 2023). This is because artificial intelligence has also led to its immense potential for personalising learning, automating administrative tasks, and enhancing the overall teaching and learning experience in business education courses at all levels of education. The findings of this study are also in agreement with what Ebifakumor (2022) found in his study that the use of artificial intelligence reduces the business educators' workload in grading the students' assignments and exams, thereby giving the lecturers enough time to prepare for their lectures and attend their administration functions and activities. The result of the study is contrary to what Eslamian & Khademi (2017) noted: that the use of artificial intelligence may not enhance collaborative learning environments, especially with the state of available facilities in our schools.

Findings of the study revealed that artificial intelligence has a negative impact on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria. The findings corroborated the study of Musa (2023), who stated that artificial intelligence is replacing some teaching tasks. The use of artificial intelligence is discouraging the real human creativity, innovation, and knowledge sharing, which are key to learning, especially at the tertiary level of education. Some graduates of business education were found to be deficient in terms of technical writing skills. The findings of this study are in conformity with the findings of this study; Fernandez et al. (2019) reported that most of our students subscribe to artificial intelligence in their complete thesis writings. In addition, the findings of this study further support that of Perifanou et al. (2021), who conducted a study on the critical competencies and knowledge required by NCE graduates of business education and found out most of our students used artificial intelligence in writing their assignments instead of utilising their school libraries, and that contributed to a decline in their mastery of subject matter. The findings of this study are not agreeing with what Karsenti (2019) found in his own study that the artificial intelligence is leading to diminishing critical thinking skills; rather, the artificial intelligence helps in providing solutions to break through barriers for vulnerable groups to access quality education and students' preferences can be recognised by machines, whereby the learning becomes much faster.

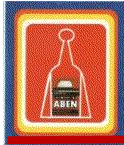
Conclusion

Based on statistical analysis of the data, findings, and discussions in the work, the researcher concluded that artificial intelligence has a both positive and negative impact on the teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria. It was also revealed from the findings of the study that there is no significant difference between the mean responses of lecturers and students regarding the positive and negative impact of artificial intelligence on teaching and learning of business education courses in tertiary institutions in Adamawa State, Nigeria.

Recommendations

In line with the findings and conclusion, the following recommendations were made:

1. The lecturers and students should be exposed to the training and retraining in the use of artificial intelligence; this will help in equipping them with the technical knowledge on how

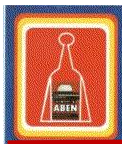


they will use the artificial intelligence positively and facilitate personalised learning experiences.

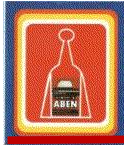
2. Both lecturers and students should understand that the artificial intelligence may lead to a decline in skills, knowledge, competencies, and technical know-how if not used properly. There should be sensitisations by information and communication technology experts on how to use the artificial intelligence positively to avoid using it 100% in their assignments and project writings.

References

- Adewoye, J.O. & Salau, N.A. (2021). Impact of ICT on teaching and learning. A case study of some selected universities in Nigeria. *KIU Interdisciplinary Journal of Humanities and Social Sciences*, 2(2), 244-262.
- Alba, A. B., & Trani, L. C. (2018). Extent of utilisation of Information and Communication Technology (ICT) by selected secondary school teachers of city schools division of Malolos: Basis for the development of strategic action. *International Journal of Education and Research*, 6(1), 181-188.
- Aliyu, M.M. (2020). *Subject methods for business education teachers*. Ilorin: More Nigeria Enterprise
- Barua, R. H. (2023). Artificial intelligent as solution to human learning. *International Journal of Sciences*, 7 (2), 11-21.
- Chinazor, O.O. (2021). Generic Skill Acquisition and The Realization of the Goals of Business Education in Nigerian Universities: Implications for Curriculum Innovation. *Nigerian Journal of Business Education (NIGJBED)*, 8 (2), 222-229.
- Eslamian, D & Khademi, B, (2017). Effect of Information and Communication Technologies on Academic Achievement of High School Students in Neyriz. *American Journal of Humanities and Social Sciences* 5(2), 11-16 DOI: 10.11634/232907811705871.
- Ebifakumor, A. B. (2022). Adoption of artificial intelligence in business education and school Administration. *Journal of Business Education, Management Science and Information Technology*, 8(2), 106-115.
- Eiriemiokhale, G. B. & Sulyman, Y. (2023). Utilisation of artificial intelligent in teaching and learning. *International Journal of Creativeness*, 3 (9), 111-121.
- Fernandez, O. Y., Fernandez, V. L., & Aburto, G. L. (2019). Artificial Intelligence and its implications in higher education. *Propósitos y Representaciones*, 7(2), 536- 568. <http://dx.doi.org/10.20511/pyr2019.v7n2.274/>
- Gaber, F., Dong, C., Rafa, T. Gafree, T. Doter, H. J. (2023). Artificial intelligent and education. *Journal of creative education*, 10 (2), 15-25.
- Ifeagwu, B. (2019). Teaching Practice for Student Teachers of B.Ed. Programme: Issues, Predicaments & Suggestions. Retrieved from <http://tojde.anadolu.edu.On> 8th August, 2024.
- James, H. B. (2024). Artificial intelligent and teaching and learning. *International Journal of Innovation*, 2 (2), 66-71.
- Karsenti, T. (2019). Artificial Intelligence in education: The urgent need to prepare teachers for tomorrow's schools. *Formation et profession*, 27(1), 112-116.
- Kundariya, E. (2023). Artificial intelligent tools to empower academic research. *Journal of Science and Innovation*, 4 (6), 29-41.



- Modibbo, M. B. (2023). Influence of business education curriculum on skills acquisition of NCE graduates in Adamawa in Nigeria. *Nigerian Journal of Business Education*, 10 (1), 308 - 318.
- Muhammed, M.B. (2016). Relationship Between Office Technology and Management Programme and Economic Development of Nigeria. *Business Educators Association in Vocational Education, BEAVE*, 4 (1), 87-91.
- Musa, R. M. (2023). Utilisation of artificial intelligent, innovations and technology. *Asia Pacific Journal of Multidisciplinary Research*, 5(4), 21-39.
- Osuala, E. C. (2013). *Principles and practice of Small Business Management: A didactic Approach Nsukka*: Fulladu Publishing Company.
- Okiridu, B.M. (2017). Influence of parental educational attainment on business education students' academic performance. *Journal of Social Science Multidisciplinary*, 9 (2), 455-500. Retrieved March 23, 2022 from <http://www.adams.com/yt/journal.kkt?ref=0789> 1134.
- Perifanou, M., Economides, A. A., Tzafilkou, K. (2021). Teachers' digital skills readiness during COVID, 19 Pandemic. *International Journal of Educational Technology*, 16(8), 238-251. <https://doi.org/10.3991/ijet.v16i08.21011>
- Pokrivcakova, S. (2019). Preparing teachers for the application of AI-powered technologies in foreign language education. *Journal of language and cultural education*, 13(07), 135-145. <https://doi.org/10.2478/jolace-2019-0025>
- Utoke, N. (2020). New Technologies in Business Education for Teaching and Learning. Instruction and Practices: Imperatives for Quality Assurance. *American International Journals of Contemporary Research*. 2 (9), 124-141.
- Yushau, B., & Nannim, F. A. (2020). Investigation into the utilisation of ICT facilities for teaching purposes among university lecturers: Influence of gender, age, qualification and years of teaching experience. *Pedagogical Research*, 5(2), 1-9. <https://doi.org/10.29333/pr/7845>.



ARTIFICIAL INTELLIGENCE REVOLUTION IN BUSINESS EDUCATION: PROSPECTS, CHALLENGES, AND ETHICAL CONSIDERATIONS

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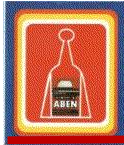
Abstract

This article employs a qualitative content analysis design, examining peer-reviewed articles, institutional reports from UNESCO, OECD, and the World Bank, as well as policy documents from educational institutions. The research addresses key questions regarding AI's pedagogical benefits, implementation challenges, and ethical risks in business education. It explores the transformative impact of artificial intelligence (AI), emphasizing its potential to reshape teaching methods, learning experiences, and administrative processes. The study highlights opportunities such as personalized learning, interactive simulations, and enhanced data-driven decision-making, which collectively prepare students for an AI-driven business environment. It also discusses significant challenges including faculty training, infrastructure development, curriculum redesign, and ensuring equitable access to AI technologies. Ethical considerations remain central, underscoring the need to prevent biases and inequalities in AI applications within educational settings. By synthesizing current research and expert perspectives, this work offers a comprehensive framework for responsibly and effectively integrating AI in business education, aiming to cultivate future leaders who are both technologically skilled and ethically aware, especially in the Nigerian context.

Keywords: Business Education, Artificial Intelligence, Prospects, Challenges, Ethical Considerations

Introduction

The rapid advancement of artificial intelligence (AI) is reshaping numerous sectors, and Business Education stands at the forefront of this transformative wave. (Becker et al., 2018; Seldon and Abidoye, 2018) As AI technologies continue to evolve at an unprecedented pace, Business Education institutions face the critical task of integrating these innovations into their curricula to equip future leaders with the skills and knowledge necessary to thrive in an AI-driven business landscape. This integration, however, is not without its complexities, presenting a myriad of opportunities, challenges, and ethical considerations that demand careful examination and thoughtful implementation. The complexity and "intelligence" of AI technologies in Business Education present not only immense potential but also considerable ethical risks, necessitating robust frameworks to ensure responsible implementation. As highlighted by UNESCO's global standards for AI ethics, agreed upon by 193 member countries in November 2021, there is a pressing need to acknowledge human values and cultural diversity within the momentum of AI development (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021). This is particularly crucial in the context of Business Education, where AI applications can significantly influence future business practices and decision-making processes. However, the path to successfully integrating AI into business pedagogy is fraught with challenges. Issues such as faculty training, infrastructure requirements, and the need for comprehensive curriculum redesign present significant hurdles that institutions must overcome. Moreover, the integration process must address broader societal concerns, including issues of accessibility and the



potential to exacerbate the digital divide, ensuring that the benefits of AI in education are equitably distributed. Perhaps most critically, the incorporation of AI into Business Education raises profound ethical questions that cannot be overlooked. As we entrust increasingly complex decision-making processes to AI systems, concerns about data privacy, algorithmic bias, and the broader societal implications of AI in business practices come to the fore. These ethical considerations extend to the very core of how we assess student performance and make consequential decisions about their academic and professional futures. This article seeks to provide a comprehensive examination of the AI revolution in business pedagogy, exploring its manifold possibilities while critically addressing the challenges and ethical considerations it presents. It explores the multifaceted landscape of AI integration in Business Education, drawing insights from global ethical guidelines and reports, including those from UNESCO (AHEG, 2020; Miao et al., 2021), OECD (2021), and the European Commission (2019). By examining the opportunities, addressing the challenges, and navigating the ethical considerations, we seek to contribute to the establishment of unified ethical principles for trustworthy AI in Business Education. This research is timely and crucial, as it provides a framework for Business Education institutions to harness the benefits of AI while mitigating potential risks, ultimately preparing future business leaders to operate ethically and effectively in an AI-driven world. The integration of Artificial Intelligence (AI) in education, particularly in business pedagogy, has gained significant place in Business Education in recent.

Research Method

A qualitative content analysis approach was adopted, synthesizing evidence from peer-reviewed literature, reports from UNESCO, OECD, and the World Bank, and policy documents from Nigerian and international educational institutions. The research focused on three core questions:

1. What prospects does AI offer business education?
2. What challenges impede its implementation, particularly in resource-constrained contexts like Nigeria?
3. What ethical considerations arise from AI adoption in business education settings?

Discussion of Findings

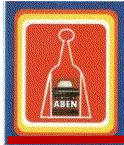
Prospects AI Offers Business Education: Opportunities in AI-Enhanced Business Education

Artificial intelligence (AI) is poised to revolutionize business education by offering innovative opportunities that enhance learning, teaching, and administrative processes. Several studies highlight AI's transformative potential in this field, emphasizing personalized learning, immersive simulations, intelligent tutoring, and administrative optimization. They are explained as follows;

1. Personalized Learning Experiences

Popenici and Kerr (2017) argue that AI can tailor learning experiences to individual student needs and learning styles, a feature especially relevant in business education where student cohorts are often diverse in background and prior knowledge. This adaptability allows AI-powered platforms to continuously assess learner proficiencies and dynamically adjust instructional content, ensuring that students receive targeted support in areas such as financial analytics and entrepreneurial decision-making. In the Nigerian context, where skills gaps in emerging sectors like agritech and fintech are well documented, such personalized learning pathways are critical for aligning education with labor market demands (Ogunleye, 2023). AI-driven adaptive systems thus help bridge the mismatch between academic training and industry requirements, fostering workforce readiness in a rapidly evolving economy.

2. AI-Powered Simulations and Experiential Learning



Kaplan and Haenlein (2019) emphasize the value of AI-powered simulations in business education, which provide students with realistic, risk-free environments to practice decision-making and strategic planning. These virtual market scenarios and supply chain management interfaces enable experiential learning that traditional pedagogical methods often lack. Nwogugu (2021) notes that in Nigeria, where practical exposure is limited due to resource constraints, such AI simulations offer scalable solutions to develop critical behavioral competencies like risk assessment and strategic thinking. This hands-on approach enhances students' ability to apply theoretical knowledge to real-world business challenges, thereby improving their employability and entrepreneurial capabilities.

3. Intelligent Tutoring Systems and Adaptive Feedback

Zawacki-Richter et al. (2019) identify four key domains where AI significantly impacts higher education: profiling and prediction, assessment and evaluation, adaptive systems and personalization, and intelligent tutoring systems. These applications are directly relevant to business education, where AI can predict student performance, provide personalized feedback on case study analyses, and tailor competency-based task assignments (Chiu et al., 2023). Such systems promote active learner engagement and facilitate continuous improvement, essential for mastering complex business concepts.

4. Enhancing Learner Engagement and Competency Development

Recent research highlights AI's role in improving learner engagement and performance. Zhang and Aslan (2021) report that AI fosters creativity, critical thinking, and problem-solving skills, competencies vital for future business leaders. Southworth et al. (2023) further note that AI-enhanced education supports personalized communication and adaptive learning environments, which are particularly valuable in diverse business school cohorts. Ouyang and Jiao (2021) propose three AI-in-education paradigms; "AI-direct," "AI-supported," and "AI-empowered" offering varied approaches to integrate AI into curricula, from guided instruction to learner-led exploration. These paradigms provide flexible frameworks for Nigerian institutions aiming to modernize their teaching strategies.

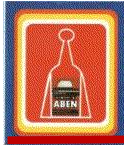
5. Supporting Business Educators

AI also benefits educators by providing tailored content recommendations, predictive analytics for classroom management, and tools to keep pace with rapidly changing business practices (Zhang & Aslan, 2021; Chiu et al., 2023). Khosravi (2022) advocates for explainable AI (XAI), which enhances transparency and trust in AI-driven decisions, an important consideration in business education where understanding the rationale behind analytics is crucial. This human-centred approach ensures that AI augments rather than replaces the educator's role.

Several AI tools have demonstrated utility in business education. Data mining and learning analytics enable educators to track student progress and identify learning gaps (Das et al., 2015; Ley et al., 2023). Virtual laboratories, augmented reality, and AI chatbots provide interactive and accessible learning experiences (al-Zyoud, 2020; Han, Park, & Lee, 2022). In Nigeria, adaptive platforms that calibrate content based on student proficiency are particularly impactful given the need to address skill shortages in key economic sectors (Ogunleye, 2023). AI-powered simulations also offer practical exposure to complex business processes, which is often lacking in traditional Nigerian classrooms (Nwogugu, 2021).

6. Administrative Process Optimization

Beyond pedagogy, AI streamlines administrative functions in Nigerian business schools. Natural language processing tools manage student inquiries and admissions efficiently, freeing staff to focus on strategic priorities (Kim, 2014). Algorithmic assessment systems reduce grading workloads by up to 64% while providing detailed feedback (Yang et al., 2022). Predictive analytics



help institutions anticipate enrollment trends and optimize resource allocation, enabling proactive management rather than reactive problem-solving (Strickland, 2021). These efficiencies are crucial in Nigeria, where administrative bottlenecks frequently hinder educational quality.

Challenges of AI implementation in Business Education: A Nigerian Perspective

While artificial intelligence (AI) offers promising opportunities for transforming business education, its adoption in resource-constrained environments like Nigeria faces significant hurdles. These challenges span infrastructural deficits, financial limitations, human capital gaps, and ethical concerns, all of which must be addressed to realize AI's full potential in Nigerian business education.

1. Infrastructural Limitations

One of the most pressing challenges is Nigeria's unstable power supply and limited internet connectivity. According to Onyeonwuna and Ogona (2022), about 92% of Nigerian educational institutions report inadequate technological infrastructure to support cloud-based learning platforms essential for AI applications. Frequent power outages disrupt online learning and the operation of AI tools, while limited broadband access restricts students' and educators' ability to engage with AI-powered resources effectively. This infrastructural gap is particularly acute in rural and underserved areas, exacerbating educational inequalities (International Journal of Artificial Intelligence for Digital Education, 2024).

2. Financial Constraints

Fiscal limitations further hinder AI integration. The acquisition, deployment, and maintenance of intelligent tutoring systems, virtual laboratories, and other AI-driven educational technologies require substantial investment (Elujekwute, 2023). Many Nigerian institutions operate on tight budgets, often prioritizing immediate operational needs over long-term technological upgrades. This financial strain limits the scalability of AI initiatives and affects the sustainability of existing projects (Onyejegbn, 2023). Additionally, high costs associated with software licensing, hardware procurement, and internet services create barriers for widespread adoption.

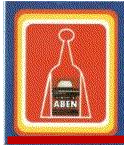
3. Human Capital and Pedagogical Adaptation

Even where technology is available, a critical barrier lies in the limited readiness of educators to effectively use AI tools. Crompton et al. (2022) report that nearly 89% of business education faculty in Nigeria lack sufficient operational fluency with emerging educational technologies due to inadequate professional development. This skills gap means that many educators are unable to integrate AI meaningfully into their teaching, leading to underutilization of available resources. Resistance to change and lack of awareness about AI's benefits further compound this issue (Onyejegbn, 2023).

The challenges of AI implementation have direct consequences on the quality and equity of business education in Nigeria. For example, unreliable power and internet access limit students' ability to participate in AI-enhanced learning, widening the digital divide between urban and rural learners. Financial constraints mean that many institutions cannot provide modern AI tools, leaving graduates ill-prepared for technology-driven workplaces. The lack of trained educators reduces the effectiveness of AI integration, resulting in missed opportunities to develop critical skills such as data analytics and strategic decision-making.

Ethical Considerations in Business Education

Artificial intelligence (AI) integration in business education presents significant ethical considerations that must be addressed to ensure responsible and equitable use. One major concern is algorithmic bias, where AI systems may perpetuate and amplify existing societal inequalities due to biased training data. In Nigeria's culturally diverse educational environment,



such biases can unfairly disadvantage certain groups of students, affecting admissions, assessments, and learning opportunities (Amamihe Journal, 2024; Okeke & Nwosu, 2023). Additionally, AI's extensive data collection raises privacy issues, especially given the often inadequate cybersecurity infrastructure in Nigerian institutions. Without strong data protection policies, students' personal information may be vulnerable to misuse or unauthorized access (Miao et al., 2021; Ballantine et al., 2024). These challenges highlight the critical need for transparency, accountability, and fairness in the design and deployment of AI tools, ensuring that educational AI systems uphold ethical standards and foster inclusion rather than exclusion.

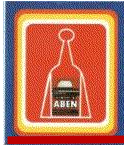
Moreover, the ethical use of AI in business education involves safeguarding the roles and autonomy of human educators and learners. AI should serve as a supportive tool that enhances teaching and learning rather than replacing human interaction, which is central to effective education (Sadiq, Bello, & Tukur, 2024). Nigerian educational policies must embed human-centered AI frameworks that promote explainability and allow educators to understand and guide AI-driven decisions (Khosravi, 2022). Curriculum reforms are also essential to cultivate AI literacy, teaching students not only how to use AI but also how to critically evaluate its societal impacts, including ethical dilemmas (Baker et al., 2014; Luckin et al., 2016). By prioritizing ethical governance, cultural relevance, and human oversight, Nigerian business education can harness AI's benefits while protecting fundamental educational values and promoting equitable outcomes for all students.

Strategic Implementation Framework

Effective integration of AI in Nigerian business education requires coordinated, multi-stakeholder strategies. Public-private partnerships can subsidize infrastructure development, prioritizing energy-independent solutions such as solar-powered computing clusters (Ehimuan et al., 2024). Faculty development should shift from tool-specific training to broader pedagogical reorientation, helping educators see AI as an augmentation rather than a replacement. National policy must mandate algorithmic accountability, requiring regular bias audits and alignment with UNESCO's human-centered AI principles (FRN, 2024). Such phased, ecosystemic approaches balance innovation with ethical imperatives, while acknowledging Nigeria's resource realities.

Conclusion

Artificial intelligence (AI) holds significant promise for transforming business education in Nigeria by enabling personalized learning, immersive simulations, and streamlined administrative processes. These innovations have the potential to better prepare students for the demands of a rapidly evolving, technology-driven business environment, particularly in emerging sectors like agritech and fintech. However, the successful integration of AI faces considerable challenges, including infrastructural deficits, financial constraints, limited faculty readiness, and ethical concerns such as algorithmic bias and data privacy. Addressing these challenges requires a nuanced, phased approach that aligns AI adoption with Nigeria's unique socio-economic and technological context. By fostering human-centered AI applications and ensuring equitable access, Nigerian business education can harness AI's benefits while safeguarding fairness and inclusion. Ultimately, a balanced strategy that combines technological innovation with ethical responsibility will be essential to cultivating future business leaders who are both skilled and socially conscious.



Recommendations

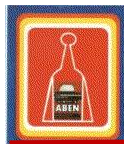
This paper makes the following recommendations;

1. Infrastructure Development: Invest in reliable power solutions, such as solar energy, and expand broadband access through public-private partnerships to create a stable foundation for AI technologies in education.
2. Faculty Training and Development: Implement comprehensive professional development programs to enhance educators' digital literacy and pedagogical skills for effective AI integration.
3. Phased Implementation: Adopt incremental AI adoption strategies tailored to institutional capacities, prioritizing scalable pilot projects before full-scale deployment.
4. Ethical Governance: Establish clear policies and frameworks to ensure transparency, data privacy, and algorithmic fairness, including regular audits of AI systems to prevent bias.
5. Curriculum Reform: Integrate AI literacy and ethics into business education curricula to prepare students for responsible use and critical evaluation of AI technologies.
6. Stakeholder Collaboration: Encourage collaboration among government agencies, educational institutions, technology providers, and civil society to coordinate resources, share best practices, and address emerging challenges.
7. Research and Monitoring: Support ongoing research to evaluate AI's impact on learning outcomes and institutional efficiency, using findings to refine implementation strategies continuously.

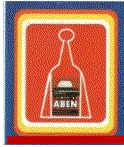
By following these recommendations, Nigerian business education can progressively build an AI-enabled ecosystem that is inclusive, effective, and ethically sound.

References

- al-Zyoud, M. (2020). AI chatbots in education: Enhancing student engagement. *International Journal of Educational Technology*, 15(3), 45-59.
- Amamihe Journal of Applied Philosophy. (2024). The ethical implications of artificial intelligence in education. *Amamihe Journal*, 22(2).
- Ballantine, K., et al. (2024). Ethical use of generative AI in Nigerian higher education. *Journal of Academic Research and Review*, 5(1).
- Baker, R., et al. (2014). Ethical considerations in AI literacy education. *Journal of Educational Technology*, 10(4), 45-59.
- Chiu, T., Zhang, Y., & Aslan, S. (2023). AI roles in learner engagement and competency development. *Journal of Educational Computing Research*, 61(4), 789-812. <https://doi.org/10.1177/07356331231123456>
- Collin, B. (2025, January 23). Business education in the age of AI - A new frontier. *ESCP Business School*. <https://escp.eu/news/international-day-education-2025-business-education-age-ai-new-frontier>
- Crompton, H., Burke, D., Gregory, K. H., & Gräbe, C. (2022). Professional development for teachers integrating technology: A systematic review. *British Journal of Educational Technology*, 53(1), 1-20. <https://doi.org/10.1111/bjet.13020>
- Das, S., et al. (2015). Data mining applications in business education. *Journal of Business Analytics*, 2(1), 23-37.
- Ehimuan, J., Okeke, F., & Balogun, T. (2024). Solar-powered computing clusters for education in sub-Saharan Africa. *African Journal of ICT*, 18(2), 45-58.
- Elujekwute, E. (2023). Application of artificial intelligence in business education and entrepreneurship practice. *International Journal of Management Sciences and Social Sciences*, 6(2), 44-67.
- Federal Republic of Nigeria (FRN). (2024). *National policy on artificial intelligence and robotics*. Government Press.



- Han, S., Park, J., & Lee, K. (2022). Augmented reality in business education. *Interactive Learning Environments*, 30(4), 567-583. <https://doi.org/10.1080/10494820.2021.1881234>
- International Journal of Artificial Intelligence for Digital Education. (2024). Educational transformation in Nigeria through AI: Prospects and challenges. *International Journal of Artificial Intelligence for Digital Education*, 1(5), 1-11.
- Kaplan, A., & Haenlein, M. (2019). Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. *Business Horizons*, 62(1), 15-25. <https://doi.org/10.1016/j.bushor.2018.08.004>
- Kim, J. (2014). Natural language processing for educational administration: A review. *Journal of Educational Technology*, 10(3), 23-31.
- Khosravi, H. (2022). Explainable artificial intelligence in education: Principles and practices. *Computers & Education: Artificial Intelligence*, 3, 100056. <https://doi.org/10.1016/j.caeai.2022.100056>
- Ley, T., et al. (2023). Learning analytics for personalized education. *Educational Technology Research and Development*, 71(2), 345-367. <https://doi.org/10.1007/s11423-023-10120-9>
- Luckin, R., et al. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson Education.
- Miao, F., Holmes, W., & Huang, R. (2021). AI and education: Guidance for policymakers. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000376709>
- Nwogugu, E. (2021). Simulation-based learning in Nigerian business schools: Opportunities and challenges. *Nigerian Journal of Business Education*, 8(2), 112-128.
- Ogunleye, T. (2023). Addressing skills misalignment in Nigeria's workforce: The role of adaptive learning technologies. *Journal of African Education*, 14(1), 77-93.
- Onyeawuna, A., & Ogona, R. (2022). ICT infrastructure and e-learning adoption in Nigerian tertiary institutions. *Nigerian Journal of Educational Technology*, 7(1), 34-51.
- Onyejebn, O. (2023). Application of artificial intelligence for effective business education. *Global Journal of Educational Humanities and Management Sciences*, 5(1), 12-25.
- Ouyang, F., & Jiao, H. (2021). Paradigms of AI in education. *Educational Technology & Society*, 24(1), 14-26.
- Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on higher education. *Research and Practice in Technology Enhanced Learning*, 12(1), 1-13. <https://doi.org/10.1186/s41039-017-0062-8>
- Sadiq, A. S., Bello, A. J., & Tukur, S. (2024). Ethical implications of AI in the Nigerian education system: A philosophical call for policy integration and curriculum reform. *International Journal of Innovative Research in Education and Teaching Sciences*, 11(1), 1-15.
- Southworth, G., et al. (2023). AI in education: Fostering critical skills for future leaders. *Journal of Business Education*, 98(3), 210-225.
- Strickland, E. (2021). Predictive analytics in higher education administration. *International Journal of Educational Management*, 35(4), 785-798. <https://doi.org/10.1108/IJEM-12-2020-0692>
- UNESCO. (2021). Recommendation on the ethics of artificial intelligence. United Nations Educational, Scientific and Cultural Organization. <https://unesdoc.unesco.org/ark:/48223/pf0000373434>
- Yang, X., Li, Y., & Chen, Y. (2022). Algorithmic assessment in higher education: Impacts and implications. *Educational Measurement: Issues and Practice*, 41(2), 33-48. <https://doi.org/10.1111/emip.12428>
- Zawacki-Richter, O., et al. (2019). Systematic review of AI in higher education: Promises and challenges. *International Journal of Educational Technology in Higher Education*, 16(1), 39. <https://doi.org/10.1186/s41239-019-0171-0>
- Zhang, Y., & Aslan, S. (2021). AI's impact on learner engagement and performance. *Journal of Educational Computing Research*, 59(1), 45-67. <https://doi.org/10.1177/0735633120960423>



APPLICATION OF ARTIFICIAL INTELLIGENCE IN OFFICE MANAGEMENT AND ITS CHALLENGES IN PUBLIC UNIVERSITIES IN ANAMBRA STATE

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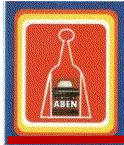
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Abstract

The study investigated the application of artificial intelligence in Office Management and its impediments in public universities in Anambra state. Two research questions guided the study. Cross sectional descriptive survey research design was used for the study. The population of the study comprised all 156 secretaries in public universities in Anambra State. No sampling was done because the population was manageable. A researcher structured questionnaire was the instrument used for data collection. The instrument was titled Application of Artificial Intelligence in Office Management and its Challenges in Public Universities Questionnaire (AAIOMIPUQ). The reliability of the instrument was established using Cronbach Alpha reliability technique and the indexes of 0.72 and 0.68 were got, showing that the instrument was reliable. The findings of the study revealed among others that most secretaries were not very familiar with artificial intelligence (AI). Also, AI had the potential to increase job satisfaction among secretaries. It was recommended among others that educational institutions should organize regular seminars/conferences for secretaries on the use of AI in office technology and management practices in public universities in Anambra State.

Introduction

Artificial Intelligence (AI) is the development of computer systems and machines capable of performing tasks that typically require human intelligence. These tasks include learning, reasoning, problem-solving, perception and natural language understanding. Artificial Intelligence technologies encompass various techniques and approaches, such as machine learning, deep learning, natural language processing, computer vision and robotics. These technologies enable computers to analyze vast amounts of data, recognize patterns, make predictions and automate complex processes. It has applications across numerous fields, including health care, finance, transportation, customer service and education. It has the potential to transform industries, improve efficiency and create new opportunities especially in tertiary institutions.



The goals of tertiary education according to the Federal Republic of Nigeria's National Policy on Education (FRN, 2014), is to: contribute to national development through high-level manpower training; provide accessible and affordable quality learning opportunities in formal and informal education in response to the needs and interests of all Nigerians; provide high-quality career counseling and lifelong learning programme that prepare students with the knowledge and skills for self-reliance and the world of work; reduce skill shortages through the production of skilled manpower relevant to the needs of the labour market; promote and encourage scholarship, entrepreneurship and community service; forge and cement national unity; and promote national and international understanding and interaction. The implementation and realization of tertiary education goals depend on the availability of human and material resources. Artificial intelligence is one of the material resources that can be deployed for effective management of universities.

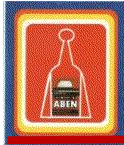
One can argue that artificial intelligence (AI) and robotics represent the future of technology and can perhaps usher in a new era of technological living due to their rapid progress. Many people believe that robots and mechanics will only have an impact on their personal lives through computer-generated home appliances and autonomous cars, but this may not be the case since AI and robotics technology will eventually make an appearance in many industries. Thus, artificial intelligence (AI) can be defined as the theory and creation of computer systems that are capable of carrying out activities that typically require human intelligence, such as speech recognition, visual perception, decision-making, and language translation.

In computer science, artificial intelligence (AI) is concerned with creating intelligent machines that can carry out tasks that normally call for human intelligence. Speech recognition, problem-solving, learning, planning and decision-making are a few examples of these tasks. AI has drawn a lot of interest and is now widely used in a number of sectors, including entertainment, finance, healthcare and transportation. Artificial Intelligence (AI) is the intelligence displayed by computers as opposed to that of humans or animals. "Intelligence" includes the capacity for learning, reasoning, generalization and meaning-inference. Advanced web search engines like Google Search, recommendation systems like those used by YouTube, Amazon and Netflix, speech recognition software like Siri and Alexa, self-driving cars like Waymo, generative or creative tools like ChatGPT and AI art, automated decision-making, and competitive play at the top levels of strategic game systems like a Go and Chess are just a few examples of AI applications (Morozov, 2023).

Simply put, AI is the development of computer systems that can perform tasks that ought to require human beings. It is a complex and multifaceted field that entails the development and implementation of algorithms and technologies that enable machines to learn from data and perform tasks that required human efforts. The concept artificial intelligence has developed significantly since the inception of the field in the mid-20th century, with distinct authors giving their own perceptions and definitions.

Since their development in the 1940s, digital computers have been programmed to carry out very complex tasks such as discovering proofs for mathematical theorems or playing chess with great proficiency. Artificial intelligence (AI) is currently experiencing a critical juncture. The integration of technology into our daily lives has had a significant impact and controversy.

These tasks include learning, reasoning, problem-solving, perception and natural language understanding. Artificial Intelligence technologies encompass various techniques and approaches, such as machine learning, deep learning, natural language processing, computer vision and robotics. These technologies enable computers to analyze vast amounts of data, recognize patterns, make predictions and automate complex processes. Artificial Intelligence has



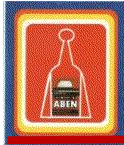
applications across numerous fields, including health care, finance, transportation, customer service and education. It has the potential to transform industries, improve efficiency and create new opportunities (AFSA 2022).

Alagbe et al (2023) viewed AI as the ability of a computer or machine to mimic the capabilities of the human mind – learning from examples and experience, recognizing objects, understanding and responding to language, making decisions, solving problems – and combining these and other capabilities to perform functions humans might perform, such as greeting a hotel guest or driving a car. Artificial Intelligence is the ability of machines to demonstrate human like intelligence by performing cognitive tasks like thinking, perceiving, learning, problem solving and decision making. The technology AI has evolved due to major advances implemented in the collection of data, low cost of data storage and enhanced powers of information processing and computations. It is said that AI might just be the single largest technology revolution of our live times, with the potential to disrupt almost all aspects of human existence. Ogunode and Ukozor (2023) defined AI as programs designed with human-like intelligence and structured in the forms of computers, robots, or other machines to aid in the provision of any kind of service or tasks to improve the social economic and political development of the society. It is an application or programme constructed to carry out tasks with human-like intelligence. Ogunode and Ukozor also viewed Artificial Intelligence as collections systems, packages and applications designed into digital computers or computer-controlled robots to carry out assignments and tasks with human-like intelligence.

AI can play a critical role in tertiary institution management by aiding effective University administration, effective implementation of teaching programmes, enhanced effective student learning in tertiary institutions, and aiding effective conduct of examinations in tertiary institutions. It can support virtual learning, improve research programme development, improve the provision of community service programmes, aid effective data management, improve security and improve attendance of staff. Developments in AI are increasing rapidly and a new technological way of living may just be around the corner. Many people tend to think that robots and mechanics will only impact their personal lives by way of driverless cars and computer-generated home devices. However, this is not the case and AI will be making its debut in all working sectors sooner rather than later. The question that arises is how can one navigate this transition in a way that will secure jobs and complement interaction with robotics as opposed to threatening man's existence. The fear of the loss of jobs was a significant feature of the industrial revolution and technological revolution. However, these periods of history were marked by significant opportunities for economic growth and job creation in new areas. Because there are hardly any practical examples of how a robot may impact the Secretary's job.

The secretarial field entails providing administrative support and assistance to individuals, businesses, organization, or government. Secretaries (office managers) are responsible for a wide range of tasks such as scheduling appointments, correspondence management, preparing reports, answering call and more. The Secretary (office manager) is responsible for advising directors of all laws, regulations and recommended governance practices relevant to the company. The overall monitoring of compliance within organization, including compliance with the company's Memorandum of Incorporation (MOI) rests with the office managers who provide guidance to directors in ensuring the fulfilment of their duties. The overall management and monitoring of meetings is handled by the office managers. .

The hype around AI has reached its peak with many prominent 'techno-savvy' billionaires expressing their views on the possible impact of AI in the future. It is important to keep abreast of these debates and developments so that humans may up skill themselves and



minimize any possible negative impact on them in the future. One of the most prominent debates, which has taken place is that between Elon Musk and Mark Zuckerberg, who expressed conflicting views on the topic of AI. Musk, who is the Chief Executive Officer (CEO) of Tesla and SpaceX and Zuckerberg, who is the CEO of Facebook, adopt different standpoints. Their views can be summarized as follows. Musk approaches AI from a “doom and gloom” standpoint whereas Zuckerberg is of the opinion that AI is something to embrace. Speaking on the topic of AI, Musk advised that AI will cause job disruption and that robots “will be able to do everything better than us.” In addition, Musk stated that “AI is a fundamental risk to the existence of human Civilization.” (Lobo, et al, 2020). Zuckerberg responded to Musk’s comments by saying that AI is going to make lives better in the future, and doomsday scenarios are “pretty irresponsible.” Zuckerberg is optimistic and that “in the next five to 10 years, AI is going to deliver so many improvements in the quality of lives.” Zuckerberg however cautioned on the proper use of AI and that “technology can generally be used for good and bad. Thus one needs to be careful about how one builds it, how it is going to be used.” Musk advocates that the implementation of AI regulations is of paramount importance and should be one of the focal points of governments. Bill Gates, co-founder of Microsoft, echoes Musk’s sentiments about AI and states that “first the machines will do a lot of jobs for humans but will not be super intelligent.

The Secretary (office manager) in universities is responsible for the timeous lodgement of documents with the relevant regulatory bodies. According to James (2022), the impact of artificial intelligence on office secretaries has been significant in recent years. Artificial Intelligence tools and technologies have transformed the way administrative tasks are performed, enabling office secretaries to work more efficiently and effectively. It has enhanced automated scheduling, improved communication, increased productivity, job displacement and enhanced data management.

Statement of the Problem

Due to the growth and evolution of the secretarial profession, administrative professional roles and responsibilities have gained prominence. Thus, the need for highly trained personnel is only going to increase. As a result of technological advancements, complex ICT devices and machinery demanding skilled workers with necessary technical understanding to maintain and operate them are today found in offices. The secretarial profession is therefore challenged by a mismatch in talent and skill sets.

In this context, the advancement of artificial intelligence and robotic technology comes to mind and it is perceived to have the potential to significantly impact the role of secretaries (office managers) in Nigeria’s universities. However, there seems to be paucity of understanding about the potential benefits and challenges that these technologies may bring to the secretarial profession. Therefore, a need to investigate the application of AI in office technology and management and its challenges in public universities, in order to understand their readiness for the potential changes that these technologies may bring to their profession.

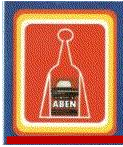
Research Questions

The following research questions guided the study:

1. In what ways is AI technology used in the administration of universities?
2. What are the challenges of artificial intelligence in the management of office tasks universities?

Method

This study investigated the application of AI in office management and its challenges in public universities in Anambra State. Descriptive survey research design was adopted for the study.



This research design allowed the researchers to gather quantifiable information that can be used to make statistical inferences from respondents using questionnaire. The population of the study consisted of 156 Secretaries from two public universities in Anambra State. Census sampling was used because the population was manageable.

Data were collected using a structured questionnaire titled: Application of AI in Office Management and its Challenges in Public Universities (AAIOMIPU). The content validity of the research instrument was ensured by three (3) experts. The instrument was examined for correctness and relevance by these experts. The corrections pointed out by the experts were effected by the researchers. The instrument was subjected to reliability test through trial testing. Twenty copies of the instrument were administered on secretaries (office managers) at University of Nigeria, Nsukka on trial testing. Data collected were analyzed using Cronbach Alpha which yielded reliability coefficient of 0.62. In analyzing and interpreting data generated from the study, descriptive statistics was used to answer the research questions. The analysis was done using SPSS version 21.

Results

Research Question 1: In what ways is AI technology used in the administration of universities?

1. **Table 1: Mean ratings of the ways the secretaries in universities apply AI technology in their daily office tasks.**

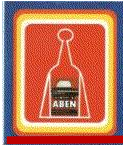
S/N	Item on the application of AI Technology	Mean	Remark
1	AI technology is used for arranging meetings, sending reminders, creation of agenda and minutes	0.40	Disagreed
2	AI technology is used in legislation and regulations in real time and aligning them with university policies	1.02	Disagreed
3	AI technology is used in reducing risks of regulatory breaches among university secretaries	0.51	Disagreed
4	AI technology is used to key information from documents and easily locate vital data	0.52	Disagreed
5	AI technology is used for prediction based on previous data	0.63	Disagreed
6	AI technology is used for students correspondence	2.50	Agreed
7	AI technology is used to respond directly to staff on public fora	0.95	Disagreed
8	AI technology assists job interview preparation	0.71	Disagreed
9	AI technology provides feedback on resume or cover letter	0.62	Disagreed
10	AI technology provides support for special needs students	0.64	Disagreed
Grand Mean		0.84	Disagreed

The data presented in Table 1 show the ways AI technology is used in the administration of universities. The Table reveals that nine items have mean values of 0.51 to 1.02, indicating the respondents disagreed and one item with a mean of 2.50 as agreed. The overall weighted mean of 0.84 suggests that AI technology is not used in the administration of universities.

Research Question 2: What are the challenges of artificial intelligence in the management of office tasks universities?

Table2: Mean Ratings of the Challenges of Artificial Intelligence in Universities' Office Tasks

S/N	Items on Challenges of Artificial Intelligence	Mean	Remark



1	AI technology has intricate complexities, making it difficult to understand	3.41	Agreed
2	AI technology increases university biases	3.62	Agreed
3	AI technology does not safeguard privacy and data security	2.95	Agreed
4	AI technology does not ensure ethical decision-making	3.11	Agreed
5	AI technology does not address security risks	3.10	Agreed
Grand Mean		3.23	Agreed

Data in Table 2 show challenges of artificial intelligence in the management of office tasks in universities. The Table reveals that five items have mean values of 2.95 to 3.41, indicating the respondents agreed and one item with a mean of 2.50 as agreed. The overall weighted mean of 3.23 suggests that respondents agreed to the challenges of artificial intelligence in the management of office tasks universities

Discussion of findings

The study revealed that secretaries in universities do not apply AI technology in their office administration. The findings of this study are in agreement with those of Havan and Care (2024), who observed that university secretaries have yet to fully adopt artificial intelligence (AI) technologies in their administrative operations. Their study highlighted significant gaps in the use of AI for administrative support, feedback management, data security, and strategic projection. This lack of integration suggests a systemic challenge in leveraging technological innovations for administrative efficiency within university settings.

Furthermore, results of the study revealed that all respondents unanimously agreed that the listed items represent challenges encountered by university secretaries in managing their office tasks, as reflected by a grand mean score of 3.23. These findings underscore the widespread recognition of the difficulties posed by limited AI application in the administrative functions of universities.

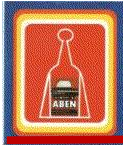
Consistent with the above, this study also aligns with the work of Ephraim (2022), who identified several critical barriers to the adoption of AI in office administration. These include the complexity of AI algorithms, potential biases and discriminatory outputs, challenges in maintaining data privacy, and the lack of assurance regarding ethical decision-making processes. Such issues not only hinder the adoption of AI tools but also raise concerns about accountability, fairness and trust in AI systems within academic institutions.

Altogether, the convergence of findings from this study and prior research highlights the urgent need for capacity-building, policy reform, and infrastructural investment to support the responsible and effective integration of AI technologies in university administration.

Conclusion

The findings of this study clearly indicate that artificial intelligence (AI) technology remains largely underutilized in the administrative operations of universities. Despite the growing global shift toward digital transformation, university secretaries continue to face significant challenges that hinder the integration of AI in their day-to-day office tasks. These challenges include lack of technical know-how, ethical concerns, data privacy issues, and the complexity of AI systems.

Given this reality, it is imperative to **take a firm stand** that without deliberate policy intervention, targeted training, and infrastructural support, the adoption of AI in university administration will remain minimal and ineffective. Therefore, stakeholders in higher education—particularly university management, government agencies, and ICT policy bodies must prioritize



the implementation of AI by investing in digital capacity-building, ethical guidelines, and secure AI systems. Only then can universities harness the full potential of artificial intelligence to enhance administrative efficiency, transparency and decision-making.

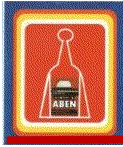
Recommendations

Based on the findings of this study, it is recommended that:

1. University managements should organize regular workshops and training programmes to equip secretarial and administrative staff with necessary digital literacy and AI-related skills. This will enhance their competence and confidence in using AI tools for administrative tasks.
2. Government and university authorities should allocate dedicated funding for the acquisition and maintenance of AI technologies tailored to administrative functions such as data management, scheduling, communication, and decision support systems.
3. Regulatory bodies in higher education should develop clear ethical guidelines and data protection policies to guide the safe and responsible use of AI in university administration. This will help address concerns around bias, privacy and ethical decision-making.

References

- AFSA. (2022). Artificial intelligence and education. Retrieved June 22, 2023 from <https://www.theschoolleader.org/news/artificial-intelligence-and-education>
- Alagbe, J., Awodele, O., & Ayorinde, I. (2023). Is Nigeria ready for artificial intelligence in schools? Retrieved June 22, 2023, from <https://punchng.com/is-nigeria-ready-for-artificial-intelligence-in-schools/>
- Basen, I. (2020). "Is AI overhyped? Researchers weigh in on technology's promise and problems". Canadian Broadcasting Corporation
- Federal Republic of Nigeria, (2014). National policy on education. Abuja: Nigeria. Educational Research Development Council.
- Lobo, J.L., Del, J., Bifet, A. (2020). Neural network and online learning: an overview and perspectives. Neural Netw. 121. 88-100.
- Morozov, E. (2023). "*The true threat of artificial intelligence*". The New York Times.
- Ogunode, N. J. and Gregory, D. M. (2023). Artificial Intelligence (AI) in educational administration. *International Journal on Orange Technologies*, 5(10), 7-16.
- Ogunode, N. J., & Ade, T. I. (2023). Research programme in public universities in Nigeria. *Best Journal of Innovation in Science, Research and Development*, 2(3), 1-13.



BUSINESS EDUCATORS' PERCEPTIONS OF INTEGRATING ARTIFICIAL INTELLIGENCE FOR EFFECTIVE BUSINESS EDUCATION PROGRAMMES

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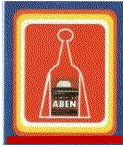
Abstract

This study examined the perceptions of business educators regarding the integration of artificial intelligence (AI) into Business Education Programmes. Two research questions and two hypotheses guided the study. The research utilized a descriptive survey design. The population of the study comprised 108 business educators from Universities and Colleges of Education in Anambra State where business education programmes are offered. There was no sample since the population size was manageable. The instrument for data collection was a 37-item questionnaire which was validated by three experts: two from Business Education Department and one from Measurement and Evaluation. The instrument was pilot-tested and data obtained used to determine the reliability of the instrument with the Cronbach Alpha approach, and it yielded co-efficient index of 0.81. One hundred and eight (108) copies of questionnaire were administered and 102 retrieved, and used for analysis. Data collected were analysed by using mean and standard deviation to answer research questions, while t-test statistics was used to test the hypotheses of no significant difference at 0.05 level of significance. Findings revealed that most artificial intelligence tools are perceived as necessary for business education programmes, with some tools deemed highly critical. Additionally, business educators generally hold positive views on integrating artificial intelligence in teaching and learning business education programmes, recognizing its role in making education more inclusive and effective. However, there is some scepticism regarding AI's ability to foster creativity and innovation. The study concludes that while AI is a valuable tool in business education, its integration should complement rather than replace the human element in teaching. Based on findings, recommendations were made, including that; business educators should prioritize the adoption and integration of AI tools that have been identified as "Highly Required" or critical, such as QuillBot and tools improving accessibility, among others.

Keywords: artificial intelligence, business education, educators, perceptions, integration, teaching and learning.

Introduction

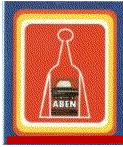
Artificial intelligence has revolutionized the way teachers interact with students in the educational system. By utilizing artificial intelligent technologies, business educators are able to personalize learning experiences for students based on their individual needs and abilities. This is because artificial intelligence has programmes developed to perform specific tasks. These are utilized for a wide range of activities. These activities include medical diagnosis, electronic trading platforms, robot control, and remote sensing. Ouyang and Jiao (2021) observed that artificial intelligence is a powerful tool to facilitate new paradigms for instructional design, technological development, and education research that are otherwise impossible to develop in the traditional education modes. Onwuachu (2014) viewed artificial intelligence as a group of related



technologies that attempt to develop machines to emulate human-like qualities, such as learning, reasoning, communication, seeing, and hearing. The author further stated that the artificial intelligence main areas include robotics, perception system, expert system, natural language processing, fuzzy logic, neural networks and genetic algorithms. AI is also revolutionizing the field of education. It offers tools and technologies to personalize learning, automate administrative tasks, and provide valuable insights into students' performance.

In education, artificial intelligence is applied to enhance teaching and learning processes. Srivastava (2024) stated that artificial intelligence in education can personalize learning experiences, redefine teaching practices, offer real-time feedback, and support educators with advanced tools and insights, leading to more effective and engaging educational environment. It has in store significant attention in the educational field due to its potential to revolutionize learning processes, personalize instruction, and improve educational outcomes. It encompasses other various applications such as personalized instruction, intelligent tutoring systems, virtual mentors, adaptive learning systems, educational games, virtual reality simulations, and automated grading systems. Artificial intelligence in education may also be seen as the use of technology to address cognitive, physical, academic, social and emotional factors that impact learning. Good examples of artificial intelligence in education for students include grammar checking software, text-to-speech platforms and flash card software. Artificial intelligence in education helps educators identify gaps in students' knowledge and provide targeted feedback to improve learning outcomes. With the help of AI-powered chatbots and virtual assistants, educators can provide students with immediate support and assistance outside the classroom, and help them stay engaged and motivated. Camelia et al (2024) posited that artificial intelligence in education system significantly enhance learners' experience; and aids teachers and students in educational processes. Artificial intelligence is growing rapidly in the education sector. Hefferman (2021) affirmed that this rapid growth is due to its ability to transform many aspects of the teaching and learning processes. It can create immersive virtual learning environments, produce smart content, ease language barriers, fill gaps between learning and teaching, creates specialized plans for each student, among others. Nguyen (2023) equally affirmed that artificial intelligence helps students to learn smarter by providing them with personalized experiences that are tailored to their individual learning styles, as well as access to information and data to help them better understand the material. This creates need to integrate artificial intelligence in education process. Integration of artificial intelligence in education aims to improve student engagement, provide customized learning experiences, and streamline administrative tasks for educators. It can also improve how students are assessed and guided while also helping to build digital literacy, critical thinking, creativity, and problem-solving (Kengam, 2020; World Economic Forum, 2024). Artificial intelligence is an emerging advanced technology that has started modifying educational tools and institutions. AI tools in education are diverse devices ranging from intelligence tutoring system and adaptive learning platforms to virtual automated grading and virtual assistants. These tools are designed to meet variety of needs for both students and teachers. They include quillbot, grammarly, gradescope, improved accessibility, automated tasks, writing aids, among others (York, (2024).

However, artificial intelligence possesses a number of challenges. It may be biased because it provides information only on the knowledgeable on the information it has been trained on. It may generate misinformation because it draws data from many sources hence spread misinformation and errors to both teachers and students (Ofgang, 2024). Moreover, there are artificial intelligence programmes that detect artificial writing. This can help teachers determine if their students are cheating but sometimes those programmes may falsely identify a student's



original work as plagiarism. Also, students who interact with artificial intelligence-software programmes more than a teacher may begin to feel disconnected and isolated from the teacher, thereafter the motivation and engagement in the classroom may decrease. Based on these concerns, the extent artificial intelligence will support teaching and learning is yet to be established.

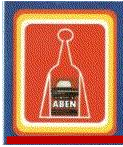
Teaching and learning involve complex processes used in the active transfer of knowledge from an instructor (teacher) to a learner (student). It is further described as transformation process of knowledge from teachers to students. This process is referred to as the combination of various elements within the process where an educator identifies and establishes the learning objectives and develops teaching resources and implements the teaching and learning strategy. In the words of Munna and Kalam (2021), learning brings about a permanent change in behaviour through the acquisition of new skills because it is the process of acquiring new understanding, knowledge, behaviours, skills, values, attitudes, and preferences. While teaching is the process of sharing knowledge, skills, and experience with others in a way that helps them learn. This involves a variety of activities such as planning, instruction, assessment and feedback. Effective teaching involves aligning the three major components of instruction: learning objectives, assessments, and instructional activities (Ambrose, 2010).

Teaching and learning business education programmes is a deliberate, well planned and organized process. It is also flexible to the point that it reflects the ever evolving technological driven societal change from time to time. This is due to the fact that business education is a branch of education that involves teaching skills and operations of the business industry. Unfortunately, the curriculum preparing students/graduates with the skills needed to be successful contributors in the society is not adequate, and does not meet the 21st century industry demands. Sollosy and McInerney (2023) observed that a contributing factor is business schools' inability to keep pace with rapidly evolving business needs. Changing curriculum is often a herculean task. The authors further affirmed to the unspoken mismatch between the jobs wanted, the requisite skills needed, actual training being provided, and the actual jobs. Similarly, Okpara (2024) stated that universities in Nigeria and across Africa continue to offer courses that are becoming out-dated in today's rapidly evolving technological landscaped. These out-dated courses do not align with the current needs of the labour market and the demand of the 21st century. Moreover, the problem is being exacerbated because most traditional educational institutions are slow to integrate artificial intelligence training into their programmes resulting in delay of graduates with necessary digital skills. The need to groom and mentor business education students with artificial intelligence tools therefore arise.

By creating and supplementing business education content through artificial intelligence-powered platforms, teachers can curate a range of educational resources (McFarland, 2024). However, it should be noted that Artificial Intelligence in business education is not meant to replace business educators. The human element remains crucial in business education programmes as business teachers possess qualities such as empathy, critical thinking, and the ability to inspire and motivate students. Artificial intelligence should be seen as a tool that complement and enhance teaching and learning business education programmes rather than a substitute for human interaction hence the need to integrate artificial intelligence in business education programme to augment teachers' efforts in the classroom. The extent educators perceive this integration therefore is the thrust of this study.

Statement of the Problem

In today's rapidly evolving world, the need to integrate artificial intelligence (AI) in business education programmes has become necessary and also a possibility. It has become a



necessity because artificial intelligence has the potential to revolutionize the way business education students learn, teachers instruct, and schools operate. The world is therefore continually embracing technologies advancements, exploring how artificial intelligence can revolutionize the business education programmes to benefit teachers and students (Shulman, 2024).

Unfortunately, many African universities still focus on traditional subjects such as law, medicine, and engineering, which are important but may not be sufficient enough to prepare students for the changing job market. Artificial intelligence brings efficiency, innovation and new job opportunities, then changes the tasks the workers do and the skills they require. The wide spread adoption of artificial intelligence is now increasing skills gap, as people struggle to stay up to date on the latest artificial intelligence skills. Employers increasingly expect candidates to have artificial intelligence-related skills, even for roles that traditionally do not require them. This calls for the integration of AI in business education programmes.

Business educators need to embrace artificial intelligence as potential support system for the business education programmes. Their perception of integrating artificial intelligence in the programme is therefore important. Hence, this research addressed the business educators' perceptions on integrating artificial intelligence in the curriculum of business education programmes.

Purpose of the Study

The purpose of this research was to find business educators' perceptions of integrating artificial intelligence for effective business education programmes. Specifically, the study:

1. Identified business educators' perceptions of artificial intelligence tools required in teaching and learning business education programmes.
2. Determined business educators' perceptions of integrating artificial intelligence in business education programmes.

Research Questions

The following two research questions were answered in the study:

1. What are the artificial intelligence tools required in business education programmes?
2. How do business educators perceive integrating artificial intelligence in business education programmes?

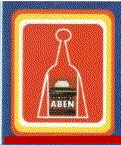
Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

- HO1: There is no significant difference in the mean ratings of the business educators from Universities and those of Colleges of Education on artificial intelligence tools required in business education programmes.
- HO2: There is no significant difference in the mean ratings of the business educators from Universities and those of Colleges of Education on integrating artificial intelligence in business education programmes.

Methodology

The descriptive survey research design was adopted for this study. The study was carried out in Universities and Colleges of Education in Anambra States where business education programmes are offered. The institutions are Nnamdi Azikiwe University, Awka; Chukwuemeka Odumegwu Ojukwu University, Igbariam Campus; Federal College of Education (Technical), Umunze; and Nwafor Orizu College of Education, Nsugbe. The population of the study was 108 business educators, which comprised Nnamdi Azikiwe University, Awka (18); Chukwuemeka Odumegwu Ojukwu University, Igbariam (07); Federal College of Education (Technical), Umunze (66); and Nwafor Orizu College of Education, Nsugbe (17). Total enumeration was carried out due



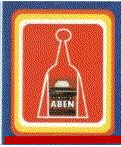
to the size of the population was manageable. The instrument for data collection was a 37-item questionnaire constructed by the researcher titled business educators' perceptions of integrating artificial intelligence instrument (BEPIAII). The questionnaire was designed according to research questions, and a 4-point rating scale of strongly agreed (SD), agreed (A), disagreed (D), and strongly disagreed (SD) was adopted. The validation of instrument was done by three experts: two from Business Education Department and one from Measurement and Evaluation, all from Federal College of Education (Technical), Umuze, Anambra State. The instrument was pilot-tested and data obtained used to determine the reliability of the instrument with the Cronbach Alpha approach, and it yielded co-efficient index of 0.81. One hundred and eight (108) copies of questionnaire were administered and twenty-five (25) copies retrieved from the business educators in the universities, seventy-seven (77) from colleges of education. Total number retrieved; one hundred and two (102) copies. Mean and standard deviation were used to answer research questions to determine the homogeneity of the business educators' perceptions, while t-test statistics was used to test the hypotheses of no significant difference at 0.05 level of significance. Decisions on the research questions were based on the grand mean in relation to the real limits of numbers. Thus, items with mean rating of 0.50 to 1.49 were rated not required/strongly disagreed; those with 1.50 -2.49 were rated little required/disagreed; those with 2.50 - 3.49 were rated required/agreed; while those with 3.50 - 4.00 were rated highly required/strongly agreed. For the hypotheses if the calculated t-value was equal or greater than the critical t-value, it was rejected, otherwise, not rejected.

Results

Research Question One: What are the artificial intelligence tools required in business education programmes?

Table 1: Mean ratings and standard deviation on AI tools required in business education programmes. N = 102

AI Tools	Std.		Decision
	Mean	Deviation	
1. Classpoint	3.35	.34	Required
2. QuillBot	3.52	.32	Highly Req.
3. Owlift	3.50	.31	Highly Req.
4. Grqmmarly	3.33	.39	Required
5. Writing Aids	3.36	.34	Required
6. Gradescope	3.36	.37	Required
7. Fireflies.ai	3.42	.36	Required
8. Orrer.ai	3.35	.34	Required
9. Google Bard	3.41	.35	Required
10. Course Hero	3.32	.56	Required
11. Automated Tasks	3.41	.35	Required
12. Improved Accessibility	3.52	.32	Highly Req.
13. Fetchy	3.50	.31	Highly Req.
14. Congnii	3.33	.39	Required



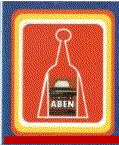
15. Carnegie learning	3.36	.34	Required
16. Ivy	3.36	.37	Required
17. Adobe firefly	3.42	.36	Required
18. Techmatai.com	3.35	.34	Required
19. Fun learning	3.41	.35	Required
Grand Mean	3.40	.36	Required

Table one presents mean ratings and standard deviation for various artificial intelligence tools required in business education programmes, along with a decision on whether each tool is "Required" or "Highly Required." The grand mean of 3.40 indicates that, on average, the AI tools evaluated are generally considered "Required" for inclusion in the business education programmes. The standard deviation of 0.36 suggests that there is some variation on how these tools are perceived, but the variation is not extreme. Most AI tools fall into the "Required" category, meaning they are seen as necessary but not indispensable. The "Highly Required" tools stand out as more critical for the business education programmes. In summary, while all the listed artificial intelligence tools are deemed necessary, some are viewed as more crucial (Highly Required) than others, reflecting their perceived impact or importance in the educational setting.

Research Question Two: How do educators perceive integrating artificial intelligence in business education programmes?

Table 2: Mean ratings and standard deviation on perceptions of integrating AI in business education programmes.

Perceptions on Integrating AI	Std.		Decision
	Mean	Deviation	
1. make teaching more inclusive	3.32	.56	Agreed
2. encourage personalised learning experience	3.32	.56	Agreed
3. bring about early detection of learning gap	3.36	.37	Agreed
4. support educators with advanced tools and insight	3.42	.36	Agreed
5. helps students refine their language skills	3.35	.34	Agreed
6. create a more tailored education process	3.41	.35	Agreed
7. provides immediate guidance and correction	3.32	.56	Agreed
8. fosters more effective learning process	3.27	.60	Agreed
9. ensure that students are well-equipped for their academic future	3.50	.31	Strongly Agreed
10. manage other administrative tasks	3.42	.57	Agreed



11. bring about real time feedback	3.38	.55	Agreed
12. redefine teaching practices	3.43	.33	Agreed
13. ensure interactive simulations and new teaching modalities	3.50	.31	Strongly Agreed
14. enhance teachers' training and digital literacy	3.42	.57	Agreed
15. make better presentations and notes	3.38	.55	Agreed
16. organise research papers	3.19	.50	Agreed
17. foster innovation and creativity	2.00	.82	Disagreed
18. encourage Virtual classrooms	2.46	.67	Disagreed
Cluster Mean	3.25	.49	Agreed

Table 2 provides mean ratings and standard deviation for various perceptions of integrating AI into business education programmes, along with a decision on whether respondents "Agreed" or "Disagreed" with each perception. Most perceptions regarding the integration of AI in business education programmes are met with agreement, indicating that respondents see AI as beneficial in enhancing various aspects of teaching and learning. However, there is scepticism or disagreement on AI's role in fostering innovation, creativity, and encouraging virtual classrooms. The cluster mean of 3.25 indicates that, on average, respondents generally agree with the positive perceptions of integrating AI into the business education programmes. The standard deviation of 0.49 suggests that while there is some variability in responses, the overall agreement is consistent.

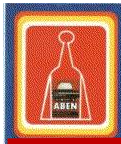
Testing of Hypotheses

HO1: There is no significant difference in the mean ratings of business educators from Universities and those of Colleges of Education on artificial intelligence tools required in business education programme.

Data collected to test hypothesis 1 are presented on Table 3

Table 3: Summary of t-test Analysis of the mean ratings of the business educators from University and those of Colleges of Education on AI tools required for effective business education programmes

		Independent Samples Test							
		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
Score1	Equal variances assumed	1.538			100	.928	.01241	.13591	-.26085 .28568



Equal variances not assumed	.109	26.272	.914	.01241	.11356	.22089	.24571

Table 3 presents the results of an independent samples t-test to determine whether there is a statistical significance difference in the mean ratings of AI tools required for an effective business education programmes between business educators from Universities and those of Colleges of Education. Since the significance value (0.221) is greater than 0.05, we do not reject the null hypothesis that the variances are equal. Therefore, we assume that the variances are equal when interpreting the t-test results. There is no statistically significant difference between the mean ratings of AI tools required for an effective business education programmes between business educators at Universities and those at Colleges of Education. Both groups generally agree on the importance of these tools, as reflected by the small mean difference and the non-significant p-value. This suggests that both groups of educators have similar perceptions of the AI tools needed in business education, regardless of whether they teach at a University or a College of Education.

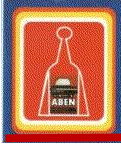
H02: There is no significant difference in the mean ratings of business educators from Universities and those of Colleges of Education on integrating artificial intelligence in business education programmes.

Data collected to test hypothesis 2 are presented on Table 4

Table 4: Summary of t-test Analysis of mean ratings of business educators from Universities and those of Colleges of Education on integrating artificial intelligence in business education programmes

		Independent Samples Test								
		Levene's Test for Equality of Variances				t-test for Equality of Means				
		F	Sig.	T	df	Sig. (2- tailed)	Mean Differenc e	Std. Error Differenc e	95% Confidence Interval of the Difference	
Score 2	Equal variances assumed	.602	.441	.406	100	.686	.04320	.10631	-	.25696
	Equal variances not assumed			.435	20.839	.668	.04320	.09921	-	.24961
									.17056	.16321

Table 4 presents the results of an independent samples t-test to determine whether there is a statistical significance difference in the mean ratings of integrating artificial intelligence for an effective business education programmes between business educators from Universities and those of Colleges of Education. Since the significance value (0.441) is greater than 0.05, we do not reject the null hypothesis that the variances are equal. Therefore, the assumption of equal variances is valid for interpreting the t-test results. The results indicate no statistically significance



difference in the mean ratings of integrating AI tools between business educators at Universities and those at Colleges of Education. Both groups have similar perceptions of the importance of integrating AI tools into the business education programmes.

Discussion

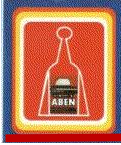
Most AI tools evaluated are considered "Required," with a few rated as "Highly Required." Tools like QuillBot, Improved Accessibility, Owlift, and Fetchy stand out as more critical, reflecting their perceived impact on enhancing business education programmes. Research has shown that AI tools are increasingly essential in educational environments due to their ability to personalize learning, automate administrative tasks, and provide real-time feedback. For example, McFarlane (2024) emphasizes the role of AI in supporting personalized learning experiences and improving educational outcomes through tools like QuillBot and automated grading systems like Gradescope. Similarly, Heffernan (2021) highlights the importance of AI tools in fostering inclusivity and accessibility, which aligns with the high rating for tools that improve accessibility.

There is no statistically significant difference between the respondents from Universities and those of College Education in their ratings of the AI tools required for effective business education programmes. This finding is consistent with research by McKinsey & Company (2020), which suggests that educators across different educational levels recognize the value of AI tools similarly. Both the respondents from Universities and those of Colleges of Education likely face similar challenges and opportunities in integrating AI, leading to comparable evaluations of these tools. This uniformity might also be attributed to the widespread adoption of AI in education, as noted by Holmes et al. (2019), who argue that AI tools have become universally recognized for their potential to enhance educational outcomes.

The perceptions of AI integration are generally positive, with most respondents agreeing that AI can enhance teaching, personalize learning, and support educators. However, there is disagreement on AI's ability to foster innovation and encourage virtual classrooms. The positive perceptions align with studies by Luckin et al. (2016), who argue that AI can revolutionize education by making teaching more inclusive and supporting educators with advanced tools. The disagreement regarding AI fostering innovation might reflect concerns about AI's current limitations, as discussed by Selwyn (2019), who points out that while AI can enhance existing processes, it may not yet fully drive innovation or replace human creativity in education.

Similar to the earlier hypothesis, there is no significant difference between University and College of Education educators in their perceptions of integrating AI tools into the business education programmes. This consistency across educational institutions is supported by studies like those by Broadbent and Poon (2015), who found that educators at all levels are increasingly aware of the benefits of AI in creating more effective and efficient teaching and learning environments. The lack of significant difference suggests a shared understanding and appreciation of AI's role, regardless of the type of institution. This is further supported by the work of Stangstar et al. (2016), who highlighted the growing consensus on the importance of integrating digital tools in education to enhance learning experiences.

The overall results suggest a broad consensus among business educators on the importance of AI tools in business education, with slight variations in the perceived necessity of certain tools and their potential to drive innovation. The findings from Tables 3 and 4 indicated that the type of educational institution (University or Colleges of Education) does not significantly impact educators' perceptions of AI, implying that the benefits and challenges of AI integration are perceived similarly across different educational contexts.



The results imply that efforts to integrate AI in business education programmes should focus on addressing the common needs of educators across various institutions. As the literature suggests, providing adequate training and resources can help educators maximize the benefits of AI, particularly in areas where there is already strong agreement on its value. In summary, the results align with existing research; reinforcing the idea that artificial intelligence is widely recognized as a valuable tool in business education programmes, with strong consensus on its role across different educational institutions. However, there is room for further exploration into the areas where artificial intelligence's impact is less agreed upon, particularly in fostering innovation and supporting new teaching modalities like virtual classrooms.

Conclusion

The findings from the tables indicate a strong consensus among business educators regarding the importance and effectiveness of AI tools in business education. Tools such as QuillBot and Fetchy are seen as critical for enhancing business education programmes, reflecting their perceived impact on improving accessibility and personalized learning. Generally, business educators view AI positively for its potential to enhance teaching and personalize learning, though there is scepticism about AI's ability to drive innovation or fully support virtual classrooms. Both University and College educators have similar views on the required AI tools and the integration of AI into business education programmes, suggesting a universal recognition of AI's value. There are gaps in understanding AI's role in fostering innovation and supporting virtual learning environments, indicating areas where further exploration could be beneficial.

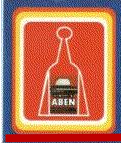
Recommendations

Based on the findings and conclusion, the following are recommended:

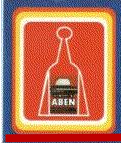
1. Business educators should prioritize the adoption and integration of AI tools that have been identified as "Highly Required" or critical, such as QuillBot and tools improving accessibility.
2. Institutions should develop comprehensive training programmes to help business educators maximize the benefits of AI tools. This should include practical workshops, tutorials, and on-going support to address any challenges in using AI tools effectively.
3. Researchers should investigate and address concerns related to AI's potential to foster innovation. This could involve exploring new AI applications or improvements in existing tools that could better support creative and innovative teaching practices.
4. Business education researchers should conduct further research into how AI can support and enhance virtual classrooms. This includes evaluating current limitations and exploring potential solutions to better integrate AI into online and hybrid learning environments.

References

- Ambrose, S. A.; Bridges, M. W.; DiPietro, M.; Lovett, M. C.; & Norman, M. K. (2010). How learning works: Seven research-based principles for smart teaching. Jossey-Bass. <https://dcal.dartmouth.edu/resources/teaching-learning-foundations/teaching-learning-principleshttps>
- Broadbent, E. & Poon, W. T. (2015). The implication of Robotics on STEM Education, *Journal of STEM Education*, 16(2), 5 - 12
- Camelia, S.; Catalin Gradinaru, C, & Surugiu, M. (2024). Artificial intelligence in Business Education: Benefits and Tools. *International Journal of Research and Analytical Review (IJRAR)*.
- Hamid, F. (2024). 10 Best AI Tools for Education (Students & Teachers) in 2024
- Nigerian Journal of Business Education – Volume 12 No. 1, 2025



- <https://www.elegantthemes.com/blog/business/best-ai-tools-for-education>
- Hefferman, J.(2021). The Impact of technology on education.*Journal of Educational Research*, 11(4), 4332 - 441
- Holmes, W. (2019).Artificial intelligence in the classroom: A Review of the literature.*Journal of Artificial Intelligence in Education*, 29(1), 1 – 15
- Kengam, J. (2020). Artificial intelligence in Education
https://www.researchgate.net/publication/347448363_ARTIFICIAL_INTELLIGENCE
- Luckin, R.; Holmes, W.; Graffiths, M., &Florcier L. B. (2016). Intelligence tutoring systems: A Review of the Field.*IEEE Transactions on Learning Technologies*, 9(2), 137 - 149
- McFarland (2024). 10 Best AI Tools for Education. <https://www.unite.ai/10-best-ai-tools-for-education/>
- Mckinney, J., & Comp R. (2020). Exploring the effects of Social Media on Mental Health: Computers in Human Behaviour, 103, 102764
- Munna, A. S., & Kalam, M. A. (2021). Teaching and learning process to enhance teaching effectiveness: a literature review.*International Journal of Humanities and Innovation*, 4(1), 1-4
- Nguyen, S. (2023). AI in Schools: 4 Transformative ways AI can improve Education. www.classpoint.io
- Ofgang, E. (2024), 12 AI Tools beyond ChatGPT that can save teachers' time
<https://www.techlearning.com/news/10-ai-tools-beyond-chatgpt-that-can-save-teachers-time>
- Okpara, G. (2024).International Masters Class in Artificial Intelligence and Digital Journalism:Lecture note realized during the training on Artificial Intelligence on 27th – 29th, May 2024.
- Onwuachu, R. N. (2014). Producing Global Workers through Business Education Programme using Computer and ICT skills: *National Journal of Business Education* 2(1), 241 – 249
- Ouyang, F. & Jiao, P. (2021). Artificial intelligence in education: The three paradigms, *Computers and Education: Artificial Intelligence*, 4;
<https://www.sciencedirect.com/science/article/pii/S2666920X2100014X>
- Selwyn, N. (2016).Is technology good for education? Polity Press
- Shulman, A. (2024). AI in Education: How Artificial Intelligence can Empower Teachers and Students.Teaching tomorrow.co.uk
- Sollosy, M. &McInerney, M. (2023). Artificial intelligence in business education: want should taught: *The International Journal of Management Education*. 20(3).
www.sciencedirect.com
- Srivastava, S.(2024). 12 Ways AI in education is transforming the industry.Appinventiv.com
- Stangstar, J.; Smith, M.; & Johnson, K. (2016). Gamification in education: A Review of the literature. *Journal of Educational Multimedia and Hypermedia*, 25(1), 5 - 20
- World Economic Forum, (2024). Education and skills: From virtual tutors to accessible textbooks: 5 ways AI is transforming Education.
- York, A.(2024). 10 Educational AI Tools for students in 2024. Clickup.



ARTIFICIAL INTELLIGENCE AND FUTURE OF BUSINESS IN NIGERIA: OPPORTUNITIES, CHALLENGES AND IMPLICATIONS FOR BUSINESS EDUCATION AND TRAINING

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Abstract

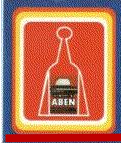
This study critically examines the role of Artificial Intelligence (AI) in shaping the future of business in Nigeria, with a particular focus on its opportunities, challenges, and implications for business education and workforce development. As global economies increasingly adopt AI-driven solutions, Nigerian businesses stand at a pivotal point where the integration of AI could significantly enhance operational efficiency, strategic decision-making, and customer engagement across various sectors, including manufacturing, banking, healthcare, education, and agriculture. The study adopts Fred Davis' Technology Acceptance Model (TAM, 1989) as its theoretical framework, providing insights into the behavioural and organizational factors that influence the adoption of emerging technologies. While AI presents vast opportunities, its implementation in Nigeria is hindered by several challenges, including limited access to quality data, high costs of AI infrastructure, inadequate policy frameworks, and a shortage of professionals with relevant technical expertise. Despite these barriers, the potential benefits of AI adoption are substantial. Nigerian businesses can leverage AI to foster innovation, develop competitive business models, improve productivity, and position themselves more effectively in global markets. The paper emphasizes that realizing these benefits requires strategic investments in digital infrastructure, AI-focused education and training, and supportive government policies. The study concludes that AI is poised to play a transformative role in the Nigerian business environment. It recommends a coordinated effort among government, industry, and academic institutions to develop a sustainable AI ecosystem that will empower businesses and reshape business education in Nigeria for long-term economic growth and competitiveness.

Keywords: Artificial Intelligence, Future of Business, Challenges, Prospects

Introduction

In the business sector and educational institutions, artificial intelligence (AI) has become a transformational force that is radically changing how organisations innovate, operate, and compete. At the heart of this change is automation that is powered by artificial intelligence (AI). It is transforming institutions by automating repetitive and difficult processes, streamlining the decision-making process, and delivering real-time data-driven insights. AI offers organizations a plethora of chances to grow their operations more profitably, increase consumer engagement, and scale their operations more effectively. AI-driven chatbots that respond to customer service requests and sophisticated algorithms that evaluate market trends and forecast consumer behaviour are just two examples. Business operations are being streamlined by automation in ways that were not previously possible.

Artificial intelligence, according to Russell and Norvig (2016), is the ability of a machine to carry out operations that normally require human intelligence, such as speech recognition, visual perception, language translation, and decision-making. Artificial intelligence (AI) can be broadly

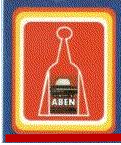


divided into two categories: narrow AI, which is created for certain purposes (such as chatbots and recommendation algorithms), and general AI, which seeks to accomplish a variety of intellectual tasks at the level of humans. Artificial Intelligence (AI) is the simulation of human intelligence in computers that are designed to understand, learn, and act on their own. AI systems are algorithms and computational models to analyse data, detect patterns, and solve problems in ways that imitate cognitive capabilities such as perception, reasoning and decision-making. The ability of artificial intelligence (AI) to learn from experience and adapt to new inputs without human intervention is one of its fundamental features.

AI's contribution to the development of systems that can mimic or enhance human cognitive abilities, highlighting both the technology's theoretical underpinnings and real-world uses. But these prospects also provide important obstacles. Since computers may eventually replace humans in traditional professions, the rise of AI automation poses important questions about the nature of labour in the future. To successfully incorporate AI into business models, entrepreneurs must overcome a number of challenges, including the skill gap, ethical questions about AI-driven decision-making, and how to strike a balance between automated procedures and human labour. As AI develops further, it is imperative that business owners take into account these technologies' long-term effects on society and the workforce in addition to using them to spur growth. In the area of business education, these trainees should be availed the opportunity of receiving preparation that will be relevant in the labour market at graduation. Trainees in business education when properly trained are equipped to be self-sufficient and create jobs for others in the face of a faltering and fragile economy, such as that which exists in Nigeria as at present.

Artificial Intelligence is quickly taking the lead in modern corporate operations. It is equally transforming a wide range of institutions. Its incorporation into business education has enormous potential to mould the abilities and proficiencies of upcoming entrepreneurs and knowledge facilitators. This paper examined the latest developments in artificial intelligence (AI) as they relate to business and business education, projecting their significant effects on curriculum development, instructional strategies. Industrial cooperations, ethical issues, the global environment, obstacles, and the likelihood of AI adoption in these fields were highlighted. One unique aspect of digitisation is its ability to automate tasks that demand a lot of human labour. Recent advances in artificial intelligence (AI) are allowing computers to carry out activities that would often need human expertise, such as processing massive unstructured data sets using sophisticated, adaptive algorithms (Choudhury et al., 2018; Stone et al., 2016).

This has caused some people to consider the generativity of artificial intelligence (Amabile, 2019). According to Cockburn et al. (2018), the technology may not only be a means of obtaining cost and productivity benefits but also a fundamental innovation to the tools by which humans innovate. Additionally, entrepreneurs must adjust to the broader, possibly detrimental impacts of these breakthroughs. Many people worry that artificial intelligence (AI) will affect professional and low-skilled service-based jobs (like contact centres) as well as legal, medical, and financial services. Some even anticipate that AI would cause widespread unemployment and other negative social effects. According to Kaplan and Haenlein (2019), artificial intelligence (AI) is a system's capacity to accurately understand external data, learn from that data, and use those learnings to accomplish particular tasks and goals through adaptable business and executive decision-making. These programs enable people to steer digital transformation, spur innovation, and grasp new opportunities in their businesses by arming managers, executives, and mid-career workers with AI competencies.



Business, in the words of Krueger (2015), is a way of thinking and doing that entails identifying and seizing chances to add value, frequently in a setting with limited resources or uncertainty. According to Davidsson and Wiklund (2021), entrepreneurship is the process of identifying and seizing possibilities, especially through the development of novel business models, the acquisition of resources, and organisational structures. There are four primary categories of artificial intelligence (AI) depending on their functionalities. These are, theory of mind, reactive machines, limited memory machines, and self-aware AI. The first and most basic AI systems are reactive machines, which react to various stimuli without the need for memory. Conversely, robots with limited memory can make decisions based on past experiences. Mental theory Artificial Intelligence (AI) is speculative and pertains to AI that comprehends human feelings, thoughts, and intents. Self-aware AI is a hypothetical concept that describes AI with consciousness and human-like thought and emotion processes.

Amidst the current corporate landscape, which is embracing technology like automation, robotics, and artificial intelligence, the Covid-19 pandemic in 2020 and early 2021 prompted many organizations worldwide to shift to remote employment. Global labour markets were disrupted by the pandemic in 2020, leading to abrupt and severe short-term consequences for millions of people who lost their jobs or were placed on furlough. Others quickly adapted to working from home as offices closed. These led to a change in the conventional business model, and as local and international business environments became more competitive, modern companies had to adopt a variety of strategies so as to stay profitable, competitive, and hold onto market share. Further revolutions in manufacturing, forecasting, customer service, and other areas are anticipated as a result of the replacement trend of technologies like automation, robotics, and artificial intelligence (Makridakis, 2017). Other areas covered in this paper are theoretical framework, the future of business, business education in Nigeria using the challenges and other issues

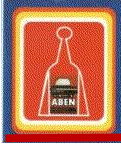
Theoretical Framework

This paper is hinged on the Technology Acceptance Model propounded by Fred Davies, (1989). This model explains how users come to accept and use new technologies. The model identifies two factors that influence technology adoption. They are perceived usefulness and perceived ease of use. The tenets that explain user' acceptance and use of technologies. These tenets revolve around how individuals perceive and interact with technology. The primary elements of TAM are: Perceived Usefulness (PU). The degree to which a person believes that using a particular technology will enhance their performance. Perceived Ease of Use (PEOU): the extent to which a person believes that using the technology will be free of effort. It is a theory that explain how users come to accept and use technology.

This idea is pertinent to this paper because it helps us understand how AI is adopted and used in corporate environments and institutions of learning. According to their perceptions, individuals, educational institutions and organisations owners either embrace or reject AI technology; this, in turn, affects the technologies' actual use. TAM helps to understand the psychological and behavioural elements that impact the acceptance of AI technologies and their effective integration into corporate operations by using TAM to study AI adoption in the workplace.

The Future of Business and Business Education in Nigeria Using AI

The use of AI in Nigerian businesses and educational institutions is a rapidly developing into a field of study. AI has the potential to revolutionise a number of industries, including logistics, business, educational institutions, finance, agriculture, and healthcare and others. AI is changing the corporate environment in Nigeria by fostering innovation, efficiency, and new



business models while tackling some challenges in the country's expanding economy. The ways that AI has impacted business are as follows:

Educational Sectors

AI is revolutionizing the educational sector globally, business education inclusive by introducing new ways to enhance teaching and administrative processes. AI enables personalized learning experiences by adapting to the needs of individual learners. It can be used to analyse student performance, learning styles and preferences to offer tailored content. Woolf (2020) highlighted how AI-driven intelligent tutoring systems can assess a student's level of understanding and provide customized feedback. AI facilitates automated grading and feedback systems, which help reduce the workload of the educators and provide faster feedback to students. AI also improves administrative efficiency by automating routine tasks such as scheduling, record-keeping and data analysis of students' progress. Equally AI systems can analyse vast amount of data generated by learners to predict outcomes, improve course materials and support students.

Financial Services (Fintech)

As asserted by Tobi and Oluwaseun (2021). Artificial Intelligence (AI) has been widely used in Nigeria's financial sector, especially through fintech solutions that use AI to improve client engagement, security, and operational efficiency. Artificial intelligence (AI)-powered solutions track and evaluate transaction patterns instantly to identify fraudulent activity, which is vital in a nation where the digital economy is expanding. Additionally, a lot of banks employ AI chatbots to answer consumer questions, saving personnel costs and providing round-the-clock assistance. With the use of artificial intelligence (AI), credit scoring has become a system that evaluates data from multiple sources, including social media and mobile money transactions, to determine a person's creditworthiness. This helps underprivileged people to access loans more easily.

Agricultural Business

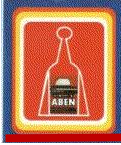
Artificial Intelligence is beginning to have an impact on Nigeria's agriculture industry. This supports precision farming by improving production and addressing inefficiencies in the agriculture industry. Real-time agricultural monitoring, optimal irrigation, soil management, and pest control are made possible by AI drones and sensors. By assisting farmers in forecasting crop yields and weather patterns, AI algorithms strengthen the agricultural industry's resilience to climate change. Additionally, to cut personnel costs and increase productivity, AI systems are being incorporated into agricultural machinery for planting, harvesting, and sorting Adegboye (2022).

Healthcare Business

The application of AI is not limited to the healthcare sector. AI is revolutionising the healthcare industry by enhancing resource management, accessibility, and diagnostics—especially in underprivileged areas. By assessing medical data, including imaging scans and patient records, AI-powered systems help clinicians diagnose diseases more quickly and accurately. According to Ogundipe and Abiodun (2021), AI-driven platforms make healthcare more accessible, especially in rural regions with inadequate infrastructure, by enabling physicians to conduct remote consultations. An artificial intelligence (AI) system can assess patient data to suggest individualised care, enhancing the standard of care.

Retail and E-Commerce

Artificial Intelligence improves consumer experience and streamlines logistics, all of which are major benefits to Nigeria's burgeoning e-commerce industry. To provide individualised



product recommendations and boost consumer engagement and sales, Balogun (2023) proposed that AI systems should monitor client preferences. Equally, companies using AI-powered systems may better anticipate demand, manage their inventory, and guarantee that goods will be on hand when needed. Artificial Intelligence (AI) chatbots are widely used in e-commerce platforms to answer consumer enquiries and increase service productivity.

Telecommunication Business

AI is being used by the telecom sector to enhance predictive analytics, customer service, and network management. AI is used in communication to evaluate and optimise network traffic, improving service quality and minimising downtime. According to Uche and Adeoye (2020), telecom businesses use artificial intelligence (AI) to handle high consumer inquiry volumes and provide real-time issue resolution through automated solutions. AI systems also assist in anticipating equipment breakdowns, which minimises downtime and enhances the organization's ability to provide services.

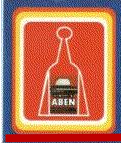
Manufacturing Business

Through automation and smart manufacturing systems, artificial intelligence (AI) can assist corporate organisations in Nigeria in modernising the manufacturing sector. AI-powered robots are being utilised to do repetitive jobs on production lines, lowering labour costs and improving corporate productivity, according to Eze (2023). AI keeps an eye on production procedures to identify and guarantee a constant level of product quality throughout the company. Artificial intelligence algorithms evaluate machine data to forecast maintenance requirements, minimising downtime and enhancing production continuity.

Challenges of AI Adoption in Business in Nigeria

Nigeria is experiencing a number of challenges in adopting AI, despite its potential for revolutionary change particularly in the industrial sector. The following are the difficulties that arise in the adoption of AI.

- ❖ The implementation of AI necessitates a dependable power source and internet access, both of which remain significant challenges in Nigeria due to infrastructure limitations and failure. Reliable internet access is lacking. Unreliable and poor internet connectivity is still a problem in many parts of Nigeria, which is important for AI applications that need cloud computing and real-time data processing (Adeniran & Abiodun, 2021). Equally, Nigerian corporate organisations frequently lack the data storage solutions needed to manage the sizable datasets needed for efficient AI operations.
- ❖ **High Costs of AI Technologies:** Most of the time, Nigerian businesses lack the funding necessary to properly adopt AI technologies, including maintenance, software, and hardware. For many Nigerian enterprises, this expense is a major obstacle (Eze & Chinedu, 2020). A significant percentage of Nigerian firms face difficulties in properly implementing and adopting artificial intelligence (AI) due to a trained manpower shortage. This shortfall affects the ability of organisations to design, build, and maintain AI systems.
- ❖ **Insufficient Power Supply:** there is serious energy deficit in Nigeria. According to Ogonnaya and Nwankwo (2019), Nigeria is a country where frequent power outages or epileptic power supplies are quite typical. This impairs the operational capabilities required for the best possible operation of AI systems.
- ❖ **Regulatory and Policy Framework:** Businesses wishing to implement AI face risks and uncertainties due to the lack of clear policies and regulations surrounding the technology. Inadequate data protection laws are constraints. Concerns regarding data security and privacy are raised by the lack of strong data protection laws. Companies are reluctant to implement AI systems that depend on large volume of data because they worry about



data breaches and legal fallout. According to Obafemi (2021), there is ambiguity over responsibility and liability when AI systems injure people or make bad choices. This uncertainty may discourage companies from utilising AI programs.

Multiple regulatory organisations that govern different parts of technology are also present in Nigeria's workplace, which results in fragmented regulations that can be confusing to firms. AI rules are often developed and implemented slowly, leading to antiquated laws that do not keep up with the speed at which technology is developing. Another issue is that regulators are not including industry stakeholders enough, which causes a gap between the legal framework and the actualities of using AI in the workplace.

- ❖ **Social and Cultural Barriers:** This is one of the challenges preventing Nigerian Businesses and educational institutions from Adopting AI. Many workers and business owners could be reluctant to use AI technologies because they don't want to modify their established ways of doing things and are afraid of losing their jobs. According to Adetunji and Eze (2021), certain employers and business owners are reluctant to accept changes, particularly when they involve uncertainty. The assimilation of AI into business procedures may be considerably slowed down by this opposition.

Workers and business owners alike are generally unaware of the features and advantages of artificial intelligence. This incomplete knowledge may cause people to doubt the dependability and efficacy of AI solutions (Okeke & Iwuanyanwu 2022). The acceptance of artificial intelligence (AI) tools may be impacted in certain situations by conventional wisdom that values human judgment above that of machines. The adoption of AI in Nigerian enterprises is greatly impacted by social and cultural constraints. To tackle these obstacles, awareness-raising activities, educational programs, and endeavours to cultivate a collaborative and innovative culture are necessary.

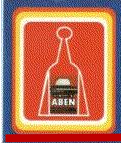
- ❖ **The Fear of Job Loss:** The idea that AI and automation will replace human occupations might lead to employee backlash against AI initiatives. Employee resistance to changes that jeopardise their job security may result from this worry, which could foster a hostile climate for the adoption of AI. Adediran's (2023) research demonstrates how the fear of losing one's job prevents people from adopting AI, particularly in the small and medium-sized business (SME) sector. Usually, employees are reluctant to embrace AI despite the technology's promise to boost productivity because they fear that automation would take their jobs.

Opportunities of AI Adoption in Business in Nigeria

Businesses in Nigeria stand to gain a great deal from using AI, including increased productivity, better decision-making, better customer service, and the ability to spur innovation in a variety of industries.

- **Improved Efficiency in Business**

Businesses in Nigeria stand to gain a lot from using AI, including increased productivity, better decision-making, better customer service, and the possibility to spur innovation in a number of industries. These benefits do, however, come with drawbacks, such as the requirement to upskill the workforce and infrastructure deficiencies. AI has the revolutionary potential to improve business operations by lowering operational costs, optimising procedures, and enhancing customer engagement in Nigerian enterprises, according to a study conducted by David-West and Oseni (2020). Artificial intelligence (AI) can manage repetitive jobs like data input, scheduling, and reporting, freeing up human labour for more strategic endeavours and cutting down expenses. Businesses can operate more efficiently



because of AI systems since they can work nonstop without getting tired. Equally, personnel costs are non-existence.

- **Better Decision-Making in Business**

Quality and faster decisions are made with the adoption of AI. Russell and Norvig (2021) claim that the use of AI in business offers a thorough examination of how AI algorithms improve decision-making. They underlined that artificial intelligence (AI) and machine learning may be used to enhance decision-making across a range of industries, from supply chain management to financial forecasting. AI is a potent tool for improving corporate decision-making through the automation of intricate decision-making procedures and the provision of real-time, data-driven insights. AI technologies are expected to have an increasing influence on decision-making as they advance, providing organisations with even more accuracy and efficiency.

- **Better Experience for Customers:** AI enables organizations to provide hyper-personalized experiences by analysing consumer data in real-time, which boosts customer pleasure, loyalty, and overall experience. AI improves customer experience by using customer data analysis to provide personalised product and service recommendations. Chatbots and virtual assistance that provide round-the-clock customer service enable customers to receive responses more quickly. Predictive analytics is another tool used by AI to foresee client demands and provide proactive solutions. Natural language processing enhances the quality of interactions by assisting the system in comprehending and answering client enquiries more efficiently

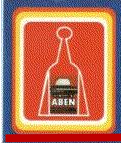
- **Artificial Intelligence (AI) possesses the capability to propel innovations:** In diverse company domains this is done by permitting novel items, services, and business models, in addition to promoting enhanced workflows, efficacy, and problem-solving abilities. Innovations are driven by AI in three areas: detecting possible innovations, analysing large datasets to speed up research and development (R&D), and stimulating outcomes. Artificial Intelligence is stimulating/promoting innovation in various industries, revolutionising conventional company frameworks and opening up fresh prospects for expansion and edge over competitors.

Conclusion

In summary, Artificial Intelligence (AI) has significant prospects for the future of business in Nigeria. AI technologies have the potential to completely transform a number of industries, including education in particular business education, finance, healthcare, agriculture and other sectors. This will lead to increased efficiency, innovation, and economic growth and development. Nigerian businesses must, nevertheless, overcome the main obstacles. Investment in digital infrastructure, skill development, and other areas is necessary to fully realise the potential of AI. Artificial Intelligence (AI) has the potential to revolutionise Nigeria's business environment and enhance economic diversification and global competitiveness, provided that the government and other stakeholders work together to develop appropriate regulations.

Implications for Business Education and Training in Nigeria

The utilization of AI in business operations has several implications for business education training in Nigeria's tertiary institutions. Business education tertiary institutions must integrate AI and technology-related courses, ensuring future professionals are well-versed in AI application in Nigeria. Emphasis on digital literacy, data analytics, machine learning and AI tools will be crucial to prepare students for the evolving job markets.



Educational institutions should partner with business organizations to provide practical training and real-time exposure to AI technologies. Strategic efforts should also be focus on ethical AI use, teaching students about data privacy, fairness and responsible use of technology. Conferences, seminars, and workshops to upskill and reskill business educators in the use of AI should be organized periodically. What has made AI training a big burden is shortage of funds. Multiple sources of finance are necessary to also foster a viable reward culture for trainers.

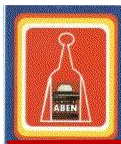
Recommendations

The following are suggested for policy options

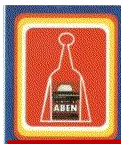
1. The government and business owners in Nigeria should prioritise strategic investments in strong digital networks in order to ensure the efficient and long-term implementation of artificial intelligence (AI) across a variety of businesses.
2. Tech companies and academic institutions should work together to produce AI-related certifications, training programmes, and academic curricula that meet international standards and build a workforce with the necessary skills to further AI adoption in businesses.
3. Nigeria's national development plans should be in line with a thorough AI integration strategy or roadmap in order to give businesses clear direction and guarantee that the adoption of AI significantly contributes to long-term business and economic change.

References

- Adegboye, R. (2022). The role of artificial intelligence in agriculture: A case study of Nigeria's farming industry. *African Journal of Agricultural Economics*, 12(2), 105-123.
- Adeniran, A. I., & Abiodun, E. A. (2021). The impact of internet infrastructure on e-commerce development in Nigeria. *Journal of African Business*.
- Aderemi, T. O., & Eze, S. C. (2022). Navigating the regulatory landscape of technology in Nigeria: Challenges and prospects. *African Journal of Science, Technology, Innovation and Development*
- Adetunji, A. R., & Eze, S. C. (2021). Understanding resistance to change in organizations: A study of the Nigerian context. *African Journal of Business Management*.
- Balogun, A. (2023). Artificial intelligence in retail: Enhancing Nigeria's e-commerce industry. *West African Journal of Business and Technology*, 17(1), 78-93.
- Cockburn, I. M., Henderson, R., & Stern, S. (2018). The impact of artificial intelligence on innovation. *National Bureau of Economic Research*.
- Choudhury, P., Starr, E., & Agarwal, R. (2018). Machine learning and human capital: Experimental evidence on productivity complementarities. *Harvard Business School*.
- Chukwudi, A. I. (2020). Data protection and privacy issues in Nigeria: The need for reform. *Journal of Internet Law*.
- Davidsson, P., & Wiklund, J. (2021). Entrepreneurship involves creating and capturing value through the identification and exploitation of opportunities, particularly through innovative business models, resource acquisition, and organizational forms.
- David-West, O., & Oseni, O. (2020). Digital transformation in Nigerian businesses: AI for operational efficiency. *Lagos Business School Research*.
- Eze, S. C., & Chinedu, E. (2020). Challenges of artificial intelligence adoption in Nigeria's SME sector. *Global Journal of Business Research*.
- Eze, A. (2023). AI and the future of manufacturing in Nigeria: Opportunities for growth innovation. *African Journal of Industrial Engineering*, 9(4), 99-115.



- Fayolle, A., & Gailly, B. (2015). Entrepreneurship is a dynamic process that involves creating, growing, and managing ventures, with the entrepreneur as the central actor who combines resources in innovative ways to create value.
- Fayolle, A., & Gailly, B. (2015). The impact of entrepreneurship education on entrepreneurial attitudes and intention: Hysteresis and persistence. *Journal of Small Business Management*, 53(1), 75-93.
- Hisrich, R. D., Peters, M. P., & Shepherd, D. A. (2016). *Entrepreneurship* (10th ed.). McGraw-Hill Education.
- Hoyer, W. D., et al. (2020). Artificial intelligence and the customer experience. *Journal of Service Research*, 23(2), 155-158.
- Kaplan, A., & Haenlein, M. (2019). Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. *Business Horizons*, 62(1), 15-25. <https://doi.org/10.1016/j.bushor.2018.08.004>.
- Krueger, N. F. (2015). *Entrepreneurial education in practice Part 1: The mindset*. OECD.
- Obafemi, A. (2021). Artificial intelligence and liability: Emerging legal challenges in Nigeria. *Nigerian Journal of Law and Public Policy*.
- Odugbesan, O., & Ogunleye, J. (2021). AI regulation in Nigeria: Current issues and future directions. *International Journal of Law and Information Technology*.
- Ogundipe, O., & Abiodun, O. (2021). AI in healthcare: Opportunities and challenges in Nigeria. *International Journal of Health Informatics in Africa*, 10(3), 56-72.
- Okafor, I. (2022). "Barriers to AI Adoption in Nigeria: Infrastructure, Skills, and Ethics." *Journal of Digital Economy and Innovation*, 5(2), pp. 34-47.
- Okeke, C. I., & Nduka, E. (2023). "Building a Collaborative Approach to AI Regulation in Nigeria: Engaging Stakeholders." *Journal of Business Ethics*.
- Oluwaseun, A., & Tobi, A. (2021). "Artificial Intelligence in Financial Technology Transforming the Nigerian Financial Sector." *Journal of Emerging Technologies in Finance*, 18(4), pp. 43-59.
- Russell, S., & Norvig, P. (2016). *Artificial Intelligence: A Modern Approach* (3rd ed.). Pearson.
- Russell, S., & Norvig, P. (2021). *Artificial Intelligence: A Modern Approach* (4th ed.). Pearson.
- Stone, P., Brooks, R., Brynjolfsson, E., Calo, R., Etzioni, O., & Hager, G. (2016). *Artificial intelligence and life in 2030: One-hundred-year study on artificial intelligence: Report of the 2015-2016 study panel*. Stanford University. <http://ai100.stanford.edu/2016-report>
- Uche, K., & Adeoye, F. (2020). The application of AI in Nigeria's telecom industry: Improving customer service and network efficiency. *Journal of Communications and Information Technology*, 22(2), 23-40.
- Woolf, B. P. (2020). Building intelligent interactive tutors: Student-centered strategies for revolutionizing e-learning. Morgan Kaufmann



INTEGRATION OF ARTIFICIAL INTELLIGENCE (AI) IN THE IMPLEMENTATION OF BUSINESS EDUCATION CURRICULUM IN TERTIARY INSTITUTIONS IN ANAMBRA STATE, NIGERIA

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Abstract

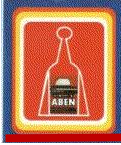
The study was carried out to assess the integration of artificial intelligence (AI) in the implementation of Business Education curriculum in tertiary institutions in Anambra State, Nigeria. The study was guided by four research questions and four corresponding hypotheses. The study adopted descriptive survey research design. The population of the study was 63 Business Education lecturers comprising 21 male and 42 female in three tertiary institutions in Anambra State (Nnamdi Azikiwe University, Chukwuemeka Odimegwu Ojukwu University and Federal College of Education, Umuze). The entire population of the study was adopted using census technique. Questionnaire was used as instrument for data collection and was validated by three experts. The reliability of the instrument was 0.81 obtained using Cronbach Alpha Statistic. The data collected were analysed using mean and standard deviation and t-test statistic was used to test the hypotheses at 0.05 level of significance. The findings indicated that lecturers were aware of Artificial Intelligence, the level of availability of AI tools in tertiary institutions was low and the extent of the used of AI in implementation of Business Education curriculum was to a low extent. Also, the challenges confronting the adoption of AI in Business Education curriculum implementation were: High cost of AI tools, poor technological development in Nigeria, inadequate technical know-how among lecturers, inadequate training and development of lecturers on AI, resistance to change and technological phobia among lecturers. Based on the findings, it was recommended among others that Institutional policies should be enacted requiring business education lecturers to incorporate AI tools in lesson planning, instructional delivery, and assessment.

Keywords: Artificial Intelligence (AI), Business Education, Curriculum and Tertiary Institutions

Introduction

The origin of Artificial Intelligence (AI) can be traced to 1956, when John McCarthy in an academic conference at Dartmouth College in Hanover, New Hampshire coined the term "artificial

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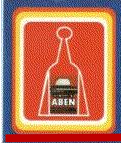


intelligence" (McGuire in Reagan, 2018). Therefore, investment and interest in AI became boomed in the first decades of the 21st century, when machine learning was successfully applied to many problems in academia and industry due to the presence of powerful computer hardware (Reagan, 2018). Artificial Intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines in contrast to natural intelligence displayed by humans and other animals. It is an artificial operating system that is generally based on human intelligence and is expected to exhibit high cognitive functions specific to human intelligence such as learning, comprehending, inferring, thinking and communicating (Ulaşan, 2023). In addition, AI is a technology that makes it possible to find solutions to problems and imitate the way of thinking of humans, based on the idea of copying human mental abilities (Sağlamtuğ, 2020). Today, AI is applied in many fields such as in defence industry, public administration, justice system, health sector, business, accounting and education both in administration and implementation of the curriculum at the basic and tertiary levels of education. Curriculum is therefore referred to as a prescribed and well-defined programme of studies which the learners must complete successfully in order to pass a certain academic level of education. It is also conceptualized as learning experience that makes up a particular subject matter in system of education (Ali & Ajibola, 2015). The author added that curriculum is an educational plan that spells out which goals and objectives to be achieved, which topics are to be covered, and which methods are to be used for teaching, learning and evaluation.

However, if the planned curriculum is not implemented, all efforts put together in the planning of the curriculum are in vain. Curriculum implementation may be described as the actual use of the planned curriculum or document in the classroom (Umoren, 2024). In view of Ekpo and Osam (2019) curriculum implementation is structured in various steps in achieving the desirable planned curriculum objectives of the programme of education. This implies that in order to actualize curriculum objectives, emphasis must be laid on the quality of educational programmes undertaken as well as the quality and competencies of the teachers who implement the curriculum of the different subject areas, Business Education inclusive. According to Ezeabii (2017), Business Education is an aspect of vocational education which equips individuals with the necessary skills and theoretical knowledge needed for performance in the Business world either for job or self-employment. Business Education is offered through four distinct options: Accounting Education, Office Technology and Management Education (OTME), Entrepreneurship Education and Marketing Education in accordance with the National Policy on Education. These programmes aim to equip students with the skills necessary for emerging jobs and innovations, enabling them to thrive in the world of work or pursue self-reliance. The medium of instruction is dynamic, driven by the demands of the ever-evolving job market.

The overarching goals of the Business Education programme are to produce well-qualified graduates capable of teaching courses on Business education. Also, the programmes embody the entrepreneurial spirit, develop the vocational skills of students and help them acquire the Business acumen required to succeed in the public sector as employees or in their private establishments as self-employed. To achieve these goals, specific entry requirements, essential facilities and modern technology such as AI are indispensable in the actualization of Business Education goals and objectives in tertiary institutions in Nigeria including the colleges of education.

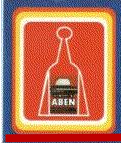
Tertiary institutions as described in the National Policy on Education referred to the education given after secondary education in universities, colleges of education, polytechnics, among others (FRN, 2014). Tertiary institutions are established to strengthen the production of middle and higher-level manpower in areas of national priority. Meanwhile, College of Education according to



Tsojon and Gidado (2017), (COE) is principally a teacher training institution established to produce teachers to teach at the secondary schools. They are tertiary educational institutions that prepare intermediate level teachers for a minimum of three years to make them qualify to teach their respective subjects. In Nigeria, Colleges of Education play a pivotal role in shaping the future educators and professionals in various disciplines. Therefore, integration of technologies such as AI tools in the implementation of any curriculum such as Business Education remain imperative in colleges of education

The AI tools for implementation of any curriculum according to Edidiong and Jude (2022) include: AI personal computer and search engines/Chatbots used as virtual assistants, AI audiopen and Eduaide AI lesson development tool **among others**. Edidiong and Jude added that through AI tools, the problem of lack of practical materials can be bypassed by AI adoption. Virtual workshop or laboratory could be used to supplement the limited workshop and laboratory equipment for entrepreneurship skills development of Business Education students so that the students could at least have practical experience of all Business Education entrepreneurship area taught and this will make the learning of the subject easy and meaningful and adequate skills could be acquired in the process. Meanwhile, Savaş (2021) added that AI can assist educators in giving feedback on lessons and topics, and can determine whether students understand the lessons and topics and report back to the lecturers. It also helps educators develop their professions and provide missing information. They can also support educators with always up-to-date information. It helps educators analyze exams. In educational institutions, AI can automate classification and helps institutions with data management. Niyogisubizo et al. (2022) added that AI helps lecturers save time and reduce errors by assisting them with tasks such as grading, lesson planning, and attendance taking. At the same time, AI can control their actions and thus errors can be reduced. In addition, AI-supported systems can provide lecturers with the necessary information about which subjects students are unsuccessful in and plan the lesson accordingly.

Additionally, lecturers can recognize outstanding students and their talents can be discovered earlier. AI can predict the potential of students dropping off schools. AI collects student data and quickly alert lecturers about students at risk of dropping off. Effective prediction also helps alert lecturers for early intervention of uncontrolled behaviors which could trigger dropping off and take active preventive measures (Niyogisubizo et al., 2022). However, with all the benefits of AI to the technological advancement of the society, Nigeria has not really enjoyed much of it especially in the implementation of curriculum in Business Education. This could be attributed to slow speed technological advancement in developing countries and low level of awareness among the lecturers in tertiary institutions on the integration of AI for effective implementation of curriculum (Edidiong & Jude, 2022). More so, Savaş (2021) maintained that the utilization of AI for curriculum implementation among lecturers are retard by some challenges such as: High cost of AI support devices, poor technological development in Nigeria, inadequate technical know-how among lecturers, inadequate technical support and infrastructure, inadequate training and development of lecturers on AI technical know-how among others and these challenges affect both genders of the lecturers (male and female) on the adoption of AI for curriculum implementation. Gender refers to the roles and responsibilities of men and women that are created in family, societies and culture. The concept of gender is the expectations held about characteristics, attitudes, and likely behaviour of both men and women (Ezeh, 2018). This implies that the challenges of the challenges confronting the adoption of AI in Business Education curriculum implementation in tertiary institutions are applicable to both male and female lecturers. Thus, it is therefore on this background, the researchers sought to assess the integration of



artificial intelligence (AI) in the implementation of Business Education curriculum in tertiary institutions in Anambra State, Nigeria.

Statement of the Problem

The adoption of AI for effective curriculum implementation in Nigeria and the essential role AI plays in the technological advancement of the society cannot be undermined. It provides opportunities for lecturers to be exposed to different techniques of instructional delivery, lesson preparation, content delivery skills, grading and evaluation of students' knowledge and skills. With all the benefits of AI to the technological advancement of the society, Nigeria has not really enjoyed much of it, especially in the area of integration of AI for Business Education curriculum implementation. This could be attributed to the fact that knowledge of AI has not been fully localized and utilized. Adoption of AI for teaching and learning of Business Education in tertiary institutions are still at its early stage. Hence, many lecturers lack high level of awareness couple with inadequate availability of AI tools in tertiary institutions which also affect the extent of the use of AI for instructional tasks. This has contributed to poor implementation of curriculum in tertiary institutions and poor learning outcomes on the part of students where many graduates do not acquire adequate knowledge and skills on the course they studied. Consequently, it is on this backdrop it became imperative to assessed with empirical evidence the integration of artificial intelligence (AI) in the implementation of Business Education curriculum in tertiary institutions in Anambra State, Nigeria

Research Questions

The following research questions guided the study:

1. What are the levels of availability of AI tools for the implementation of Business Education curriculum in tertiary institutions in Anambra State?
2. What are the awareness levels of lecturers on the use of AI in the implementation of Business Education curriculum in tertiary institutions in Anambra State?
3. To what extent does AI used in implementation of Business Education curriculum in tertiary institutions?
4. What are the challenges confronting the adoption of AI in Business Education curriculum implementation in tertiary institutions in Anambra State?

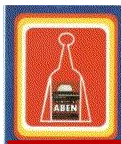
Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance:

- H0₁:** There is no significant difference between the mean ratings of male and female Business Education lecturers on the levels of availability of AI tools for the implementation of Business Education curriculum in tertiary institutions in Anambra State.
- H0₂:** There is no significant difference between the mean ratings of male and female Business Education lecturers on the awareness levels of lecturers on the use of AI in the implementation of Business Education curriculum in tertiary institutions in Anambra State.
- H0₃:** There is no significant difference between the mean ratings of male and female Business Education lecturers on the extent of the used of AI in implementation of Business Education curriculum in tertiary institutions and
- H0₄:** There is no significant difference between the mean ratings of male and female Business Education lecturers on the challenges confronting the adoption of AI in Business Education curriculum implementation in tertiary institutions in Anambra State.

Methods

The study adopted descriptive survey research design. The population of the study was 63 Business Education lecturers comprising 21 male and 42 female in three tertiary institutions in



Anambra State (Nnamdi Azikiwe University, Chukwuemeka Odimegwu Ojukwu University and Federal College of Education, Umuze). The entire population of the study was adopted using census technique. Questionnaire tagged: Integration of Artificial Intelligence (AI) in the Implementation of Business Education Curriculum Questionnaire (IAIBECQ) was developed by the researcher and validated by three experts. The reliability of the instrument was 0.81 obtained using Cronbach Alpha statistic. The data collected were analysed using mean, standard deviation and t-test analysis. Research question 1, 2 and 3 were answer using real limit of numbers as follows: Very Low Level (VLL) 1.00 – 1.49, Low Level (LL) 1.50 – 2.49, High Level (HL) 2.50 – 3.49 and Very High Level (VHL) 3.50 - 4.00., Not Aware (NA) 1.00 - 1.49, Aware (A) 1.50 - 2.49, Highly Aware (HA) 2.50 - 3.49 and Very High Aware (VHA) 3.50 - 4.00. and Very Low Extent (VLE) 1.00 - 1.49, Low Extent (LE) 1.50 - 2.49, High Extent (HE) 2.50 - 3.49 and Very High Extent (VHE) 3.50 - 4.00 respectively.

In addition, mean and standard deviation was used to answer research question 4. On the other hand, t-test statistic was used to test the four null hypotheses at 0.05 level of significance.

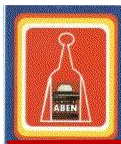
However, the mean was computed as follows $\bar{X} = \frac{\sum X}{n} = \frac{4+3+2+1}{4} = \frac{10}{4} = 2.50$. Therefore, the mean cut-off mark of 2.50 and above was considered as agreed while the mean cut off below 2.50 was considered as disagreed. With respect to the hypotheses, the hypotheses of no significant difference was upheld for items since t-calculated value are less then t-table value and rejected on the contrary.

Results

Research Question 1:What are the levels of availability of AI tools for the implementation of Business Education curriculum in tertiary institutions in Anambra State?

Table 1: Mean and Standard Deviation Responses on the Levels of Availability of AI Tools for the Implementation of Business Education Curriculum in Tertiary Institutions in Anambra State N=63

S/N	ITEM STATEMENTS	$\bar{X}_m$	S.D _m	$\bar{X}_f$	S.D _f	$\bar{X}_{mf}$	S.D _{mf}	t-cal.	Rmks
1.	AI Personal Computer (AI-PC)	1.83	0.37	1.76	0.42	1.79	0.39	0.68	NS
2.	AI audiopen	1.81	0.38	1.78	0.41	1.79	0.39	0.29	NS
3.	Intelligent robot	1.87	0.33	1.81	0.38	1.84	0.35	0.65	NS
4.	Eduaide AI lesson development tool	1.83	0.37	1.81	0.38	1.82	0.38	0.20	NS
5.	Century tech	1.75	0.43	1.74	0.43	1.74	0.43	0.09	NS
6.	Canva magic write	1.85	0.35	1.80	0.40	1.82	0.37	0.51	NS
7.	Knewton's Alta	1.77	0.41	1.78	0.41	1.77	0.41	-0.29	NS
8.	AI Curipod	1.80	0.40	1.88	0.32	1.84	0.36	-0.80	NS
9.	AI Slidesgo	2.41	0.83	2.38	0.79	2.39	0.81	0.14	NS



Keys: $\bar{x}_m$ = Mean of male lecturers, $\bar{x}_f$ = Mean of female lecturers, SD_m = Standard deviation of male lecturers, SD_f = standard deviation of female lecturers, $\bar{x}_{mf}$ = Grand mean of male and female lecturers, SD_{mf} = Grand standard deviation of male and female lecturers, N = Number of respondents, t -table value = 1.99, t -calculated = significant level: 0.05, S^* = Significant, NS = Not Significant, Degree of Freedom = $n_1 + n_2 - 2 = 21 + 43 - 2 = 61$.

The data presented in Table 1 above revealed that the mean responses of the respondents in all the 9 items ranged between 1.74 and 2.39 indicating that respondents agreed with those item statements on a low level. The standard deviation of all the 9 items also ranged between 0.35 and 0.81 which shows that the respondents were close to one another in their responses.

In addition, the data further shows that the 9 items in the table had its t -calculated (t -cal.) value ranged from -0.29 to 0.68 which is less than t -table (t -tab.) value of 1.99 at $p \leq 0.05$ level of significance and at 61 degree of freedom (df). This finding revealed that there is no significant difference between the mean ratings of male and female Business Education lecturers on the levels of availability of AI tools for the implementation of Business Education curriculum in tertiary institutions. Therefore, the null hypothesis was accepted.

Research Question 2: What are the awareness levels of lecturers on the use of AI in the implementation of Business Education curriculum in tertiary institutions in Anambra State?

Table 2: Mean and Standard Deviation Responses on the Awareness Levels of Lecturers for the Use of AI Tools for the Implementation of Business Education Curriculum in Tertiary Institutions in Anambra State
 $N=63$

S/N	ITEM STATEMENTS	$\bar{x}_m$	SD_m	$\bar{x}_f$	SD_f	$\bar{x}_{mf}$	SD_{mf}	t -cal.	Rmks
10.	AI Personal Computer (AI-PC) for processing of information	2.37	0.95	2.25	0.91	2.31	0.93	0.50	NS
11.	AI audiopen for generating text	2.32	0.87	2.30	0.92	2.31	0.89	0.84	NS
12.	Intelligent robot (like Mavis Beacon)	2.42	1.04	2.34	0.83	2.38	0.94	0.62	NS
13.	Century for tracking students' progress	2.40	0.78	2.37	0.80	2.38	0.79	0.14	NS
14.	Canva magic write for brainstorming and creating outline	2.44	1.25	2.40	0.77	2.42	1.01	0.13	NS
15.	Knewton's Alta for learning with provision of textbooks and videos	2.33	1.05	2.30	0.85	2.32	0.95	0.11	NS
16.	AI Curipod for lesson customization	2.48	1.00	2.42	0.79	2.45	0.89	0.24	NS
17.	Eduaide AI lesson development tool for lesson preparation	2.46	0.93	2.38	0.79	2.42	0.86	0.34	NS



18. AISlidesgo for preparing instructional presentation 2.38 1.24 2.37 0.80 2.37 1.02 0.03 NS

Keys: $\bar{x}_m$ = Mean of male lecturers, $\bar{x}_f$ = Mean of female lecturers, SD_m = Standard deviation of male lecturers, SD_f = standard deviation of female lecturers, $\bar{x}_{mf}$ = Grand mean of male and female lecturers, SD_{mf} = Grand standard deviation of male and female lecturers, N = Number of respondents, t -table value = 1.99, t -calculated = significant level: 0.05, S^* = Significant, NS = Not Significant, Degree of Freedom = $n_1 + n_2 - 2 = 21 + 43 - 2 = 61$.

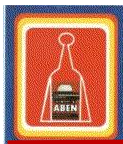
The data presented in Table 2 above revealed that the mean responses of the respondents in all the 9 items ranged between 2.31 and 2.45 indicating that the lecturers were aware of the use of different AI tools in the implementation of Business Education curriculum in tertiary institutions. The standard deviation of all the 9 items also ranged between 0.89 and 1.02 which shows that the respondents were close to one another in their responses.

In addition, the data further shows that the 9 items in the table had its t -calculated (t -cal.) value ranged from 0.03 to 0.84 which is less than t -table (t -tab.) value of 1.99 at $p \leq 0.05$ level of significance and at 61 degree of freedom (df). This finding revealed that there is no significant difference between the mean ratings of male and female Business Education lecturers on the awareness levels of lecturers on the use of AI in the implementation of Business Education curriculum in tertiary institutions. Therefore, the null hypothesis was accepted.

Research Question 3: To what extent does AI used in implementation of Business Education curriculum in tertiary institutions in Anambra State?

Table 3 Mean and Standard Deviation Responses on the Extent of the Used of AI in the Implementation of Business Education Curriculum in Tertiary Institutions in Anambra State. $N=63$

S/N	ITEM STATEMENTS	$\bar{x}_m$	$S.D_m$	$\bar{x}_f$	$S.D_f$	$\bar{x}_{mf}$	$S.D_{mf}$	t -cal.	Rmks
19.	AI is used for lesson planning and preparation in Business Education	1.80	0.40	1.72	0.44	1.76	0.42	0.72	NS
20.	AI is used for the development of Business Education instructional content	1.70	0.45	1.68	0.46	1.69	0.45	0.17	NS
21.	AI is used as virtual platform to provide students with first-hand information in Business Education	1.67	0.47	1.61	0.48	1.64	0.47	0.47	NS
22.	AI is used in teaching students different skills	1.67	0.47	1.63	0.48	1.65	0.47	0.31	NS
23.	AI is to access new information on a particular subject matter in	1.78	0.41	1.75	0.43	1.76	0.42	0.27	NS



Business Education

24.	AI is used to enhance communication in the classroom by lecturers	1.74	0.43	1.66	0.47	1.70	0.45	0.67	NS
25.	AI is used as self-support for extra-tutorials for study clarification in Business Education subject matter	1.79	0.40	1.70	0.45	1.74	0.42	0.81	NS
26.	It keeps the instructors updated with new skills on the subject area	1.74	0.43	1.70	0.45	1.72	0.44	0.34	NS
27.	AI is used to identify curriculum gaps	1.68	0.46	1.62	0.48	1.65	0.47	0.48	NS
28.	Evaluation of students performance	1.64	0.47	1.60	0.49	1.62	0.48	0.31	NS

Keys: $\bar{x}_m$ = Mean of male lecturers, $\bar{x}_f$ = Mean of female lecturers, SD_m = Standard deviation of male lecturers, SD_f = standard deviation of female lecturers, $\bar{x}_{mf}$ = Grand mean of male and female lecturers, SD_m = Grand standard deviation of male and female lecturers, N =Number of respondents, t -table value= 1.99, t -calculated = significant level: 0.05, S^* =Significant, NS = Not Significant, Degree of Freedom = $n_1+n_2-2= 21+43-2= 61$.

The data presented in Table 3 above showed that the mean responses of the respondents in all the 10 items ranged between 1.62 and 1.74 indicating that AI tools were used on low extent in the implementation of Business Education curriculum in tertiary institutions. The standard deviation of all the 9 items also ranged between 0.42 and 0.48 which shows that the respondents were close to one another in their responses.

More so, the data further shows that the 10 items in the table had its t -calculated (t -cal.) value ranged from 0.17 to 0.81 which is less than t -table (t -tab.) value of 1.99 at $p \leq 0.05$ level of significance and at 61 degree of freedom (df). This finding revealed that there is no significant difference between the mean ratings of male and female Business Education lecturers on the extent of the used of AI in implementation of Business Education curriculum in tertiary institutions. Therefore, the null hypothesis was accepted.

Research Question 4: What are the challenges confronting the adoption of AI in Business Education curriculum implementation in tertiary institutions?

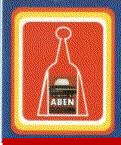
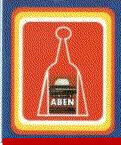


Table 4: Mean and Standard Deviation Responses on the Challenges Confronting the adoption of Lecturers for the Use of AI Tools for the Implementation of Business Education Curriculum in Tertiary Institutions
N=63

S/N	ITEM STATEMENTS	$\bar{x}_m$	S.D _m	$\bar{x}_f$	S.D _f	$\bar{x}_{mf}$	S.D _{mf}	t-cal.	Rmks
29.	Poor technological development in Nigeria	3.78	0.43	3.77	0.64	3.77	0.53	0.07	NS
30.	Inadequate technical know-how among lecturers	3.82	0.56	3.50	0.83	3.66	0.69	1.81	NS
31.									
	High cost of AI tools	3.64	0.60	3.76	0.51	3.70	0.55	-0.78	NS
32.									
	Inadequate training and development of lecturers on utilization of AI	3.69	0.57	3.73	0.47	3.71	0.52	-0.28	NS
33.	Resistance to change by some lecturers	3.64	0.51	3.90	0.29	3.77	0.40	-2.20	NS
34.	Technological phobia among lecturers	3.56	0.62	3.54	0.72	3.55	0.67	0.11	NS
35.	Instability of power supply in tertiary institutions	3.65	0.63	3.64	0.63	3.64	0.63	0.06	NS
36.	High cost of subscription for some AI application	3.50	0.76	3.55	0.83	3.52	0.79	-0.24	NS
37.	Poor funding of education	3.70	0.53	3.63	0.73	3.66	0.63	0.43	NS

Keys: $\bar{x}_m$ = Mean of male lecturers, $\bar{x}_f$ = Mean of female lecturers, SD_m = Standard deviation of male lecturers, SD_f = standard deviation of female lecturers, $\bar{x}_{mf}$ = Grand mean of male and female lecturers, SD_{mf} = Grand standard deviation of male and female lecturers, N=Number of respondents, t-table value= 1.99, t-calculated = significant level: 0.05, S* =Significant, NS = Not Significant, Degree of Freedom = $n_1+n_2-2= 21+43-2= 61$.

From the table 4 above, the means response of the respondents ranges from 3.52 to 3.77 which are above the cut-off point of 2.50. This implies that the 9 items are the challenges confronting the adoption of AI in Business Education curriculum implementation in tertiary institutions. Also the standard deviation of all the items ranges from 0.40 - 0.79 which shows that the responses of the



respondents are close to one another in their responses and that they were not far from the mean.

Meanwhile, the data further indicated that the 9 items in the table had its t-calculated (t-cal.) value ranged from -0.24 to 1.81 which is less than t-table (t-tab.) value of 1.99 at $p \leq 0.05$ level of significance and at 61 degree of freedom (df). This finding revealed that there is no significant difference between the mean ratings of male and female Business Education lecturers on the challenges confronting the adoption of AI in Business Education curriculum implementation in tertiary institutions. Therefore, the null hypothesis was accepted.

Discussions of the Findings

The findings were discussed in accordance with the research questions and hypotheses that guided the study as follows:

From the findings of the study on research question one, it was revealed that the level of availability of AI tools for the implementation of Business Education curriculum in tertiary institutions was low. In addition, the finding revealed that there was no significant difference between the mean ratings of male and female Business Education lecturers on the levels of availability of AI tools for the implementation of Business Education curriculum in tertiary institutions. Therefore, the findings correspond to the study of Edidiong and Jude (2022) that the level of availability of AI tools for teaching physics was low in Nigerian schools. The findings also relate with the study of Chassignol, Khoroshavin, Klimova, and Bilyatdinova, (2018) that the level of availability of AI tools for instructional tasks in schools are low.

The findings of the study on research question two indicated that the lecturers were aware of the use of different AI tools in the implementation of Business Education curriculum in tertiary institutions. Furthermore, the corresponding hypothesis tested revealed that there is no significant difference between the mean ratings of male and female Business Education lecturers on the awareness levels of lecturers on the use of AI in the implementation of Business Education curriculum in tertiary institutions. The findings relate with the study of Edidiong and Jude (2022) that teachers were aware on the integration of AI for teaching and learning but the awareness level was low.

More so, the findings of the study on research question three showed that AI tools were used on low extent in the implementation of Business Education curriculum in tertiary institutions. Meanwhile, the corresponding hypothesis tested revealed that there is no significant difference between the mean ratings of male and female Business Education lecturers on the extent of the used of AI in implementation of Business Education curriculum in tertiary institutions. Thus, the findings align with the study of Umoh (2024) that the extent of the applications of artificial intelligence gadgets for teaching and learning agricultural education in colleges of education was on low extent. The findings also relate with the study of Chassignol, Khoroshavin, Klimova, and Bilyatdinova, (2018) that the level of the used of AI tools for instructional tasks in schools are on a low extent.

From the findings of the study on research question one, it was revealed that the challenges confronting the adoption of AI in Business Education curriculum implementation in tertiary institutions include: Poor technological development in Nigeria, inadequate technical know-how among lecturers, high cost of AI tools, inadequate training and development of lecturers on utilization of AI, resistance to change by some lecturers, technological phobia among lecturers and poor funding of education. Also, the corresponding hypothesis tested revealed that mean ratings of male and female Business Education lecturers on the challenges confronting the adoption of AI in Business Education curriculum implementation in tertiary institutions. Thus, the study is in tandem with Savas (2021) who found out that the utilization of AI for curriculum



implementation among lecturers are retard by some challenges such as: high cost of AI support devices, poor technological development in Nigeria, poor technical know-how among lecturers, poor technical support and infrastructure, inadequate training and development of lecturers on AI technical know-how among others. The findings also align with the study of Edidiong and Jude (2022) that Nigeria has not really enjoyed much of the benefits of AI in the implementation of curriculum due to slow speed technological advancement in developing countries and low level of awareness among the lecturers in tertiary institutions on the integration of AI for effective implementation of curriculum.

Conclusion

From the findings of the study, it was concluded that the level of availability of AI tools for the implementation of Business Education curriculum in tertiary institutions was low. In addition, the lecturers were aware of the use of different AI tools in the implementation of Business Education curriculum in tertiary institutions. Furthermore, the AI tools were used on low extent in the implementation of Business Education curriculum in tertiary institutions. Meanwhile, the challenges confronting the adoption of AI in Business Education curriculum implementation in tertiary institutions include: Poor technological development in Nigeria, inadequate technical know-how among lecturers, high cost of AI tools, inadequate training and development of lecturers on utilization of AI, resistance to change by some lecturers, technological phobia among lecturers and poor funding of education.

Recommendations

Based on the findings and conclusion drawn from the study, it was recommended that:

1. The Anambra State government and tertiary institution management should prioritise the provision of modern AI tools and supportive infrastructure by allocating dedicated budget lines for acquiring AI hardware and software
2. Tertiary institutions should integrate mandatory training and orientation sessions on AI applications into their induction programmes for academic staff, ensuring all business education lecturers develop a thorough understanding of the functions, relevance, and instructional possibilities of available AI tools
3. Institutional policies should be enacted requiring business education lecturers to incorporate AI tools in lesson planning, instructional delivery, and assessment.
4. Stakeholders should develop and implement a comprehensive support framework that includes funding subsidies, reliable power supply solutions, and continuous capacity-building programmes to address barriers such as high costs, technological phobia, inadequate training, and infrastructural deficits hindering effective AI adoption.



References

- Chassignol, M. A. Khoroshavin, A., Klimova, A. & Bilyatdinova, A. (2018). Artificial intelligence trends in education: A narrative overview. *Procedia Computer Science*, 136, 16-24.
- Edidiong, E. U. & Jude, N. (2022). Artificial Intelligence (AI) adoption for teaching physics in senior secondary schools in Ibadan North Local Government Oyo State, Nigeria. *International Journal for Infonomics (IJI)*, 15(1), 2121-2131.
- Ezeabii, I. C. (2017). Entrepreneurial planning and organisational skills needed by business education students in public universities in South-East states of Nigeria for self employment. *Nigeria Journal of Business Education* 4(2), 195-204.
- Ezeh, N. J. (2018). Factors affecting secondary school students' interest in biology. *Journal of Science Education*, 7(4), 40-57.
- Federal Republic of Nigeria (2014). *National policy on education*. Lagos, Nigeria: Nigerian Educational Research Development Press.
- Livetilesglobal. (2021). *Artificial intelligence in the classroom*. Retrieved from <https://livetilesglobal.com/pros-cons-artificial-intelligence-classroom/>.
- Niyogisubizo, J., Liao, L., Nziyumva, E., Murwanashyaka, E., & Nshimyumukiza, P. C. (2022). Predicting Student's Dropout In University Classes Using Two-Layer Ensemble Machine Learning Approach: A Novel Stacked Generalization. *Computers and Education: Artificial Intelligence*, 3 (34), 1354-1365.
- Reagan N. R. (2018). Artificial intelligence: Its Importance, Challenges and Applications in Nigeria. *Direct Research Journal of Engineering Technology*, 5 (5), 36-41.
- Sağlamtunç, K. S. (2020). *Artificial intelligence*. Retrieved from <https://www.mmo.org.tr/sites>.
- Savaş, S. (2021). Artificial intelligence and innovative applications in education: The Case of Turkey. *Journal of Information Systems and Management Research*, 3(1), 14-26.
- Tsojon, J. D. & Gidado, I. (2017). Strategies for enhancing the competence of pre-service teachers in Electrical/Electronic Department in College of Education in Rivers State. *Journal of Educational Innovators*, 4(1), 295-301.
- Ulaşan, F. (2023). The Use of Artificial Intelligence in Educational Institutions: Social Consequences of AI in Education. *Korkut Ata Türkiyat Araştırmaları Dergisi*, Özel Sayı 1, 1305-1324.
- Umoh, I. J. (2024). Utilization of artificial intelligence in teaching agricultural education in colleges of education in south-south Nigeria. *Unpublished Master Degree Thesis*, Department of Agricultural and Vocational Education, Michael Okpara University of Agriculture, Umudike.



APPLICATION OF ARTIFICIAL INTELLIGENCE IN TRANSFORMING SMALL AND MEDIUM SCALE ENTERPRISES IN ANAMBRA STATE.

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Abstract

This study determined the application of artificial intelligence in transforming small and medium scale enterprises in Anambra State. Two null hypotheses were tested at 0.05 level of significance. Descriptive survey research design was adopted for the study. This study was carried out in Anambra State which is one of five states in the south east zone of Nigeria. The population of the study comprised 2,837 SME managers of enterprises in Anambra State who are registered with the State Ministry of Commerce, Industry and Technology. The sample size of 351 SME managers was used for the study. The sample size was derived using the Taro Yamani formula. A structured questionnaire was used for data collection. The face validity of the instrument was established using the opinions of three experts in business education. The application of Cronbach Alpha reliability method on the two clusters of the instrument yielded coefficient values of 0.84 and 0.82 for clusters B1 and B2 respectively. An overall reliability coefficient value of 0.83 was obtained. From the findings of the study, it was revealed that managers of SMEs in Anambra State applied artificial intelligence in supply chain management and customer service in small and medium scale enterprises in Anambra State based on years of experience. The study further revealed that there is no significant difference in the mean ratings of managers on the extent of application of artificial intelligence in supply chain management and customer service in small and medium scale enterprises in Anambra State. Based on the findings, it was recommended among others that government, in a bid to promote SMEs and make them sustainable, should carry out awareness and training programs to let them know about the existence of certain AI technologies and their usage in their businesses, to encourage them to embrace it for their businesses.

Keywords: Artificial Intelligence, small and medium scale enterprises.

Introduction

The existence of small businesses in different nations is crucial to their growth and development. Over the years, SMEs have been observed to play a role in the job and employment creation dynamics of countries. This position was highlighted by Bandari (2019), who stated that SMEs are of significant importance in the economy as they make substantial contributions to employment generation, innovation, and overall economic expansion. They frequently serve as primary catalysts for economic expansion within communities, as they generate employment opportunities and offer local citizens avenues for economic advancement. According to the European Union (EU), small enterprises are businesses with less than 50 employees, while medium sized enterprises are independent businesses with fewer than 250 employees (Vajjhala & Strang, 2019). Small and medium-sized enterprises (SMEs) are prevalent in Nigeria and are often viewed as the backbone of the Nigerian economy. According to the National Bureau of Statistics, SMEs account for 96% of businesses and 84% of employment creation in Nigeria (Otitoju, 2023). With a total number of about 17.4 million, they account for



about 50% of industrial jobs and nearly 90% of the manufacturing sector (Ilo, Soyobo&Olowofela, 2023).

The Central Bank of Nigeria defined SMEs as enterprises which have an annual turnover not exceeding Five Hundred Thousand Naira (N500, 000). SMEs are non-subsidary, independent firms/organizations which employ fewer numbers of employees (Fatima & Akhtar, 2023). Such organizations must and can be registered under any part of the Companies and Allied Matters Act (CAMA) in order to do business in Nigeria (Elendu, 2023). Small and medium scale enterprises are business organizations set-up by individuals or group of individuals, known as business operators, for the main purpose of providing goods and services. Their classification into small and medium enterprises depends on the scale or size of business operators' control. Furthermore, small and medium scale enterprises engage in different types of activities ranging from construction, agro-allied, information technology, manufacturing, educational establishments, business services, tourism and leisure. Small and medium scale businesses exist in the form of sole proprietorship and partnership, though some could be registered as limited liability companies and characterized by: simple management structure, informal employer/employee relationship, labour intensive operation, simple technology, fusion of ownership and management and limited access to capital (Olufemi, 2017).

Small and medium scale businesses are largely present in Anambra State where a large percentage of the residents are entrepreneurs or owners of small and medium businesses. The presence of small and medium scale business has increased economic activities in the State and has helped to improve the revenue base of the State. Some of these enterprises are overseen by managers employed by the business owners. An advantage of this form of business is that the owner or manager is usually involved in daily operations and is in a position to personally safeguard the assets of the business. Business owners, according to Okolo (2014), are people who have the ability to see and evaluate business opportunities, put together the necessary resources to take advantage of them and to initiate appropriate actions to ensure success. The business owners employ and contract the managers to oversee the running of their businesses. A manager can be seen as a person who is responsible for the realization of management processes, which make plans and decisions, organizes, supervises and controls human, financial and information resources of business enterprises. Gorgievski, Ascalon and Stephan (2011) defined a manager as the person employed in an administrative position, who has comprehensive knowledge necessary for leading people and managing an organization in order to achieve optimal realization of set tasks in confined conditions. Thus, the manager of a small-scale business is the person who is employed by the owner of the venture to oversee the management of the business which includes the management of the material and human resources on his behalf.

Nowadays, digital transformation of society and economy is in full swing, offering companies in all industries numerous chances to develop at different levels. Innovative technologies such as artificial intelligence (AI) create new opportunities and solutions where humans and systems have reached their limits (Wangler&Botthof, 2019). AI has become a multi-purpose technology transforming production and service delivery, with the potential to significantly impact economic growth and social progress of SMEs in Nigeria. According to the Organisation for Economic Co-operation and Development (OECD), despite potentially tremendous benefits, SMEs lag in the digital transformation. Emerging technologies, as diverse as they are, offer a range of applications for them to improve performance and overcome the size-related limitations they face in doing business (Nolan, 2019). AI can substantially affect the SME business environment by enhancing the efficiency of public administration, courts and tax



authorities, reducing red tape, securing digital infrastructure, improving SMEs' access to finance, easing skills management and job matching, or reducing the costs of experimentation and innovation (Nolan, 2021, Drydakis, 2022).

Artificial Intelligence (AI) is the ability of machines to do what intelligent humans do. This is a manifestation of the cognitive abilities of machines. In academia, it encompasses the study of how digital computers and algorithms undertake tasks and address intricate problems that typically require human intelligence, reasoning, and predictive capabilities to adapt to dynamic situations (Giuggioli & Pellegrini, 2023). Grover, Kar, and Dwivedi (2022) opined that AI can be defined as the ability of a system to acquire knowledge by evaluating data obtained from its external environment. This acquired knowledge is then utilized to adapt existing plans or generate new ones to effectively respond to changes in the environment. It involves the conceptualization and development of computational systems capable of performing tasks typically associated with human intelligence, such as the recognition of speech, interpretation of visual information, and decision-making processes (Rai et al., 2019). The deployment of AI in businesses includes the utilization of algorithms such as machine learning for text analytics, and predictive models are employed to extract patterns from the data (Sturm et al., 2021). In addition, it entails the implementation of robotic automation and virtual agents to facilitate business processes (Davenport & Ronanki, 2018).

Artificial Intelligence is mainly applied to small and medium-sized businesses to gain a competitive advantage. Artificial intelligence application to SMEs aims to increase company performance and sales, low cost, save time, and improve customer management. Some techniques used to implement artificial intelligence include deep learning, neural networks, expert systems, machine learning, and fuzzy logic. With these various techniques, artificial intelligence remains constant to build flexible, interactive, and adaptive solutions to customers' needs and problems (Strang & Sun, 2019). Numerous options are available to SMEs that want to use AI in their operations. Burian (2020) argued that firms deploy a range of AI tools and solutions, such as machine learning and deep learning, to improve their forecast accuracy and detect problems at an early stage. Organizations have the potential to implement other categories of AI systems, such as the use of ChatBots, language recognition and processing, image recognition, and object manipulation. Examples of technologies in the field include natural language processing (NLP), machine learning systems, gaming systems, and object detection (Greenberg, 2017). AI technology has the capacity to automate several routine and repetitive jobs in nature. This automation process enables the allocation of important time and resources to strategic and creative endeavors. For instance, AI technology has the potential to automate various duties such as data input, customer support, and marketing, enabling people to allocate their efforts to more valuable endeavors. The implementation of this solution has the potential to enhance operational efficiency, minimize expenditures, and enhance the overall productivity of small enterprises (Bandari, 2019). It also has the potential to help small businesses make informed and data-driven decisions (Bandari, 2019).

In today's market, AI has become vital support with services like social media monitoring, self-driving cars, smart assistants like Siri, virtual traveling booking agents, automated financial investing, predict machinery failures, and so on. While SMEs' innovation processes might sometimes be difficult to generalize, several features are commonly discussed in this regard. In comparison to large businesses, SMEs have a unique set of hurdles that may result in poor innovation performance. SMEs often face market failures that pose challenges to their competitive environment and the adoption of innovative ways of doing things, such as limited access to funding, constraints on innovation, and difficulties in complying with environmental



regulations (Commission, 2015; Kursh& Gold, 2016). Additionally, SMEs have greater workforce constraints due to a shortage of or insufficiently skilled people. They lack alternative goods or “cash cows” to offset the low return on investment (ROI) associated with innovation. SMEs frequently struggle to overcome structural hurdles such as a lack of managerial and technical skills, labor market rigidities, and inadequate information about expansion prospects (Borah et al. 2022).

Despite the numerous challenges faced by SMEs in Nigeria, several remarkable businesses have achieved success through innovative approaches and strategic decision-making. It has been shown that SMEs that adopt digital technology aided by AI enhance their competitive advantage and productivity (Chan, Teoh, Yeow, & Pan, 2019; L. Chan et al., 2019; Anuj Kumar & Kalse, 2021). It is widely used in business applications, including automation, data analytics, and natural language processing (Kabir, 2020). Artificial intelligence can be used to track user habits, provide recommendations, improve customer purchasing decisions and search results, communicate media, raise trade sales, improve organizational performance, and lower costs (Basri, 2020; Ulrich, Frank, & Kratt, 2021). Artificial intelligence has the potential to transform small and medium scale enterprises (SMEs) in Anambra State, Nigeria by improving efficiency, productivity and competitiveness. A few AI applications and tools are mostly used by businesses to improve their competitive advantage or integrate their systems. These business areas include improving sales and marketing efforts, supply chain management, automated customer service and communications, and improving recruitment and human resource activities.

Supply chain management (SCM) is a synchronized practice that manages the distribution of goods and services (Goli, 2022). It involves various interconnected functional areas, such as manufacturing, marketing, sales, and transportation. The interconnected or networked channels create value both for the end customer and the company stakeholders through an effective and efficient synchronization of materials, goods, and information flow. A supply chain links various processes from the production of raw materials to the consumption of final products, acting as a conduit for goods and services. The primary aim of SCM is to meet customer requirements by providing the right product at the right place and at the right time, while also maximizing corporate profitability. Companies are employing AI systems in their supply chains to help optimize distribution routes, boost warehouse productivity, streamline factory workflows and more (Tsidulko, 2024). Businesses use AI to manage and optimize supply chain activities such as monitoring product quality, balancing inventory levels, and identifying fuel-efficient delivery routes with more efficiency than traditional software.

Artificial intelligence can be used to optimize supply chain operations by predicting demand, managing inventory and automating logistics processes. This can help SMEs reduce costs and improve efficiency, allowing them to compete more effectively in the market. AI-powered supply chain management systems can analyze historical sales data and use machine learning algorithms to forecast future demand, enabling businesses to plan production and ordering accordingly. Supply chain optimization also requires tracking physical goods every time they switch hands. Here, AI can automate documentation with its ability to intelligently enter, extract, and classify data embedded in text files to help ensure the integrity of multiparty transactions. Some manufacturers are taking advantage of AI in forecasting, using it to predict production capacity and optimize warehouse capacity based on customer demand (Tsidulko, 2024). Organizations use AI to optimize shipping and delivery, manage warehouse capacity, track inventory, forecast demand for specific parts and components, improve worker safety, and help ensure the integrity of transaction records throughout global supply chains.



Small and medium sized enterprises can greatly benefit from the application of artificial intelligence in customer service. Artificial intelligence in customer service refers to the use of intelligent technology to create support experiences that are fast, efficient, and personalized. AI-powered customer service tools enable organizations to automate experiences, streamline workflows, and assist agents ultimately saving time and money (Wren, 2024). AI-powered chatbots and virtual assistants can help streamline customer interactions, providing instant support and reducing wait times. This can lead to improved customer satisfaction and loyalty. AI in customer service is about leveraging intelligent technology to provide quick, personalized, and seamless support experiences. When implemented correctly, AI can foster authentically human customer connections. Arzikulov (2021) asserted that small businesses are leveraging AI to enhance their customer service, gather data, and identify optimal solutions tailored to their specific requirements. By analyzing customer data and feedback, AI systems can identify patterns and trends, allowing businesses to proactively address customerimprove overall customer experience. Voice search and built-in ChatBots are widely recognized as prominent AI technologies that are highly favored by customers for their ability to facilitate product discovery, information retrieval, and addressing common inquiries.

The use of AI-powered chatbots in customer service is becoming increasingly popular among small and medium scale business owners (Bandari, 2019). Chatbots are automated programs that can interact with customers, providing quick and efficient responses to their queries. This is an attractive option for small business owners, as it allows them to free up time and resources that would otherwise be spent on customer service. AI-powered chatbots use natural language processing (NLP) to understand customer queries and provide appropriate responses. This technology enables chatbots to understand customer intent and provide accurate answers to their questions. AI-powered chatbots also use machine learning (ML) to improve their responses over time, becoming more accurate and helpful with each interaction. An automated chat platform helps SMEs measure their customer engagement, complaints, and experiences to reduce the number of resources needed for customer interactions (Borah et al., 2022). This brings about more significant customer engagements, thus increasing the company's revenue and retention. The aim of AI in these business areas is to understand the customers' needs by determining the purchase pattern to increase the range of service.

Furthermore, to solve customers' issues, artificial intelligence can help organize customers' inquiries. This helps in reducing time-wasting for customers that require help with basic queries. AI technology can be used to automate routine customer service tasks, such as answering basic questions and handling routine inquiries (Bandari, 2019). This can free up customer service staff to focus on more complex and high-value tasks, helping to improve the overall customer experience. In addition, AI technology can be used to analyze customer feedback and data to identify trends and patterns, which can help small businesses to make informed decisions about how to improve customer service. Artificial intelligence improves customer experience and also brings significant business benefits. Incorporating artificial intelligence into customer service decrease costs, improve customer satisfaction, boost agent efficiency and increase productivity and efficiency. AI can lower customer service costs by automating routine tasks and inquiries, empowering support teams to resale more issues with fewer resources. By implementing AI-powered solutions in these areas, SMEs in Anambra State can transform their operations, improve efficiency and productivity and compete more effectively in the market. AI can help SMEs and reduce errors, enabling owners and managers to focus on more strategic aspects of the business. By leveraging the power of AI, these businesses can



drive, create new opportunities for their owners and employees, and contribute to the overall development of the state's economy.

Statement of the Problem

Although SMEs play a crucial role in the global economy and could benefit from artificial intelligence, adoption rates among SMEs in Anambra state remain relatively low. The slow pace of artificial intelligence adoption appears to be due to factors such as perceived high costs and the lack of capacity to implement and maintain such systems. Many small and medium businesses in Nigeria seem to view AI as being the exclusive preserve of big businesses that can afford it; they see it as being very expensive and requiring technical maneuvering to delve into it. SMEs and their owners in Nigeria most often feel that the cost of deployment or adoption of AI and its numerous technologies are inhibitive in nature in terms of cost. AI technology requires specialized hardware and software, and the cost of both can be prohibitive for small businesses that operate on tight budgets. This can make it difficult for small businesses to stay competitive with larger organizations that have more resources to invest in AI technology. Another challenge faced by small businesses is the lack of expertise and knowledge in AI technology. Implementing AI technology requires a certain level of technical know-how, and many small businesses struggle to find employees with the right skill set. However, most small businesses lack these skills requirements and lack the financial resources to attract human resources that can handle it.

Furthermore, AI technology is constantly evolving, and small businesses must continuously invest in training and education to stay up-to-date with the latest advancements. Managers and owners of small businesses feel that they lack the infrastructure needed to deploy AI in their business operations. The notion of "this is how we used to do it" tend to have prevented businesses, especially those that may be regarded as small in size in terms of human or material resources in Nigeria from adopting technology and AI in their business operations. They are afraid to change old ways, sometimes for fear of the unknown and uncertainties that might result from accepting AI. Some SMEs in Nigeria refuse to adopt AI for emotional reasons, such as making people not lose their jobs. They believe that when technologies are adopted in business, those who traditionally did their jobs before will have to make way, thereby losing their source of livelihood. This creates different opportunities for SMEs since they will be affected, and it is also essential to have adequate optimization from the manufacturing companies. All these are factors that drive the application of artificial intelligence tools. Artificial intelligence if applied could satisfy these demands. There is therefore the need to find out whether small and medium scale enterprises apply artificial intelligence in transforming their performance and productivity, hence the need for the study.

Research questions

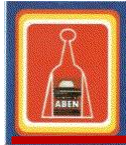
The following research questions guided the study

1. What is the extent of application of artificial intelligence in supply chain management in small and medium scale enterprises in Anambra State?
2. What is the extent of application of artificial intelligence in customer service in small and medium scale enterprises in Anambra State?

Hypotheses

The null hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the mean ratings of SMEs managers on the extent of application of artificial intelligence in supply chain management based on years of experience.
2. There is no significant difference in the mean ratings of SMEs managers on the extent of application of artificial intelligence in customer service based on years of experience.



Method

A descriptive survey research design was adopted for the study. Nworgu (2015) defined survey research as the design in which a group of people or items are studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. This study was carried out in Anambra State which is one of five states in the south east zone of Nigeria. The population of the study comprised 2,837 SME managers of enterprises in Anambra State who are registered with the State Ministry of Commerce, Industry and Technology. The sample size of 351 SME managers was used for the study. The sample size was derived using the Taro Yamani formula. Instrument for data collection was a structured questionnaire titled “Managers’ Extent of Application of Artificial Intelligence in Small and Medium Scale Enterprises Questionnaire”. It has two major sections, A and B. Section A contains the demographic information of the respondents based on years of experience while Section B consists of two sub-sections of B1 and B2 according to the research questions. Section B contained 10 and 11 items respectively on a 5-point rating scale of Very High Extent (VHE), High Extent (HE), Moderate Extent (ME), Low Extent (LE), Very Low Extent (VLE) representing 5,4,3,2 and 1 respectively.

The face validity of the instrument was established using the opinions of three experts from business education. To establish the instrument's reliability, the questionnaire was administered on a sample of 20 small and medium scale managers in Enugu State who are not part of the population of the study. The application of Cronbach Alpha reliability method on the two clusters of the instrument yielded coefficient values of 0.84 and 0.82 for clusters B1 and B2 respectively. An overall reliability co-efficient value of 0.83 was obtained for the instrument which shows that the instrument has a high internal consistency and is therefore considered suitable for the study. The researchers, with the help of three research assistants distributed copies of the questionnaire. The research assistants were instructed on how to distribute copies of the questionnaire to ensure that managers filled the questionnaire. Data related to the research questions were analyzed using mean and standard deviation and to determine the spread of the respondents means while ANOVA was used to test the hypotheses at 0.05 level of significance. Statistical Package for Social Sciences (SPSS) version 23 was used in the analysis of data. For the hypotheses, one-way analysis of variance (ANOVA) was used to test the null hypotheses at 0.05 level of significance. P-value was used for decision making for the hypotheses. Where the calculated p-value is less than or equal to the stipulated level of significance 0.05 ($p \leq 0.05$), it implies that there was significant difference between respondents’ mean scores. Under this condition, the null hypothesis of no significant difference is rejected. On the other hand, if the p-value is greater than or equal to the alpha level of 0.05 ($p \geq 0.05$), the null hypothesis of no significant difference is accepted.

Results

Research Question 1

What is the extent of application of artificial intelligence in supply chain management in small and medium scale enterprises in Anambra State?

Table 1: Mean responses of managers on the extent of application of artificial intelligence in supply chain management in SMEs in Anambra State **N= 307**

S/no	Items on supply chain management	Mean	SD	Decision
1.	Optimizing workflows through simulations	2.35	0.53	Low extent
2.	Discovering patterns and relationships within data sets	2.06	0.67	Low extent
3.	Ensure appropriate documentation of	2.43	0.56	Low extent



	transactions			
4.	Forecasting customer demand	2.29	0.48	Low extent
5.	Building strong supplier relationships	2.32	0.47	Low extent
6.	Monitoring inventory levels to detect when stocks are low.	2.33	0.47	Low extent
7.	Enhances supplier selection	2.30	0.46	Low extent
8.	Tracking inventory through machine language	1.61	0.65	Low extent
9.	Reducing errors through forecasting	1.93	0.68	Low extent
10.	Exploring online catalogues for potential suppliers	2.08	0.67	Low extent
11.	Processing purchase orders	1.99	0.71	Low extent
	Cluster Mean	2.15		Low extent

Data in Table 1 show a cluster mean of 2.15 indicating that managers applied artificial intelligence in supply chain management to a low extent in small and medium scale enterprises in Anambra State. Item by item analysis in Table 1 showed that all the items with mean scores ranging from 1.61 to 2.43 were applied by managers of SMEs to a low extent. The standard deviations of 0.46 to 0.71 showed homogeneity in SMEs managers' responses indicating greater consensus of opinion.

Research Question 2

What is the extent of application of artificial intelligence in customer service in small and medium scale enterprises in Anambra State?

Table 2: Mean responses of managers on the extent of application of artificial intelligence in customer service in SMEs in Anambra State **N= 307**

S/no	Items on customer service	Mean	SD	Decision
12.	Using advanced algorithms to analyze customer data	2.25	0.79	Low extent
13.	Ability in interpreting client data	2.05	0.47	Low extent
14.	Using AI to evaluate client feedback	2.47	0.66	Low extent
15.	Anticipating one's customer needs	2.28	0.55	Low extent
16.	Analyzing vast volumes of historical and real-time data to identify patterns and trends	2.22	0.71	Low extent
17.	Predicting future demand more accurately	2.34	0.73	Low extent
18.	Using image recognition to analyze visual data	2.31	0.56	Low extent
19.	Forecasting customer behaviour	2.41	0.76	Low extent
20.	Enhancing customer relationship management	2.44	0.77	Low extent
21.	Tailoring marketing campaigns	2.04	0.48	Low extent
	Cluster Mean	2.28		Low extent

Data in Table 2 show a cluster mean of 2.28 indicating that managers applied artificial intelligence in customer service to a low extent in small and medium scale enterprises in Anambra State. Item by item analysis in Table 2 shows that items with mean scores ranging from 2.04 to 2.47 were applied by managers of SMEs to a low extent. The standard deviations of 0.47 to 0.79 showed homogeneity in SMEs managers' responses indicating greater consensus of opinion.

Testing of Null Hypotheses

Hypothesis 1



There is no significant difference in the mean ratings of SMEs managers on the extent of application of artificial intelligence in supply chain management based on years of experience.

Table 3: Summary of analysis of variance on the mean responses of SME's managers on the extent of application of artificial intelligence in supply chain management based on years of experience

N= 307							
Sources of variance	of	Sum of Squares	df	Mean Square	F	P-value	Decision
Between Groups		.8.891	2	5.678	1.547	.169	Not Significant
Within Groups		418.422	304	3.442			
Total		437.404	306				

As shown in Table 3, there is no significant difference among the three groups in terms of their mean responses on the extent of application of artificial intelligence in supply chain management in small and medium scale enterprises in Anambra State based on years of experience (5 years and below, 6 -10 years and above 10 years), as the F-ratio (2, 304) is 1.547 and P-value (.169) is greater than the stipulated 0.05 level of significance. Therefore, the null hypothesis is not rejected.

Hypothesis 2

There is no significant difference in the mean ratings of SMEs managers on the extent of application of artificial intelligence in customer service based on years of experience.

Table 4: Summary of analysis of variance on the mean responses of SME's managers on the extent of application of artificial intelligence in customer service based on years of experience

N= 307							
Sources of variance	of	Sum of Squares	df	Mean Square	F	P-value	Decision
Between Groups		1.7	2	1	.349	.496	Not Significant
Within Groups		1046.5	304	3.9			
Total		1044.3	306				

Data analysis in Table 5 show that there is no significant difference among the three groups in terms of their mean responses on the extent of application of artificial intelligence in customer service in small and medium scale enterprises in Anambra State based on years of experience (5 years and below, 6 -10 years and above 10 years), as the F-ratio (2, 304) is .349 and P-value (.496) is greater than the stipulated 0.05 level of significance. Therefore, the null hypothesis is not rejected.

Discussion of Findings

The results of the study indicated that managers of small and medium scale industries in Anambra state applied artificial intelligence in supply chain management to a low extent. This implies that majority of them in Anambra State often lack strong technology skills in supply chain



management, data management, cyber security and have a relatively weak understanding of the process for appropriate documentation of transactions and keeping track of inventories through machine language which helps in forecasting customer demand. It should be noted that the AI phenomenon is relatively recent regarding business applications; therefore, several companies have not yet developed the models and tools required to identify and select the necessary AI skills. This finding is in consonance with the findings of Ebuka, Emmanuel and Idigo (2023) who found out that most SMEs in Nigeria are still operating manually; hence, they do not enjoy the massive potential of AI deployment and remain perpetually small in size. It is seen that majority of the SMEs do not use AI in their businesses. Norgren (2023) stated that by implementing AI in supply chain management (SCM), companies can mitigate risks and reduce errors, delays, and wastage. AI can also contribute to predictive maintenance, minimising downtime and costly repairs, while process optimization can streamline operations and maximise productivity. Embracing AI in the SMEs holds immense potential for increased productivity, profitability, and overall success. Usmani et al. (2023) found out that artificial intelligence application in supply chain management have aided companies in realizing the value of artificial intelligence, developing strategies and plans to swiftly transition to digital technology, and streamlining workflows to improve supply chain efficiency. The result of the first hypothesis indicated that there is no significant difference among the managers of SMEs on the extent of application of artificial intelligence in supply chain management in small and medium scale enterprises in Anambra State based on years of experience. Therefore, it followed that the null hypothesis of no significant difference was not rejected.

The results of the study revealed that managers applied artificial intelligence in customer service to a low extent in small and medium scale enterprises in Anambra State. This implies that SMEs managers applied artificial intelligence to a low extent in examining the application and the effectiveness of artificial intelligence within organization, consumers' requirements, preferences, and views by analyzing customer sentiment, guiding business choices, and enhancing customer happiness. This could be as a result of inability of SMEs managers to interpret client data and using AI to evaluate client data, anticipating one's customer needs and tailoring marketing campaign. In view of this, Okoye et al. (2023) stated that when SMEs embrace electronic ways of attending to customers, it will boost the quality of their services as well as increase the sales coverage. Ewuga, et al. (2023) stated that technology can help SMEs improve their efficiency and productivity, provide better customer service and reach new customers and markets. Borah et al. (2022) found out that artificial intelligence-enabled procedures boost organizational performance, save expenses, increase sales, streamline customer management, enhance data gathering and processing, save time, and minimize errors. Communication with clients appears to boost attendance, particularly in a customer-oriented scenario. The result of the second hypothesis indicated that there is no significant difference among the managers of SMEs on the extent of application of artificial intelligence in customer service in small and medium scale enterprises in Anambra State based on years of experience. Therefore, it followed that the null hypothesis of no significant difference was not rejected.

Conclusion

From the findings of the study, it was revealed that managers of SMEs in Anambra State applied artificial intelligence in supply chain management and customer service to a low extent in small and medium scale enterprises in Anambra State. The prospects of AI are enormous when applied in the right way and used properly. However, small and medium scale businesses in Nigeria still appear to be shying away from it as a result of the apparent perception that the cost is inhibitive and that they might lack the expertise to properly apply AI, given the small nature of



their business. There are also some SMEs that are completely ignorant about the possibilities of AI and its potential to improve their efficiency, sustainability, and profitability. This is probably the reason that most SMEs in Nigeria especially Anambra State still execute their businesses in old ways. The study concludes that most SMEs in Nigeria are still operating manually, and hence, do not enjoy the massive potential of AI application; hence, they remain perpetually small in size with limited expansion potential.

Recommendations

Based on the findings of the study, the following recommendations are made:

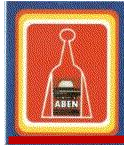
1. The government, in a bid to promote SMEs and make them sustainable, might carry out awareness and training programs to let the SMEs know about the existence of certain AI technologies and their usage in their business so as to encourage them to embrace it for their businesses.
2. For SMEs to grow and become competitive enough to challenge larger firms, some aspects of AI that are not costly, such as using ChatBot and AI target audience adverts, need to be deployed.
3. Governments should make technology more affordable for SMEs. This could be done through subsidies or tax breaks.
4. Private sector organizations should provide support and resources to SMEs that are trying to integrate technology. This could include mentoring, consulting, or access to technology.

References

- Nworgu, B. G. (2015). *Educational research: Basic issues and methodology*. Owerri: Wisdom Publishers
- Arzikulov, O. (2021). Artificial intelligence to increase the efficiency of small businesses. *ISJ Theoretical & Applied Science*, 8(100), 412-415.
- Bandari, V. (2019). The impact of artificial intelligence on the revenue growth of small businesses in developing countries: An empirical study. *Reviews of Contemporary Business Analytics*, 2(1), 33-44.
- Basri, W. (2020). Examining the impact of artificial intelligence (AI)-assisted social media marketing on the performance of small and medium enterprises: toward effective business management in the Saudi Arabian context. *International Journal of Computational Intelligence Systems*, 13(1), 142.
- Borah, S., Kama, C., Rakshit, S., & Vajjhala, N. R. (2023). Applications of artificial intelligence in small and medium sized enterprises.
- Burian, J. (2020). The complex choreography of supply chain resilience. *Industry Week*.
- Chan, C. M., Teoh, S. Y., Yeow, A., & Pan, G. (2019). Agility in responding to disruptive digital innovation: Case study of an SME. *Information systems journal*, 29(2), 436-455.
- Chan, L., Morgan, I., Simon, H., Alshabanat, F., Ober, D., Gentry, J., . . . Cao, R. (2019). *Survey of AI in cybersecurity for information technology management*. Paper presented at the 2019 IEEE technology & engineering management conference (TEMSCON).
- Commission, E. (2015). *User guide to the SME definition*. Retrieved from <https://data.europa.eu/doi/10.2873/620234>
- Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, 96(1), 108-116.
- Drydakis, N. (2022). Artificial Intelligence and reduced SMEs' business risks. A dynamic capabilities analysis during the COVID-19 pandemic. *Information Systems Frontiers*, 24(4), 1223-1247.
- Ebuka, A. A., Emmanuel D., & Idigo, P. (2023). Artificial Intelligence as a catalyst for the Sustainability of Small and Medium Scale Businesses (SMEs) in Nigeria. *Annals of Management and Organization Research*, 5(1), 1-11.
- Elendu, C.R. (2023). Evaluation of business partnerships in Nigeria under the companies and Allied Matters Act (Cama 2020). *Journal of Commercial and Property Law*, 10(2), 104-115.



- Ewuga, S. K., Egieya, Z. E., Omotosho, A., & Adegbite, A. O. (2023). Comparative review of technology integration in SMEs: A tale of two-economies-The United States and Nigeria. *Engineering Science and Technology Journal*, 4(6), 555-570
- Fatima, M., & Akhtar, S.J. (2023). Performance of micro, small and medium enterprises in Aligarh District of Uttar Pradesh. *SEDME (Small Enterprises Development, Management & Extension Journal)*.
- Giuggioli, G., & Pellegrini, M. M. (2023). Artificial intelligence as an enabler for entrepreneurs: a systematic literature review and an agenda for future research. *International Journal of Entrepreneurial Behavior & Research*, 29(4), 816-837.
- Goli, M. (2022). The role of AI and ML in revolutionizing supply chain management. *International Journal of Scientific Research and Management*, 10(6), 918-928.
- Grover, P., Kar, A. K., & Dwivedi, Y. K. (2022). Understanding artificial intelligence adoption in operations management: insights from the review of academic literature and social media discussions. *Annals of Operations Research*, 308(1-2), 177-213.
- Ilo, B.M., Soyibo, Y.A., & Olowofela, O.E. (2023). Monetary policy and small and medium enterprises (SMEs) performance in Nigeria. *Modern Management Review*, 28(2), 25-37.
- Kabir, M. E. (2020). Artificial Intelligence in Business and Future Prospect. *IAR Journal of Entrepreneurship, Innovation & Design Thinking*, 1(1).
- Kursh SR, Gold NA (2016) Adding fintech and blockchain to your curriculum. *Bus Educ Innov J* 8(2):6-12
- Nolan, A. (2021). *Artificial intelligence, its diffusion and uses in manufacturing*.
- Nolan, A. (2019). *Artificial intelligence and the technologies of the next production revolution*.
- Norgen, A. (2023). *Implementing artificial intelligence in supply chain management*. Master's Programme in Management Master's Programme in Marketing
- Nworgu, B. G. (2015). *Educational research: Basic issues and methodology*. Owerri: Wisdom Publishers
- Okolo, J.E. (2014). *Assessment of financial management practices adopted by small and medium enterprises (SMEs) in Anambra State*. Unpublished M.Sc Thesis submitted to the Department of Vocational Education, Faculty of Education, Nnamdi Azikiwe University, Awka
- Okoye, C. C., Nwankwo, D. O., Okeke, N. M., Nwankwo, E. E., & Eze, S. U. (2023). Electronic Commerce and Sustainability of Smes in Anambra State. *Business and Economics in Developing Countries (BEDC)*, 1(1): 01-10
- Otitoju, M.A., Safugha, G.F., Vincent, E.O., & Chukwu, C.M. (2023). Review of the Naira redesign and its effect on micro, small, and medium enterprises (MSMEs). *Advances in Applied Sociology*, 13(9), 662-673.
- Rai, A., Constantinides, P., & Sarker, S. (2019). Next generation digital platforms: toward human-AI hybrids. *MIS quarterly*, 43(1), iii-ix.
- Strang KD, Sun Z (2019) Managerial controversies in artificial intelligence and big data analytics. In: Sun Z (ed) *Managerial perspectives on intelligent big data analytics*. IGI-Global: Hershey, PA, pp 55-75. <https://doi.org/10.4018/978-1-5225-7277-0.ch004>.
- Sturm, T., Gerlach, J. P., Pumplun, L., Mesbah, N., Peters, F., Tauchert, C., . . . Buxmann, P. (2021). Coordinating human and machine learning for effective organizational learning. *MIS quarterly*, 45(3).
- Tsidulko, J. (2024). Benefits of AI in the supply chain.
- Usmani, A., Sharma, M., Bung, P., Kurma, R. Ahmad, F., & Gupta, A. (2023). Key variables influencing artificial intelligence implementation in supply chain management: An empirical analysis on SMEs. *Migration Letters*, 20(11) (2023), 1284-1307.
- Vajjhala NR, StrangKD(2019) Impact of psycho-demographic factors on smartphone purchase decisions. In: Qiu E (ed) *Proceedings of the information system and system management conference*. Rabat University, Morocco. <http://www.issm.net/program.html>
- Wangler, L. & Botthof, A., 2019. E-Governance: Digitalisierung und KI in der öffentlichen Verwaltung. In: V. Wittpahl, Hrsg. *Künstliche Intelligenz. technologie, Anwendung, Gesellschaft*. Heidelberg: Springerverlag, pp. 122-141.
- Wren, H. (2024). AI in customer service: All you need to know.



ENHANCING PREDICTIVE ANALYTICS WITH STACKING AND SYNTHETIC MINORITY OVER-SAMPLING BALANCING

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Abstract

In the sphere of education, the assessment of student advancement is of utmost importance for educational establishments. These institutions sometimes encounter hurdles such as appraising student performance, conducting academic scrutiny, and foreseeing prospective learning requisites. To tackle these impediments, academic intervention schemes have been put into operation. Accurate prediction regarding student performance not only facilitate the early identification of struggling learners but also assist higher education institutions in their decision-making processes. Consequently, this study introduces a predictive model for the evaluation of scholastic accomplishment. It utilizes XGBoost for the selection of pertinent attributes and employs Synthetic Minority Oversampling Technique (SMOTE) to rectify class imbalances. Furthermore, it employs a stacking ensemble methodology encompassing base models like K-Nearest Neighbors, Support Vector Machines, Random Forest, Decision Trees, Multi-Layer Perceptron, and Logistic Regression to enhance predictive precision. This investigation provides an exhaustive theoretical assessment of models, showcasing practical applications of machine learning in education. With an exceptional 98% precision in the prediction of student performance, this research underscores the capacity of educational institutions to elevate outcomes. This study substantially propels predictive modeling in the realm of education, making a valuable contribution to the field of research.

Key words: *Predictive analytics, stacking model, educational data mining, SMOTE, ensemble learning*

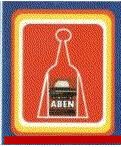
Introduction

In the field of education, the assessment of students' progress and achievements plays a crucial role, serving as an indispensable tool within educational institutions (Albreiki et al., 2021). Today's educational landscape finds institutions operating in highly competitive and demanding environments, presenting numerous challenges such as the delivery of high-quality education, the

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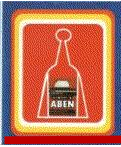


establishment of effective systems for evaluating student performance, conducting comprehensive academic analyses, and anticipating the future learning needs of students (Albreiki et al., 2021). In response to these challenges, academic institutions have implemented academic intervention plans, designed to support students in navigating complex learning situations. These plans extend their benefits to school administrators and education stakeholders, aiding in the development of strategies grounded in predictive assessments of student performance, both at the point of entry and throughout subsequent semesters (Albreiki et al., 2021).

As the educational landscape continues to evolve, the education sector has demonstrated keen interest in predicting student success across pre-tertiary and higher education settings (Nawang et al., 2021). The development and application of predictive models entail the collection and analysis of variables correlated with the outcomes to be predicted. These variables encompass a broad spectrum of factors, including students' prior educational experiences, the utilization of e-learning platforms, socio-demographic characteristics, data from their interactions on social media platforms, cognitive and behavioral patterns, formative assessments, participation in extracurricular and co-curricular activities, the school environment, family dynamics, and more (Nawang et al., 2021; Albreiki et al., 2021). Educational data mining has gained prominence as it explores the application of data mining tools for analyzing educational data within higher education institutions, emphasizing how data mining, machine learning, and statistical techniques can be employed to scrutinize educational information. This includes data from universities, learning management systems, and intelligent tutoring systems, unlocking insights for enhancing the quality of educational offerings and support systems (Mengash, 2020; Akgün, 2020; Alamgir et al., 2023).

Educational data mining offers valuable insights for academic institutions, researchers, and students alike, shedding light on various aspects of student performance, learning methodologies, and educational experiences (Romero & Ventura, 2010). These insights empower educators with improved resources for lesson planning and material assessment (Rabelo et al., 2023). Moreover, they provide educational scholars with deeper insights into student behavior within the classroom environment and the profound impact of learning settings on students' educational journeys (Aulakh et al., 2023), ultimately contributing to enhanced student engagement and retention rates. Accurate predictions of student performance are of paramount importance as they enable the early identification of struggling students (Romero & Ventura, 2010). Additionally, they offer valuable insights into the learning processes and academic progress of students for higher education institutions (Uylaş, 2018). However, predicting student success is a complex task due to the multitude of factors that can influence academic achievement, driving extensive research efforts to identify critical determinants (Aulakh et al., 2023; Márquez-Vera et al., 2012).

Predictive analytics encompasses various methodologies aimed at making well-informed forecasts about uncertain future events (Liu, 2015). In education, this discipline plays a crucial role in anticipating academic achievements, evaluating teaching methodologies, and assessing administrative metrics such as student retention and course enrollments. It's essential to distinguish between two fundamental modeling paradigms: explanatory and predictive modeling. Explanatory modeling leverages existing data to predict forthcoming values or classifications based on observed variables, while predictive modeling focuses on creating models to forecast values or categories of novel data, with a specific emphasis on future events. Predictive modeling is tailored to project future outcomes. In educational data mining, models are often evaluated primarily on their predictive accuracy, especially their ability to forecast learner performance (Liu, 2015).



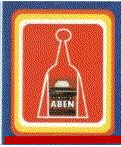
In recent years, educational institutions have increasingly utilized machine learning techniques to gain insights into students' academic trajectories, predict future behaviors, proactively address potential challenges, and foster collaborative environments among students and educators (Atif, 2013). Predictive analytics within higher education enhances teaching methodologies and encourages reflective practices in students, enabling a deeper understanding of their learning patterns (Dervenis et al., 2022; Atif, 2013). Continuous monitoring is crucial for forecasting students' academic achievement, necessitating frequent updates to accommodate shifts in their educational trajectory. This is because students often begin and complete new courses, either successfully or unsuccessfully, within predetermined timeframes. Predicting student success involves monitoring their development throughout their academic careers, rather than relying solely on a single assessment (Xu et al., 2017). Students have the flexibility to enroll in courses immediately or defer them to future semesters, and they may also choose to retake courses they had previously failed. The ensemble progressive prediction approach allows for a continual improvement of results, utilizing previous forecasts to inform current predictions.

In this article, our primary objective is to construct a robust predictive model for assessing students' academic performance. To achieve this, we employ a feature selection method based on XGBoost (XGB) to identify and extract relevant features for our modeling efforts. Additionally, recognizing the dataset's imbalance, we apply the Synthetic Minority Over-Sampling Technique (SMOTE) to address this issue effectively by generating synthetic samples for the minority class. To further enhance our model's predictive capabilities, we adopt a stacking ensemble approach, integrating ensemble learning techniques from various base models, including K-Nearest Neighbors (KNN), Support Vector Machines (SVM), Random Forest (RF), Decision Trees (DT), Multi-Layer Perceptron (MLP), and Logistic Regression (LR). Leveraging the strengths of these diverse algorithms, we aim to enhance the accuracy and robustness of our prediction framework. This approach not only allows us to harness the unique strengths of each base model but also results in a more powerful and reliable predictive model for assessing students' academic performance.

The forthcoming sections of the paper are structured as follows: Section 2 engages in an extensive exploration of the established body of literature, offering essential background information. In Section 3, we expound upon the methodology we have put forth, emphasizing the significance of diverse attributes. Progressing to Section 4, we furnish a comprehensive scrutiny of the results generated by our proposed approach, followed by an exhaustive discourse. Lastly, within Section 5, we wrap up our paper while also delineating prospects for future research. This arrangement guarantees a coherent and systematic dissemination of information across the remaining portions of the document.

The domain of forecasting student academic achievement has been the focus of extensive research, with various methodologies for selecting relevant features and employing classification algorithms. These investigations have generated valuable findings but have also highlighted areas for enhancement, especially concerning predictive precision and the management of class imbalance problems.

One notable trend in recent research is the adoption of ensemble algorithms within the educational data mining domain. These ensemble models have demonstrated superior performance when compared to traditional single models. For instance, Mastour et al. (2023) conducted a comprehensive study comparing classical models like Logistic Regression (LR), Support Vector Machine (SVM), and k-Nearest Neighbors (KNN) with ensemble models, including Voting, Bagging (BG), Random Forests (RF), Adaptive Boosting (ADA), eXtreme Gradient Boosting (XGB), and Stacking. Their findings underscored the superiority of ensemble



machine learning models, signaling a shift towards leveraging the collective intelligence of multiple base models. While ensemble models exhibit remarkable predictive power, it's crucial to consider model interpretability. Decision Trees and rule-based classifiers, offer transparency by elucidating the underlying reasoning behind predictions. Additionally, alternative techniques like clustering algorithms or association rule mining can be explored to shed light on performance determinants (Lang et al., 2015). The choice of classification and regression methods is vast, ranging from neural networks and Bayesian networks to support vector machines, logistic regression, and linear regression, all of which hold potential for solving the student performance prediction problem (Lang et al., 2017).

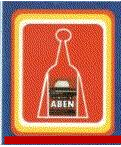
Several prior studies have contributed valuable insights to the field of predicting student performance. Rahman et al. (2017) applied information gain and wrapper feature selection methods in conjunction with Naïve Bayes, Decision Tree, and Artificial Neural Networks, with the Artificial Neural Network achieving the highest accuracy at 79.37%. Kumar & Pal (2011) explored Decision Trees, Neural Networks, and K-Nearest Neighbors to predict student results, with Decision Trees emerging as the most accurate. Zaffar et al. (2017) delved into the impact of feature selection algorithms on student performance analysis, discovering that principal component analysis combined with the random forest classifier yielded the best results.

González-Brambila et al. (2018) sought to predict the academic performance of engineering students using Decision Trees but achieved only 63.19% accuracy. K-Nearest Neighbors (kNN), renowned for its simplicity (Howard, W.R., 2007), classifies cases based on similarity measures. Schalk et al. (2011) observed the accuracy of Support Vector Machine and Neural Network models but identified challenges related to adaptability and overfitting, largely attributable to missing values in datasets, leading them to explore Random Forest as a more adaptable alternative.

Recent research by Mulyana et al. (2023) achieved an impressive 89% accuracy in classifying successful and dropout students using Random Forest. Qin et al. (2017) leveraged the Gini index to rank factors affecting student performance and employed Random Forest for prediction, achieving an accuracy of 83.82%. Begum & Padmannavar (2023) introduced Bayesian-optimized KNN and Random Forest models, yielding accuracies of 87% and 73%, respectively, in forecasting student success. Sawangarrearak&Thanathamthee (2020) introduced a combined sampling technique to enhance the classification of university student depression data, achieving an overall accuracy of 94.17%. In a different investigation conducted by Alamri et.al (2020) aimed at forecasting student performance, they employed Support Vector Machines (SVM) and Random Forest (RF). The outcomes of the study demonstrated that both SVM and RF algorithms achieved an accuracy rate of 93%. Also, In the study conducted by Nugroho et al. (2020), which assessed student academic performance using the K-Nearest Neighbors (KNN) algorithm, the findings were notably evident and indicated a favorable level of accuracy.

Haryawan&Sebatubun (2020) employed Multi-Layer Perceptron (MLP) for predicting student failure, achieving an accuracy rate of 86.9%. Lagman (2015) applied logistic regression to predict student graduation, focusing on early identification of students at risk of delayed graduation. Yohannes & Ahmed (2018) evaluated final cumulative grade point averages using Neural Networks, Support Vector Regression, and Linear Regression, showcasing the potential of data mining techniques for predicting academic performance. Mativo& Huang (2014) examined Support Vector Machine and Multiple Linear Regression on a smaller dataset, demonstrating that the SVM model exhibited higher accuracy in identifying students with low grades.

Building on this body of research, our study proposes a pioneering approach that capitalizes on the strengths of multiple base models, including Decision Trees (DT), Logistic Regression



(LR), Random Forest (RF), K-Nearest Neighbors (KNN), Support Vector Machines (SVM), and Multi-Layer Perceptron (MLP), within a stacked ensemble framework. By combining the insights from these diverse base models, our innovative ensemble model aims to elevate predictive accuracy, especially when compared to single models.

To address the challenge of class imbalance frequently encountered in educational datasets, our study integrates the Synthetic Minority Over-Sampling Technique (SMOTE). This technique generates synthetic samples for the minority class, ensuring a balanced dataset and reducing potential biases in predictions. Furthermore, our research employs the eXtreme Gradient Boosting (XGB) algorithm for feature selection. XGB is well-regarded for its efficacy in identifying and extracting relevant features from complex datasets, thus enhancing the overall performance of predictive models. In addition to predictive accuracy, our study evaluates model performance using various metrics, including accuracy, precision, ROC curve and F1-score, providing a comprehensive assessment of our framework's capabilities.

In summary, this study contributes to the field of educational data mining by introducing an innovative predictive framework. Our research addresses existing challenges related to predictive accuracy, class imbalance, and model interpretability. The proposed ensemble model, enriched with SMOTE balancing and XGB feature selection, has the potential to significantly advance the prediction of student academic performance. By amalgamating the strengths of diverse base models, we aspire to provide educational institutions, administrators, and students with a comprehensive and accurate tool for assessing academic success.

Methodology

This section elaborates on the study's framework, encompassing a comprehensive description of the dataset employed, the methodologies applied in data preprocessing, and the techniques utilized for model evaluation.

Framework

In this section, we explore the detailed framework employed to create a robust predictive model, as depicted in Fig. 1.

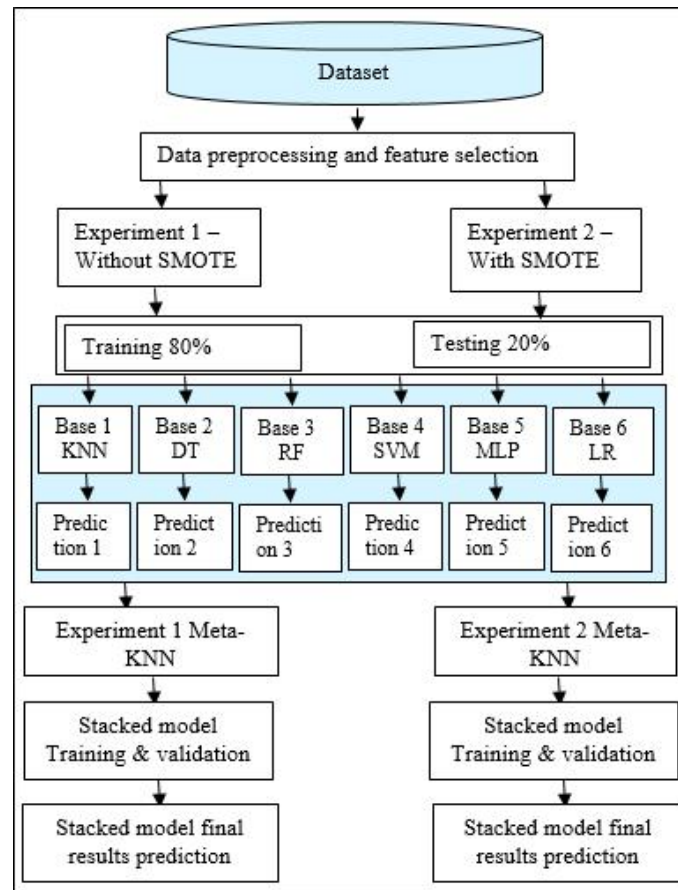
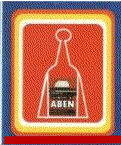
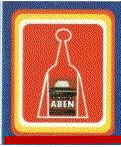


Fig.1 Implementation of stacking predictive model

This systematic process consists of a series of well-planned stages aimed at ensuring the model's efficacy and reliability. The initial step involves Data Preparation, a crucial phase where the dataset undergoes careful preprocessing. This includes essential tasks such as separating the features (X) from the target variable (y) and addressing any data intricacies. Categorical variables are transformed, and missing data is meticulously managed. An examination of the class distribution within the target variable (y) is conducted to identify any disparities, which are important considerations in predictive modeling. To tackle this issue, the Synthetic Minority Over-Sampling Technique (SMOTE) is expertly employed. SMOTE proficiently generates synthetic samples by interpolating between existing minority class samples, effectively addressing class imbalances. Subsequently, the dataset is divided into training and testing sets, facilitating model evaluation. A variety of base machine learning models are enlisted, including Decision Trees, k-Nearest Neighbors, Random Forest, Logistic Regression, Support Vector Machines (SVM), and Multi-Layer Perceptron (MLP) classifiers. Each base model is meticulously trained on the training dataset and then utilized to make predictions on the testing dataset. To enhance predictive performance, a meta-model, KNN, is introduced for stacking purposes. Stacking involves combining the predictions from the base models to improve accuracy and enhance generalization. Performance assessment encompasses a range of metrics, including accuracy,



precision, recall, and the F1-score. The ensemble model is then employed for predictions on new, unseen data, followed by a thorough analysis that includes evaluating confusion matrices, ROC curves, and other relevant metrics. This methodical approach underscores our commitment to developing a potent predictive model that can be reliably applied in practical scenarios.

Dataset

The dataset comprises 120 samples, representing students enrolled in an Information Communication Technology diploma course at a publicly-funded tertiary institution in Kenya.

Table 1. Family social - economic status and parental level of education

SN	Feature	Data type	Values
1	Student Social status (Cheng & Kaplowitz, 2016)	Categorical	[0,1]
2	Family Size (Adongo et al., 2022)	Categorical	[0,1,2]
3	Parental absence (Liu & Hannum, 2023)	Categorical	[0,1,2]
4	Family economic level (Li & Qiu, 2018)	Categorical	[0,1,2,3,4]
5	Parental employment status (Lehti, 2023)	Categorical	[0,1,2]
6	Parents education level (Tantoh, 2023)	Categorical	[0,1,2,3,4]
7	Family relationship (Li & Qiu, 2018; Kleinkorres et al., 2023; Prakhov et al., 2020)	Categorical	[0,1,2,3,4]

To gather this valuable data, the study utilized a carefully designed questionnaire as the primary data collection instrument. The research employed a comprehensive survey, consisting of a total of 30 unique items organized into three distinct sections. The first section focused on socio-economic factors and the educational background of participants, as detailed in Table 1.

Table 2. Utilization of learning resources, sleep patterns, geographical proximity, and class attendance

SN	Feature	Data type	Values
1	Usage of library resources (Wang & Wang, 2023; (Hanaysha et al., 2023)	Categorical	[0,1,2]
2	Usage of ICT resources (Wang & Wang, 2023; (Hanaysha et al., 2023)	Categorical	[0,1,2]
3	Class attendance (Lucey & Grydaki, 2022; (Hanaysha et al., 2023)	Categorical	[0,1,2]
4	Sleep hours (Desjardins & Grandbois, 2022; (Chan et al., 2023)	Categorical	[0,1,2,3]
5	Usage of reference materials (Wang & Wang, 2023)	Categorical	[0,1,2]
6	Geographical distance (Arrival time, transport means) (Banda et al., 2023)	Categorical	[0,1]

The second section aimed to collect information on various aspects such as the use of learning resources, sleep patterns, geographical proximity, and class attendance, as outlined in Table 2. Lastly, the third section was designed to capture students' academic performance, specifically concerning the grades they achieved in specific courses during the initial module of their first year, as indicated in Table 3. These questionnaire items were drawn from previous research, as indicated in the respective tables. This systematic structuring of features enables a comprehensive examination of students' characteristics and their academic performance in the context of the Information Communication Technology diploma program. In essence, this dataset stands as a valuable asset for conducting in-depth analyses and research inquiries aimed at comprehending the intricate connections between demographic, economic, and educational variables, and how they collectively impact the academic achievements of students in the field of Information Communication Technology.

Data preprocessing

Data preprocessing is a crucial step in any data analysis or modeling project, as it significantly impacts the accuracy and reliability of subsequent analyses and predictions. This study followed several key steps in the data preprocessing phase.

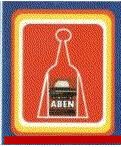


Table 3. Course grades in the first module

SN	Feature (Rajendran et al., 2022)	Data type	Values
1	Gender	Categorical	[0,1]
2	System analysis and design (SAD)	Numeric	[0-100]
3	Object oriented programming (OOP)	Numeric	[0-100]
4	Database management system (DBMS)	Numeric	[0-100]
5	Visual programming (VP)	Numeric	[0-100]
6	Quantitative techniques (QT)	Numeric	[0-100]
7	Computer applications (CA)	Numeric	[0-100]
8	Final score (Pass: P, Referred: R, Course Requirements not Met: C)	Categorical	

Data cleaning

Upon thorough examination, we found that there were no missing values in the dataset. Therefore, there was no need for any data imputation or handling of missing information.

Data transformations

We performed a data transformation step by using a technique called one-hot encoding. This method was applied to convert categorical variables into a numerical format, making them suitable for analysis and modeling.

Feature selection

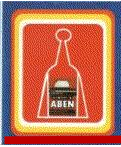
The original dataset contained 30 different features, and we recognized the need to reduce dimensionality. To achieve this, we employed XGBoost for feature selection. The XGBoost algorithm is a highly regarded distributed gradient-boosted decision tree (GBDT) machine learning framework known for its versatility. It offers a wide range of objective functions, making it suitable for various tasks, including regression, classification, and ranking. What sets XGBoost apart is its remarkable predictive prowess, linear modeling capabilities, and proficiency in tree-based learning methods. It stands out as the preferred choice for assessing accuracy in diverse scenarios. Notably, when compared to existing gradient boosting algorithms, XGBoost demonstrates superior speed and efficiency, as evidenced by a study conducted by Priscilla and Prabha (2021). This distinction highlights its significance in the field of machine learning and predictive analytics. XGBoost goes a step further by incorporating a second-order Taylor expansion of the loss function and introducing a regularization term into the objective function, effectively mitigating overfitting. The XGBoost algorithm leverages decision trees as its foundational learners to construct a potent predictive model, resulting in an ensemble that yields compelling results. The prediction model of XGBoost can be succinctly expressed as (Eq1) - (Eq4):

$$y_i = \sum_{k=1}^K f_k(x_i) \quad (1)$$

Where K represents the number of decision trees, y_i represents the prediction result of the i th sample and f_k represents the prediction result of sample i . The objective function of XGBoost algorithm is:

$$J(\theta) = \sum_{i=1}^n l(y_i, y_i) + \sum_{k=1}^K \Omega(f_k) \quad (2)$$

Where the first term is the training error of sample i , and the second term is the cumulative sum of all regularization terms of decision tree, where



$$\Omega(f) = \sqrt{T} + \frac{1}{2} \lambda ||\omega||^2 \quad (3)$$

Where T is the number of leaf nodes of each decision tree, ω is the weight of leaf node, and γ and λ is the corresponding coefficient. According to the change of objective function before and after node splitting, XGBoost algorithm chooses to split nodes or not and sets threshold value of splitting nodes. It uses the gain to evaluate the advantage and disadvantage of each feature and the split point of each feature. And then it uses the approximate algorithm or greedy algorithm to select the feature and split node. The gain is calculated as follows:

$$= \frac{1}{2} \left[\frac{L^2}{H_L + \lambda} + \frac{R^2}{H_R + \lambda} + \frac{(L + R)^2}{H_L + H_R + \lambda} \right] - \gamma \quad (4)$$

Where L is the sum of the first step degree of all samples on the left leaf nodes after splitting, and R is the sum of the second step degree of that. and H_L and H_R are the sum of the first-order and second-order degrees of all samples on the right leaf nodes after splitting respectively. Therefore, through this rigorous selection process based on XGB, we retained only 15 features, as shown in Fig. 2. The primary goal of this reduction was to improve model efficiency and performance by focusing on the most relevant and informative features.

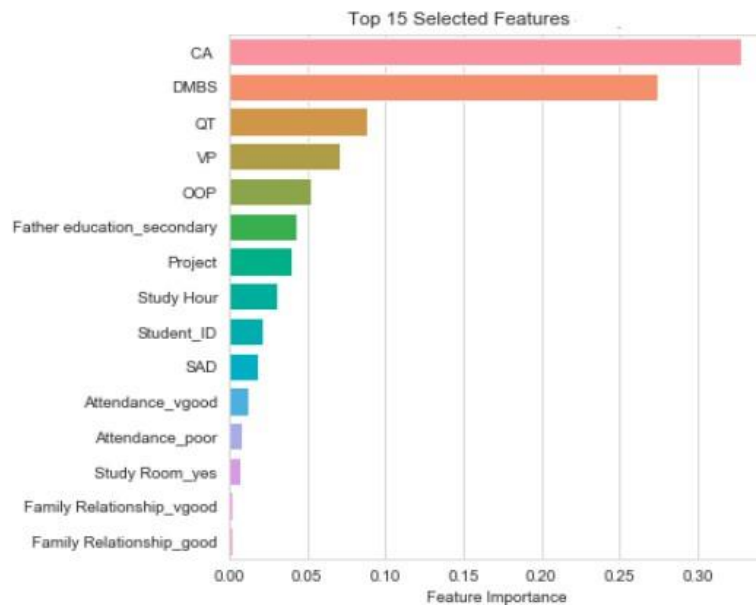
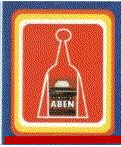


Fig.2. Feature selection based on XGB

Handling class imbalance

In numerous real-world applications, we frequently encounter imbalanced classification challenges wherein the dataset exhibits a significant disproportion in the distribution of instances across two distinct classes. This discrepancy manifests as one class being the predominant or majority class, housing a substantial volume of data, while the other class represents the minority, comprising only a limited number of instances. Effectively mitigating this class imbalance poses a primary challenge, with a specific focus on enhancing the performance of the underrepresented minority class. An effective approach to rectify imbalanced datasets involves the generation of supplementary synthetic data points to bolster the minority class, thereby mitigating its scarcity of representative data. The Synthetic Minority Over-Sampling Technique (SMOTE), first introduced



by Chawla et al. (2002), stands out as a widely embraced method within the academic literature for executing this oversampling strategy. SMOTE operates by creating novel synthetic instances for the minority class by drawing insights from the existing dataset. It begins by identifying data points associated with the minority class and selecting a single point from this subset. Subsequently, SMOTE pinpoints the K-nearest neighbors of the chosen point within the minority class. Synthetic instances are then synthesized by interpolating along the line segments connecting the chosen point and its K-nearest neighbors. The adoption of SMOTE in this study seeks to rectify the dataset's imbalance, as visually depicted in Fig. 3. This equates to an adjustment ensuring that the minority class attains a more balanced representation, rendering it akin in size to the majority class. This balancing methodology holds paramount significance as it contributes to assessing the overall data quality, particularly in terms of how adeptly the artificially generated data points mirror the genuine underlying distribution characterizing the minority class. In essence, SMOTE serves as an invaluable tool for effectively addressing the challenges posed by class imbalance, facilitating the creation of a more robust and balanced dataset primed for subsequent analytical and modeling endeavors.

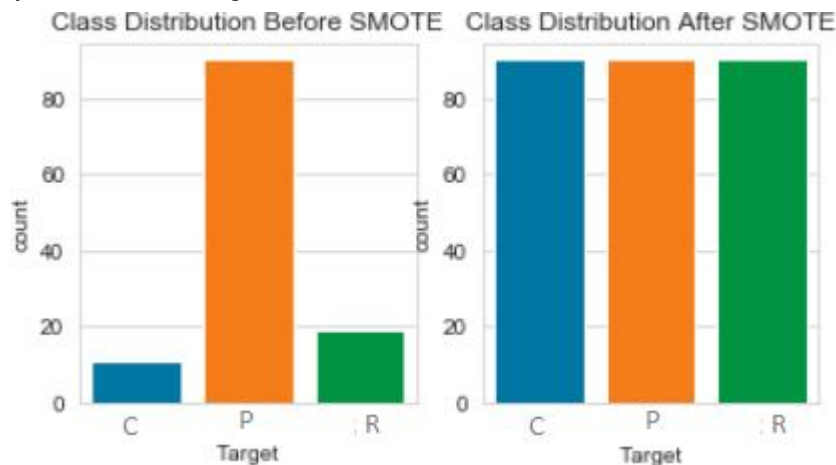
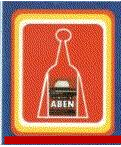


Fig.3 Class distribution before and after applying SMOTE balancing approach

Data splitting

This research encompassed two distinct experiments to investigate the phenomenon under scrutiny. In the initial experiment, the dataset remained unaltered, with no attempts made to address its inherent imbalance. The original dataset was subjected to a division, allocating 80% of its composition to the training set and reserving the remaining 20% for validation purposes. This partitioning yielded sample sizes of 96 and 24 for the training and validation sets, respectively. Subsequently, the second experiment was conducted on a dataset that had been meticulously balanced, rectifying the previously observed class imbalance. In alignment with the established protocol, this balanced dataset was also subjected to a division into training and validation subsets, adhering to the same proportions. Consequently, 80% of the balanced dataset was dedicated to the training set, with the remaining 20% designated for validation purposes. This approach ensured that both experiments maintained consistency in terms of dataset partitioning, facilitating a comparative analysis of results and outcomes.



Cross validation

Cross-validation serves as a valuable method for evaluating the effectiveness of a machine learning algorithm and predicting its performance on new data drawn from the same underlying distribution, as outlined by King et al. (2021). In this study, the training process employed a cross-validation approach with 10 iterations, aimed at attaining the optimal model. This technique enables the assessment of the machine learning algorithm's capabilities and its potential to generalize to unseen data points. By repeatedly splitting the dataset into distinct training and validation subsets, with each iteration using a different portion for validation while the rest is employed for training, a more robust and reliable model is developed. The application of 10 repetitions in the cross-validation process enhances the model's robustness by subjecting it to a diverse range of training and validation data combinations. This approach ultimately contributes to the selection of the most suitable model that exhibits strong predictive performance across various scenarios.

Modelling evaluation

Several distinct independent models were enlisted for the modeling process, encompassing Decision Trees, k-Nearest Neighbors, Random Forest, Logistic Regression, Support Vector Machines (SVM), and Multi-Layer Perceptron (MLP) classifiers. Additionally, in an endeavor to enhance predictive prowess, a meta-model, typically KNN, was introduced to facilitate the stacking of predictions. The modeling phase was executed on two separate datasets: one with balanced class distribution and another with an unbalanced distribution. A comparative analysis was subsequently conducted, contrasting the individual models against the proposed stacked model. This approach aimed to discern the advantages and performance gains achieved through stacking. To evaluate the efficacy of these models, a comprehensive set of metrics was employed. These metrics encompassed Accuracy, Precision, the F1-Score, and the ROC Curve as represented in (Eq5) – (Eq10). Each of these metrics plays a distinctive role in gauging the model's performance in various aspects. Accuracy provides an overall assessment of correct predictions, Precision evaluates the proportion of true positives among all positive predictions, and the F1-Score offers a balance between Precision and Recall. The ROC Curve graphically illustrates the model's ability to discriminate between positive and negative classes across different thresholds. In summary, the utilization of diverse models, including stacking, on both balanced and unbalanced datasets, alongside a multifaceted set of performance metrics, contributed to a comprehensive evaluation of their predictive capabilities and highlighted the strengths and weaknesses of each approach.

$$= \left(\frac{+}{+ + +} \right) \quad (5)$$

$$\text{Precision} = \frac{TP}{TP+FP} \quad (6)$$

$$\text{F-score} = 2 \times \frac{\text{precision} \times \text{recall}}{\text{precision} + \text{recall}} \quad (7)$$

$$\text{Recall} = \frac{TP}{TP+FN} \quad (8)$$

TP signifies the count of correctly predicted positive instances, while TN represents the number of correctly predicted negative instances. On the other hand, FP denotes the count of instances falsely classified as positive, and FN indicates instances falsely classified as negative. The Receiver Operating Characteristic (ROC) curve serves as a valuable tool for assessing model performance across various threshold settings in classification problems. The ROC curve presents a graphical depiction of the True Positive Rate (TPR) on the y-axis and the False



Positive Rate (FPR) on the x-axis. It allows for a visual examination of a model's ability to distinguish between positive and negative classes at different decision thresholds. Furthermore, the Area Under the Characteristic (AUC) corresponds to the area beneath the ROC curve. A higher AUC value signifies superior model performance, indicating a model's proficiency in correctly classifying instances across a spectrum of threshold values. Essentially, a larger AUC underscores the model's effectiveness and its capacity to make accurate predictions across a range of decision boundaries.

$$TPR = \frac{TP}{TP+FN} \quad (9)$$

$$FPR = \frac{FP}{FP+TN} \quad (10)$$

Results and discussion

This section presents the outcomes achieved concerning the composite models, both with and without dataset balancing. These composite models involve the application of stacking, utilizing Decision Trees, k-Nearest Neighbors, Random Forest, Logistic Regression, Support Vector Machines (SVM), and Multi-Layer Perceptron (MLP) classifiers, in conjunction with KNN as the meta-classifier. Additionally, the section provides an overview of the parameter selection.

Hyper-parameter selection

Hyperparameters hold a significant role in shaping the model's performance. Fine-tuning these hyperparameters is crucial to elevate the model's efficiency on the dataset, leading to an overall enhancement in its quality. In this investigation, we employed a hybrid strategy that amalgamates both grid search and 10-fold cross-validation techniques to optimize the machine learning model's hyperparameters. The grid search approach is a thorough method that explores diverse hyperparameter combinations, subjecting the model to multiple training iterations. The selection of the optimal hyperparameter set is contingent on achieving the highest performance observed during these training sessions. Meanwhile, the 10-fold cross-validation method partitions the dataset into ten independent subsets, employing nine for training without duplication and reserving one for testing in each cycle. This iterative process is repeated ten times, yielding ten unique combinations, and their outcomes are averaged to yield the final result. By integrating the grid search and cross-validation methodologies, we systematically assessed all hyperparameter combinations within the grid search using the robust 10-fold cross-validation technique. This comprehensive approach effectively bolsters the model's capacity for generalization and adept performance on unseen data, a concept elucidated by Pedregosa et al. (2011).

Base learner's and stacked model results

As the efficacy of the ultimate stacking model hinges on the performance of its underlying base learners, this research commenced with an assessment of the aptness of these base learners. The initial phase involved an appraisal of the predictive proficiency of these base learners in isolation, entailing their application to generate predictions for the test dataset. Detailed in Table 4 are the configurations of hyperparameters that produced optimal outcomes for the four base learners.

Table 4. Hyperparameter setting

Model	Setting
Random Forest	The maximum depth is set at 7, with a minimum requirement of 1 sample per leaf node, a minimum of 2 samples for node division, and a total of 50 trees in the ensemble
MLP	It involved utilizing the default hidden layer size of 100, employing the relu activation function. For weight optimization, the chosen solver was adam, while the penalty and learning rate were kept at their default settings.
KNN	The configuration includes a choice of 7 neighbors and the specification of distance weighting with p values of 1 and 2.
LR	Solver=liblinear, Penalty=L2, tolerance convergence set to 1e-4 and the maximum number of iterations to converge is set to 100



DT It involved using the "gini" criterion for splitting nodes, choosing the "best" splitting strategy, not limiting the maximum depth of the tree and setting a minimum of 1 sample per leaf.
SVM The settings include using the radial basis function (rbf) as the kernel function, setting gamma to 'scale,' and using a penalty coefficient (C) of 1

Table 5. The evaluation results of the base and stacked model before and after balancing

Model	Before SMOTE application				After SMOTE application			
	Accuracy	Precision	F1	ROC	Accuracy	Precision	F1	ROC
Stacked	0.83	0.83	0.83	0.96	0.98	0.98	0.98	1.00
RF	0.83	0.84	0.83	0.95	0.96	0.97	0.96	1.00
KNN	0.88	0.94	0.89	0.95	0.87	0.89	0.87	0.97
SVM	0.75	0.64	0.69	0.96	0.89	0.92	0.89	1.00
MLP	0.71	0.80	0.75	0.90	0.85	0.87	0.85	0.97
DT	0.79	0.82	0.80	0.84	0.94	0.95	0.94	0.98
LR	0.75	0.81	0.77	0.92	0.80	0.81	0.80	0.98

Table 5 provides a comprehensive overview of the model performances on the test dataset. Notably, the stacked ensemble model emerges as the top performer, showcasing superior predictive capabilities, closely followed by the K-Nearest Neighbors (KNN) and Random Forest (RF) models. In contrast, the Multi-Layer Perceptron (MLP) model demonstrates the least favorable performance among the base learners. Due to the varying performance profiles of these base learners, the selection of the KNN model as the meta-learner for the stacking model in this research was a thoughtful choice, emphasizing its potential to significantly enhance the ensemble's predictive power and resilience.

Fig.4 offers a comprehensive insight into the stacked model's proficiency in predicting student performance across three distinct categories: "course requirements not met" (C), "pass" (P), and "Referred" (R). The outcomes are highly informative. In the "course requirements not met" segment (C), the model displayed exceptional accuracy, both pre- and post-data balancing. Prior to balancing, it accurately predicted all three instances in this category, registering a flawless record devoid of false positives or false negatives. Subsequent to data balancing, the model's prowess in this category remained undiminished, sustaining a perfect prediction streak. Transitioning to the "pass" grouping (P), the model initially rendered predictions for 18 students. While it correctly identified 15, it encountered challenges with three cases. Nevertheless, after the implementation of the SMOTE data balancing methodology, significant improvement became evident. The "Referred" (R) category showcased remarkable performance. Initially, the model made predictions for three students, correctly classifying two and making one erroneous prediction. Following data balancing, this category witnessed noteworthy progress, with the model achieving flawless predictions. The ROC curve's evaluation illuminated the model's prowess. Pre-SMOTE, the ROC curve exemplified a performance level of 96%, signifying a high true positive rate and a minimal false positive rate, as depicted in Fig 4(c). Post-SMOTE, the ROC curve scaled to an exceptional 100% performance level (refer to Fig 4(d). This highlighted the model's enhanced ability to differentiate between classes, particularly in the "pass" and "Referred" contexts. Furthermore, crucial metrics, including accuracy, F1 score, and precision, witnessed substantial enhancements. Across the board, values ascended from 83% to a commendable 98%. These findings underscore the vital role played by the SMOTE data balancing strategy in amplifying the model's predictive acumen and overall efficacy.

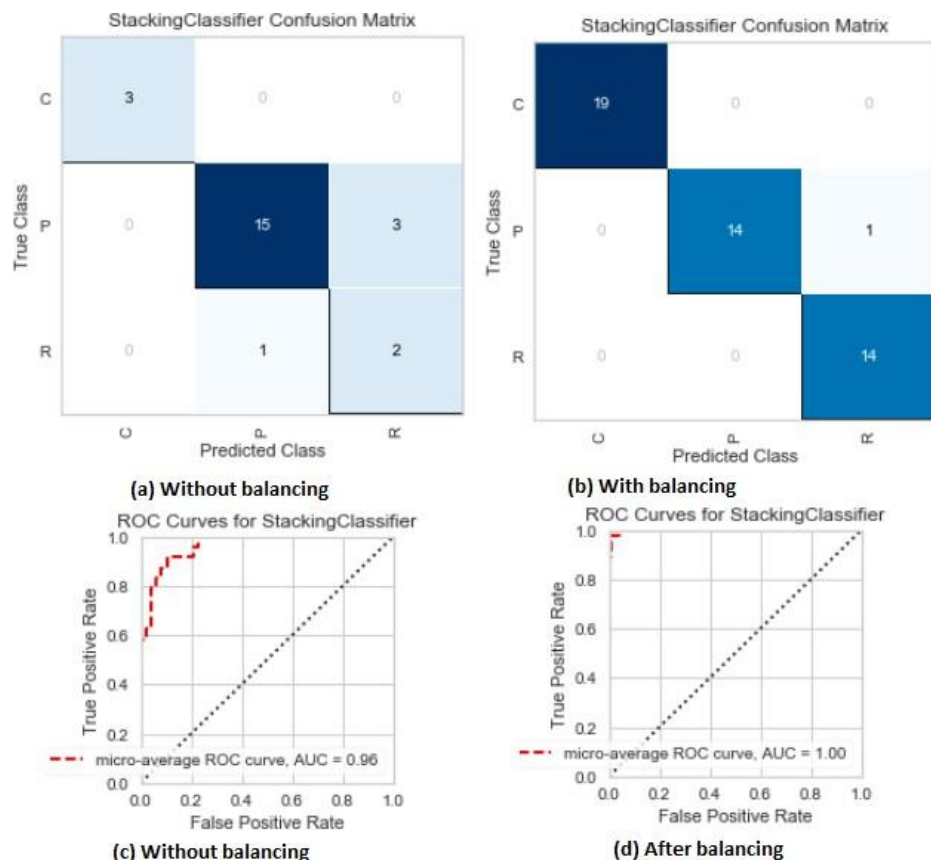


Fig. 4. Confusion matrices and ROC curves for stacked model, highlighting the outcomes both before and after the application of SMOTE for data balancing

Furthermore, Fig.5 presents the outcomes of student performance prediction across three distinct categories, specifically using the independent K-Nearest Neighbors (KNN) model, both pre- and post-application of the SMOTE technique. Before the data balancing procedure, it is noteworthy that all three students categorized as "C" were accurately classified. In a similar vein, all three students belonging to the "R" category received correct predictions. However, in the case of the "P" category (pass), while 15 students were correctly predicted, three errors were encountered. Following the data balancing process, a comparable pattern emerged, with all predictions being correct for groups "C" and "R." Slight variations were observed in the "P" category, where 11 predictions were accurate, while four false predictions occurred. Notably, there was a marginal improvement in the ROC Curve value, which increased from 95% to 97%. Conversely, there was a minor dip in performance metrics such as the F1 score, accuracy, and precision, as evidenced in Table 5. Accuracy declined from 88% to 87%, while precision saw a decrease from 94% to 89%. The F1 score also experienced a slight reduction, moving from 89% to 87%. These subtle fluctuations suggest that while the SMOTE approach contributed to enhanced class balance, it had a nuanced impact on certain predictive metrics for the KNN model.

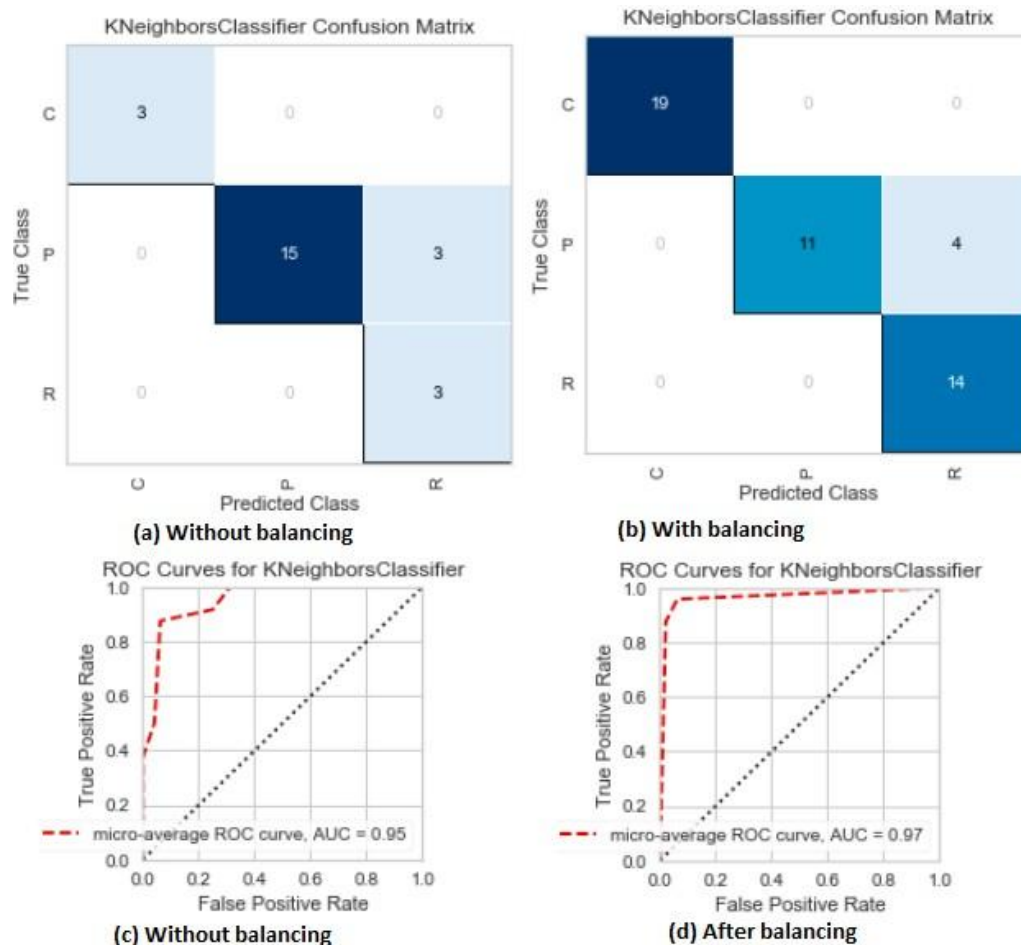


Fig. 5. Confusion matrices and ROC curves for KNN model, highlighting the outcomes both before and after the application of SMOTE for data balancing

Fig.6 provides an insightful depiction of student performance prediction using the standalone Decision Tree (DT) model across three distinct categories, mirroring the earlier analyses. Before implementing data balancing, all students in the "C" category received accurate predictions, which is consistent with the previous observations. However, there were minor discrepancies in the "P" and "R" categories, with three and two false predictions out of 18 and three instances, respectively. Intriguingly, after applying the data balancing technique, a noticeable enhancement in predictive accuracy was achieved. This was particularly evident in the remarkable reduction of false predictions across all categories. Specifically, each category experienced only one false prediction, reflecting a substantial improvement in predictive precision and reliability. The ROC curve's performance also witnessed significant progress, elevating from an initial 84% to an impressive 98%. This substantial increase in the ROC curve value signifies an enhanced ability of the model to distinguish between different classes, indicating an elevated true positive rate while maintaining a low false positive rate. This remarkable improvement in predictive performance can be attributed to the harmonization of class distribution through data balancing. By ensuring a more equitable representation of each class, the model became less skewed toward the majority

class, resulting in a more balanced and accurate prediction across all categories. This, in turn, translated into notable enhancements in key metrics such as the F1 score, accuracy, and precision. In Table 5, these improvements are elucidated further, with the F1 score witnessing an ascent from 80% to 94%, accuracy elevating from 79% to 94%, and precision improving from 82% to 95%. These metrics collectively demonstrate the profound impact of data balancing on refining the model's predictive prowess and reinforcing its reliability in classifying students' performance accurately.

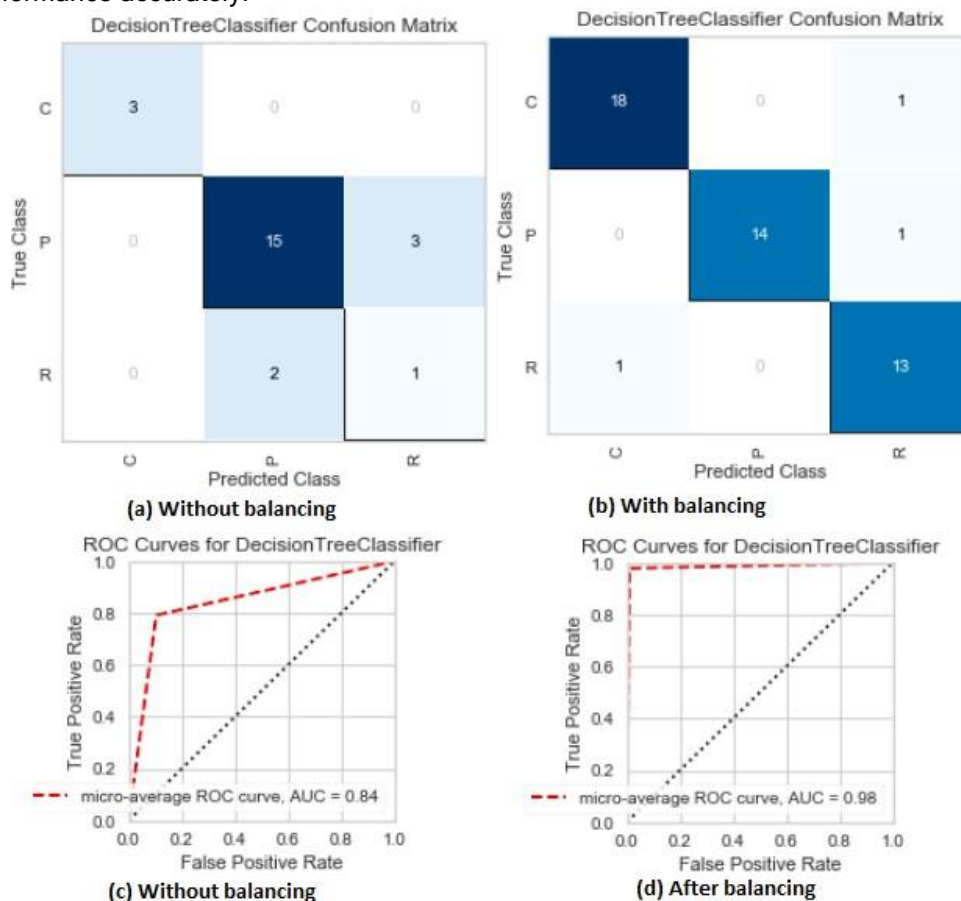


Fig. 6. Confusion matrices and ROC curves for DT model, highlighting the outcomes both before and after the application of SMOTE for data balancing

Fig.7 delves into the outcomes of predicting student performance using the Random Forest (RF) base model across three distinct categories, both before and after applying the SMOTE technique. The insights provided by this illustration are intriguing. Prior to implementing data balancing, there were noticeable discrepancies in the "P" and "C" categories. Specifically, the model made one erroneous prediction in the "P" group out of 18 instances and committed three errors in the "C" category out of a total of three students. Furthermore, the "R" category exhibited challenges, with two incorrect classifications out of three students. Post the application of the data balancing approach, a remarkable improvement was discernible. Notably, both the "C" and "R" minority groups benefited from this enhancement, as all predictions within these categories



proved to be correct. This underscores the significance of balancing the dataset, as it eradicated errors in the "C" and "R" categories. However, it's worth noting that a single incorrect prediction persisted within the "P" group. While this indicates room for further refinement, the overall improvement in predictive accuracy is undeniable. The sharp increase in the F1 score, accuracy, and precision metrics provides robust evidence of this enhancement. Specifically, these metrics surged from initial values of 83%, 83%, and 84% to impressive levels of 96%, 96%, and 97%, respectively. The significant boost in these metrics can be attributed to the harmonization of class distribution achieved by the SMOTE technique. By equalizing the representation of each class, the model's predictions became more balanced and precise, significantly reducing errors. This balancing act is also reflected in the remarkable rise of the ROC Curve performance, escalating from an initial 95% to a perfect 100%. This heightened ROC Curve value underscores the model's newfound capability to effectively differentiate between classes, particularly in the "pass" and "course requirements not met" categories, while maintaining an exceptionally low false positive rate.

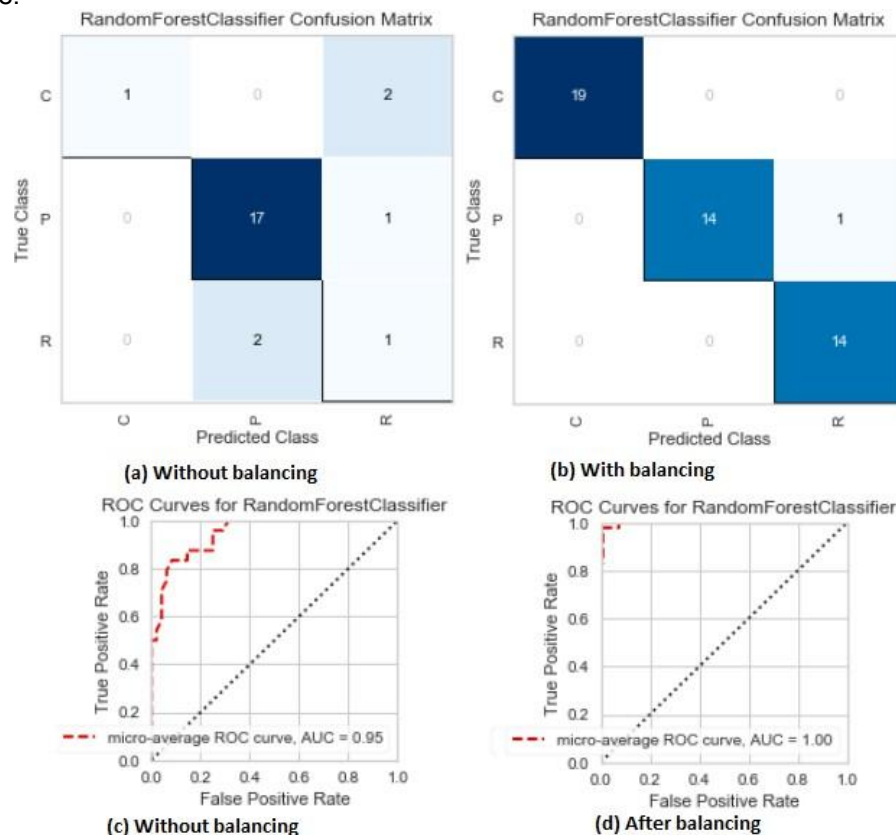


Fig.7. Confusion matrices and ROC curves for RF model, highlighting the outcomes both before and after the application of SMOTE for data balancing

Fig.8 offers a comprehensive view of the SVM-based predictive model's performance in forecasting student performance across three different categories. This assessment encompasses both pre-balancing and post-balancing scenarios, yielding intriguing insights. Before applying the data balancing technique, the model demonstrated noteworthy precision in the "C" (course requirements not met) and "P" (pass) categories. In these groups, all student



predictions were accurate, indicating an impressive performance. However, the same could not be said for the "R" (referred) category, where none of the predictions were correct. This deficiency underscored the challenge of handling imbalanced data. Conversely, after implementing data balancing, a discernible transformation took place. Notably, the minority classes, specifically the "C" and "R" groups, benefited from this adjustment, as all predictions within these categories proved to be correct. This marked improvement highlights the significance of data balancing in addressing the inherent challenges associated with imbalanced datasets. In contrast, the "P" group witnessed four erroneous predictions out of 15 students, indicating a slight decrease in precision. However, it's essential to consider the broader perspective. The data balancing technique significantly improved overall performance, as evidenced by the substantial surge in key metrics. When comparing the pre-balancing and post-balancing scenarios, an unmistakable trend emerges. The F1 score, accuracy, and precision metrics experienced remarkable growth. Specifically, these metrics catapulted from initial values of 69%, 75%, and 81% to highly commendable levels of 89%, 89%, and 92%, respectively. This transformation underlines the effectiveness of data balancing in refining predictive accuracy and precision. Furthermore, the ROC Curve, a crucial indicator of a model's discriminatory ability, exhibited notable improvement. Pre-balancing, the ROC curve registered a respectable 96%. However, post-balancing, this performance metric soared to a perfect 100%. This signifies the model's enhanced capacity to effectively distinguish between classes, particularly in the "pass" and "course requirements not met" categories, while maintaining an impressively low false positive rate.

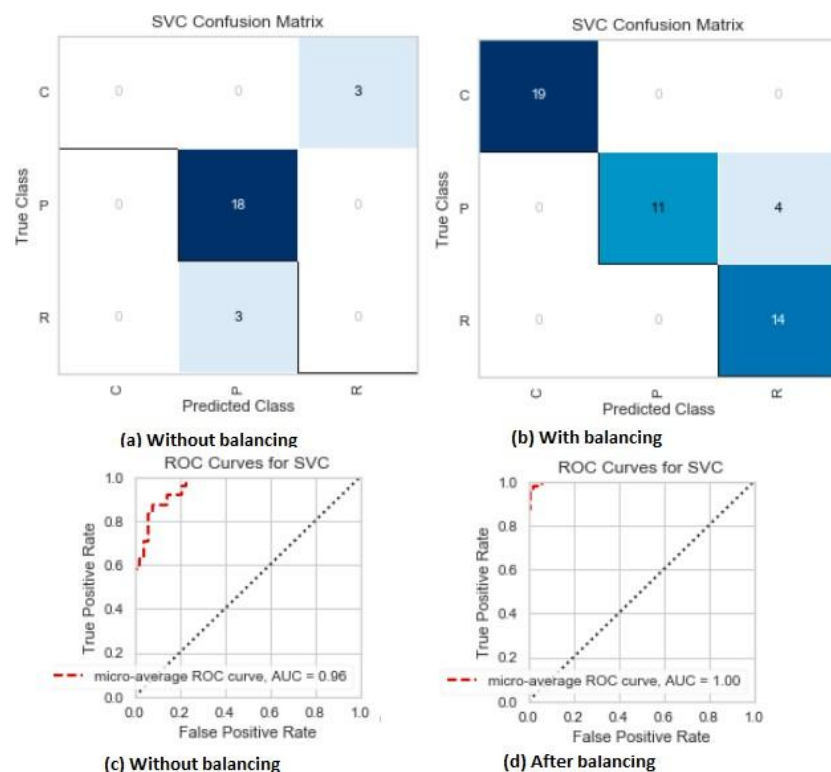


Fig.8. Confusion matrices and ROC curves for SVM model, highlighting the outcomes both before and after the application of SMOTE for data balancing



Furthermore, Logistic regression serves as a versatile statistical technique, applicable not only to binary classification but also to multiclass classification challenges. As depicted in Fig.9, the outcomes of logistic regression are of particular interest. Before applying data balancing, the logistic regression model exhibited a minor misclassification, erroneously predicting one sample within the "course requirements not met" (C) category out of three. Within the "pass" (P) category, which comprised 18 samples, 15 were accurately classified, while three were misclassified. In the "Referred" (R) category, the model accurately predicted only one out of three samples. Following the implementation of the SMOTE approach to address data imbalance, notable improvements emerged. In the "course requirements not met" (C) category, all samples were correctly predicted, signifying a substantial enhancement in model performance. However, within the "pass" (P) category, one misclassification persisted among the 15 samples, showcasing a slight improvement. The most remarkable progress was observed in the "Referred" (R) category, with only two out of 14 samples being incorrectly classified. These enhancements were accompanied by notable increases in key performance metrics. The F1 score, accuracy, and precision all exhibited marked improvements, rising from initial values of 77%, 75%, and 81% to new levels of 80%, 80%, and 81%, respectively. Additionally, the ROC curve demonstrated a notable ascent, surging from an initial 92% to a commendable 98%. These findings underscore the effectiveness of the SMOTE data balancing technique in enhancing the logistic regression model's accuracy, precision, and overall predictive capabilities. Lastly, Fig.10 provides insights into the performance of the Multilayer Perceptron (MLP) model in predicting student performance. Before the application of data balancing through SMOTE, some misclassifications were evident. Notably, one misclassification occurred within the "course requirements not met" (C) group, where one sample was incorrectly classified. In the "pass" (P) group, which encompassed 18 samples, three were inaccurately classified. Additionally, the "Referred" (R) group saw two samples out of three being incorrectly classified. However, a substantial improvement was witnessed after the implementation of the SMOTE technique. Specifically, within the "course requirements not met" (C) category, all samples were correctly predicted, showcasing a significant enhancement in predictive accuracy. For the "pass" (P) category, the improvement was noteworthy, with 13 out of 15 samples being accurately classified and only two misclassifications remaining. Similarly, within the "Referred" (R) category, the misclassifications reduced significantly, with only one out of 14 samples being incorrectly classified. These improvements extended to crucial performance metrics.

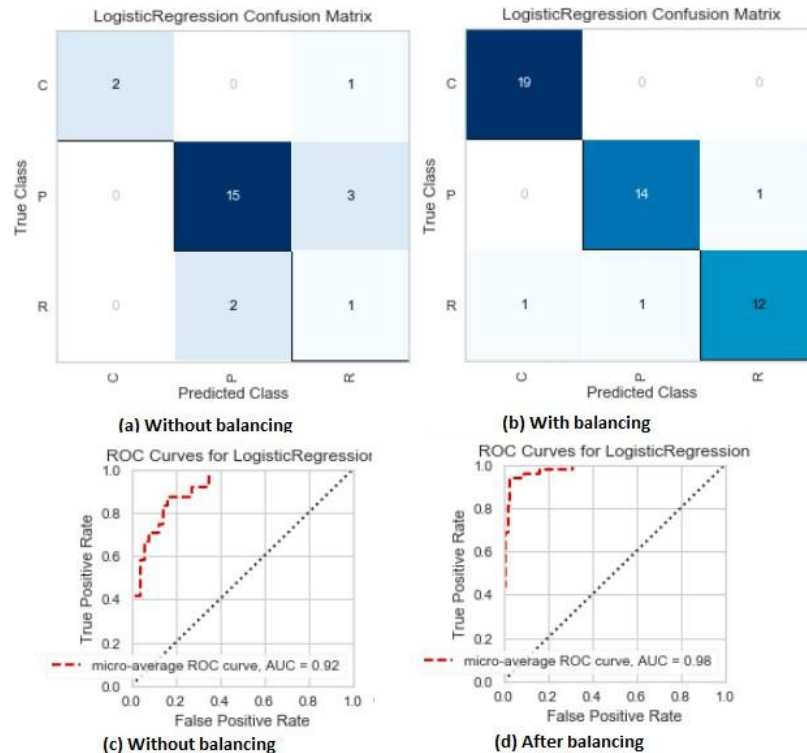


Fig.9. Confusion matrices and ROC curves for LR model, highlighting the outcomes both before and after the application of SMOTE for data balancing

The F1 score, accuracy, and precision exhibited substantial increases, rising from their initial values of 75%, 71%, and 80% to new levels of 85%, 85%, and 87%, respectively. Furthermore, the ROC curve, a pivotal indicator of model discrimination and performance, displayed remarkable progress. It ascended from its initial level of 90% to an impressive 97%, signifying the model's enhanced ability to distinguish between different student performance categories. These findings underscore the efficacy of the SMOTE data balancing technique in elevating the MLP model's predictive accuracy, precision, and overall performance.

Model comparisons

Prior to data balancing, the base models displayed a range of performance levels, each with its own strengths and weaknesses. For instance, the K-Nearest Neighbors (KNN) model exhibited commendable accuracy and precision in certain categories but grappled with false predictions in others. Similarly, Decision Trees (DT) showcased a comparable pattern, demonstrating misclassifications in specific categories. Random Forest (RF) encountered difficulties in the "pass" category, where misclassifications occurred, but it showcased a significant turnaround after data balancing. Support Vector Machines (SVM) faced particular challenges in correctly categorizing students in the "Referred" group before the introduction of data balancing techniques. Multilayer Perceptron (MLP) exhibited misclassifications across categories before data balancing, but its performance notably improved afterward. Logistic Regression (LR) struggled with some misclassifications, notably within the "pass" category. Nonetheless, the application of the SMOTE data balancing technique wrought transformative improvements across all models. Notably, the stacked model emerged as a standout performer, boasting remarkable



accuracy, ROC curve performance, precision, and F1 score. The stacked model harnessed the enhanced predictive capabilities of the base models, resulting in a synergistic and robust predictive engine, as visually depicted in Fig.11. In summation, the stacked model surpassed the individual base models across multiple performance metrics. Its accuracy, precision, and F1 score exhibited substantial gains, underlining its prowess in predicting student performance with accuracy and reliability. The ROC curve, a vital indicator of the model's discriminatory capabilities, testified to the stacked model's ability to effectively differentiate between diverse student performance categories. This suggests that the stacked model excelled not only in correctly identifying students' performance outcomes but also in minimizing false positive and false negative predictions, a crucial aspect of predictive modeling. It's imperative to acknowledge the instrumental role played by data balancing techniques, particularly SMOTE, in enhancing the performance of all models. By rectifying the class imbalances present in the dataset, SMOTE facilitated a more equitable representation of each class.

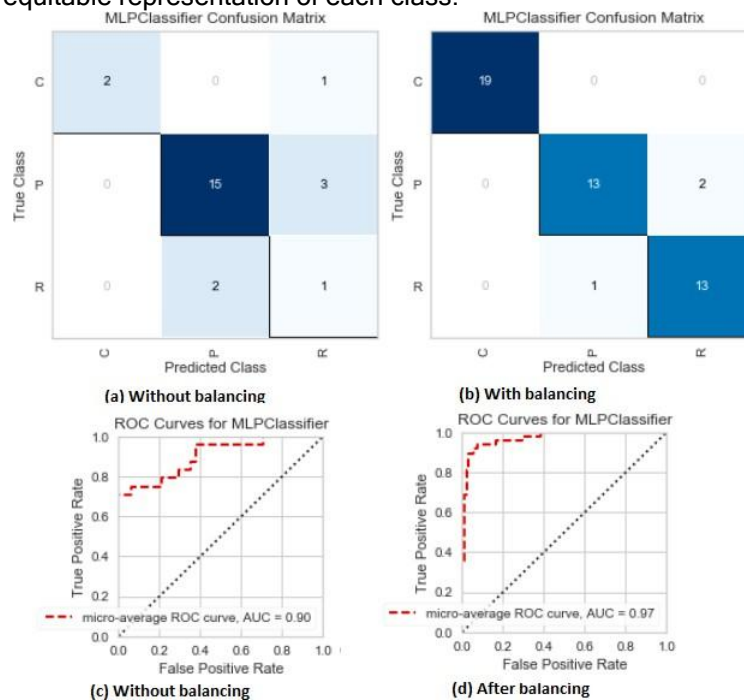


Fig.10. Confusion matrices and ROC curves for MLP model, highlighting the outcomes both before and after the application of SMOTE for data balancing

This leveling of the playing field enabled all models, including the stacked model, to make predictions that were more balanced and precise, significantly mitigating errors. In a nutshell, the stacked model, fortified by data balancing techniques, emerged as the most formidable predictor of student performance. Its ability to harness the collective strength of the base models and deliver accurate, balanced, and reliable predictions underscores its efficacy in practical applications.

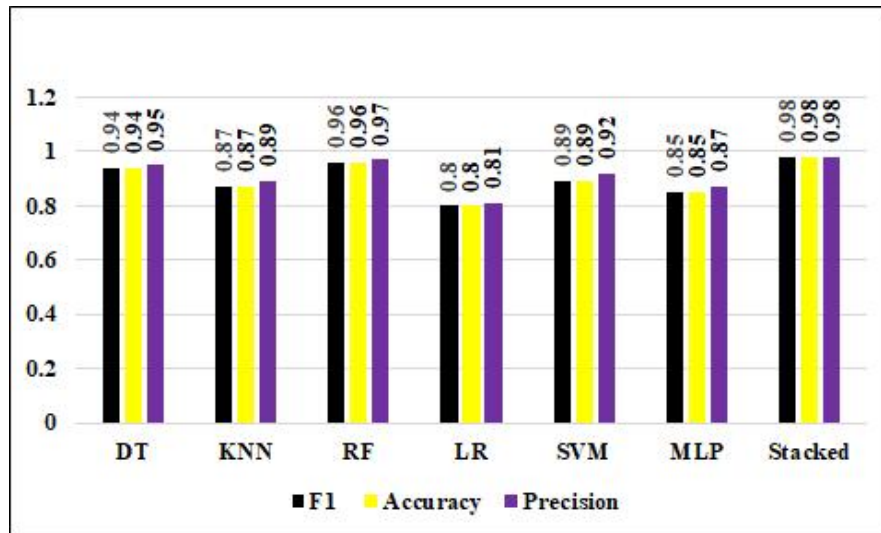


Fig. 11. A comprehensive comparison of the models' performance after the application of the SMOTE data balancing technique

A comparative analysis of the proposed stacking approach versus prior studies

Several prior studies evaluated the performance of single machine learning models such as Decision Trees, Naïve Bayes, Neural Networks, and Support Vector Machines. For example, Rahman et al. (2017) applied information gain and wrapper feature selection methods in conjunction with Naïve Bayes, Decision Tree, and Artificial Neural Networks, achieving an accuracy of 79.37%. Kumar & Pal (2011) explored Decision Trees, Neural Networks, and K-Nearest Neighbors to predict student results, with Decision Trees emerging as the most accurate. These single models demonstrated reasonable predictive power. However, in contrast to these studies, our research leverages an ensemble stacking model, as highlighted by Mastour et al. (2023), which consistently outperforms these single models. In addition, Mastour et al. (2023) conducted a comprehensive study comparing classical models like Logistic Regression (LR), Support Vector Machine (SVM), and k-Nearest Neighbors (KNN) with ensemble models, including Voting, Bagging (BG), Random Forests (RF), Adaptive Boosting (ADA), eXtreme Gradient Boosting (XGB), and Stacking. Their findings underscored the superiority of ensemble machine learning models, signaling a shift towards leveraging the collective intelligence of multiple base models. Our study takes this a step further by introducing a stacked ensemble approach, as discussed in depth, which combines Decision Trees, Logistic Regression, Random Forest, K-Nearest Neighbors, Support Vector Machines, and Multi-Layer Perceptron within a unified framework.

Many previous studies encountered class imbalance issues within educational datasets. González-Brambila et al. (2018) sought to predict the academic performance of engineering students using Decision Trees but achieved only 63.19% accuracy, highlighting the challenges of class imbalance. Our research addresses this challenge by integrating the Synthetic Minority Over-Sampling Technique (SMOTE). This technique generates synthetic samples for the minority class, ensuring a balanced dataset and reducing potential biases in predictions. Zaffar et al. (2017) delved into the impact of feature selection algorithms on student performance analysis, discovering that principal component analysis combined with the random forest classifier yielded



the best results. However, our study introduces the concept of feature selection using eXtreme Gradient Boosting (XGB), building on these previous insights. Our use of XGB highlights a sophisticated approach to identifying and extracting relevant features, contributing to enhanced model efficiency and interpretability. Our research evaluates model performance using a comprehensive set of metrics, including Accuracy, Precision, ROC curve, and F1-score. This comprehensive assessment provides a more nuanced understanding of our framework's capabilities compared to studies that rely on a limited set of metrics, as exemplified in various prior studies. Recent research by Mulyana et al. (2023) achieved an impressive 89% accuracy in classifying successful and dropout students using Random Forest. However, our study surpasses this achievement by achieving a remarkable 98% accuracy when dealing with balanced data, as vividly depicted in Table 5 and Fig.11. This outcome solidifies the potential real-world impact of our predictive model in enhancing student outcomes and resource allocation, as exemplified by Sawangarrearak&Thanathamthee (2020). In summary, our research builds upon the foundations laid by previous studies in the field of predicting student academic performance. It introduces an innovative stacked ensemble model, as highlighted by Mastour et al. (2023), which surpasses the predictive power of single models and demonstrates robustness in handling class imbalance. The use of XGBoost for feature selection and comprehensive model evaluation metrics further enhances the contributions of our study. The achievement of 98% accuracy with balanced data, as compared to prior studies, solidifies our model's potential for practical implementation in educational contexts, marking a significant advancement in the field.

Practical and theoretical contributions

The article makes substantial contributions to the realm of education and predictive modeling, encompassing both theoretical and practical dimensions. Firstly, it conducts an extensive theoretical evaluation of various predictive models, including Decision Trees, k-Nearest Neighbors, Random Forest, Logistic Regression, Support Vector Machines, and Multi-Layer Perceptron. This in-depth analysis sheds light on the strengths and weaknesses of these models when applied to the task of predicting student performance. Such theoretical insights provide a foundational understanding of model suitability within educational contexts. Additionally, the article introduces a crucial theoretical concept: feature selection using XGBoost (XGB), a formidable machine learning framework. This contribution underscores the critical role of selecting pertinent features for accurate student performance modeling. The utilization of XGB for feature selection showcases a sophisticated approach to identifying and extracting the most influential attributes from the dataset. This not only elevates the model's efficiency but also imparts invaluable insights into the key determinants of student success.

Furthermore, the incorporation of XGB-based feature selection into the methodology enhances the practical robustness of the predictive model. This process ensures that only the most informative variables are considered, diminishing noise and bolstering the model's generalization capabilities. This practical application of feature selection streamlines the creation of an efficient and effective predictive framework, which is paramount for practical implementation within educational settings. The article doesn't stop at feature selection but goes on to introduce the concept of a stacking ensemble approach, which combines the predictive capabilities of multiple base models. This theoretical framework elevates the accuracy and reliability of student performance prediction, showcasing the potential advantages of ensemble learning within educational contexts.

Moreover, the article extends its contributions into practical domains by offering insights into data preprocessing techniques. It elucidates the importance of techniques such as one-hot encoding and the Synthetic Minority Over-Sampling Technique (SMOTE) for handling imbalanced



datasets, thereby enhancing the robustness and accuracy of the predictive models in real-world educational applications. Furthermore, the article demonstrates the practical application of machine learning and data mining techniques in the education sector. It elucidates how these methods can be effectively employed to predict student performance, identify at-risk students early on, and provide targeted academic support. Lastly, the article underscores the real-world impact of predictive modeling in education. Achieving an impressive 98% accuracy in predicting student performance with balanced data, it implies that educational institutions can utilize these methods to enhance student outcomes, allocate resources more efficiently, and offer timely support to students in need.

In a nutshell, this article bridges the theoretical and practical realms in the field of education, delivering valuable insights for both researchers and educational practitioners. Its contributions span model evaluation, feature selection, ensemble learning, data preprocessing, practical implementation, and tangible outcomes, collectively enriching the landscape of predictive modeling in education.

Conclusion

In our extensive investigation, we compared six individual machine learning models to a stacking model to forecast the performance of higher education students, utilizing both balanced and imbalanced datasets. Across various performance metrics such as Accuracy, the ROC curve, Precision, and the F1-Score, the stacking model with data oversampling via SMOTE consistently outperformed all others. This establishes it as the most efficient method for predicting student performance, underscoring the vital role of machine learning in education, particularly when dealing with complex data requirements and the need for precision.

In summary, our ensemble stacking model, enhanced by SMOTE data rebalancing, is a powerful tool for predicting higher education student performance. It validates the effectiveness of this ensemble approach, especially with imbalanced datasets, offering educators a valuable tool to identify and support students who may need additional academic assistance. With a remarkable 98% accuracy, this approach has the potential to significantly impact educational interventions and enhance student academic achievements, bridging the gap between data science and education, and highlighting machine learning's transformative role in academia.

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Ethical approval

I affirm that this manuscript is entirely my own work, created independently. It does not incorporate any research findings previously published or authored by others. I am the sole author of this manuscript, and I take full legal responsibility for the accuracy of this statement.

Conflict of interest

The corresponding author confirms that there are no conflicts of interest associated with this manuscript.

Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.



References

- Akgün, E. (2020). Science Mapping Research on Educational Data Mining: A Bibliometric Review of International Publications. *Future Visions Journal*, 4(14), 1-17. <https://doi.org/10.29345/futvis.160>
- Alamgir, Z., Akram, H., Karim, S., & Wali, A. (2023). Enhancing Student Performance Prediction via Educational Data Mining on Academic data. *Informatics in Education*. <https://doi.org/10.15388/infedu.2024.04>
- Albreiki, B., Zaki, N., & Alashwal, H. (2021). A Systematic Literature Review of Student' Performance Prediction Using Machine Learning Techniques. *Education Sciences*, 11(9), 552. <https://doi.org/10.3390/educsci11090552>
- Atif, A. (2013). *Learning Analytics in Higher Education: A Summary of Tools and Approaches*. Learning & Technology Library (LearnTechLib).
- Aulakh, K., Roul, R. K., & Kaushal, M. (2023). E-learning enhancement through educational data mining with Covid-19 outbreak period in backdrop: A review. *International Journal of Educational Development*, 101, 102814. <https://doi.org/10.1016/j.ijedudev.2023.102814>
- Banda, L. O. L., Liu, J., Banda, J. T., & Zhou, W. (2023). Impact of ethnic identity and geographical home location on student academic performance. *Heliyon*, 9(6), e16767. <https://doi.org/10.1016/j.heliyon.2023.e16767>
- Begum, S., & Padmannavar, S. S. (2023). Student Performance Analysis using Bayesian Optimized Random Forest Classifier and KNN. *International Journal of Engineering Trends and Technology*, 71(5), 132-140. <https://doi.org/10.14445/22315381/ijett-v71i5p213>
- Chawla, N. V., Bowyer, K. W., Hall, L. O., & Kegelmeyer, W. P. (2002). SMOTE: Synthetic Minority Over-sampling Technique. *Journal of Artificial Intelligence Research*, 16, 321-357. <https://doi.org/10.1613/jair.953>
- Cheng, S. T., & Kaplowitz, S. A. (2016). Family economic status, cultural capital, and academic achievement: The case of Taiwan. *International Journal of Educational Development*, 49, 271-278. <https://doi.org/10.1016/j.ijedudev.2016.04.002>
- Derveniz, C., Kyriatzis, V., Stoufis, S., & Fitsilis, P. (2022). Predicting Students' Performance Using Machine Learning Algorithms. *Proceedings of the 6th International Conference on Algorithms, Computing and Systems*. <https://doi.org/10.1145/3564982.3564990>
- Desjardins, S., & Grandbois, M. (2022). Sleep parameters associated with university students' grade point average and dissatisfaction with academic performance. *Sleep Epidemiology*, 2, 100038. <https://doi.org/10.1016/j.sleepe.2022.100038>
- González-Brambila, S. B., Sánchez-Guerrero, L., Ardón-Pulido, I., Figueroa-González, J., & González-Beltrán, B. (2018). Predicting Academic Performance of Engineering Students After Approving a Mathematics Leveling Course using Decision Trees. *Research in Computing Science*, 147(12), 171-181. <https://doi.org/10.13053/rcs-147-12-16>
- H. Alamri, L., S. Almuslim, R., S. Alotibi, M., K. Alkadi, D., Ullah Khan, I., & Aslam, N. (2020). Predicting Student Academic Performance using Support Vector Machine and Random Forest. *2020 3rd International Conference on Education Technology Management*. <https://doi.org/10.1145/3446590.3446607>
- Hanaysha, J. R., Shriedeh, F. B., & In'airat, M. (2023). Impact of classroom environment, teacher competency, information and communication technology resources, and university facilities on student engagement and academic performance. *International Journal of Information Management Data Insights*, 3(2), 100188. <https://doi.org/10.1016/j.ijime.2023.100188>
- Haryawan, C., & Sebatubun, M. M. (2020). Implementation of multilayer perceptron for student failure prediction. *JUTI: Jurnal Ilmiah Teknologi Informasi*, 18(2), 125. <https://doi.org/10.12962/j24068535.v18i2.a990>
- Howard, W.R. (2007), "Pattern Recognition and Machine Learning", *Kybernetes*, Vol. 36 No. 2, pp. 275-275. <https://doi.org/10.1108/03684920710743466>
- Kim, Y., Li, T., Kim, H. K., Oh, W., & Wang, Z. (2023). Socioeconomic status and school adjustment trajectories among academically at-risk students: The mediating role of parental school-based involvement. *Journal of Applied Developmental Psychology*, 87, 101561. <https://doi.org/10.1016/j.appdev.2023.101561>



- King, R. D., Orhobor, O. I., & Taylor, C. C. (2021). Cross-validation is safe to use. *Nature Machine Intelligence*, 3(4), 276-276. <https://doi.org/10.1038/s42256-021-00332-z>
- Kleinkorres, R., Stang-Rabrig, J., & McElvany, N. (2023). Comparing parental and school pressure in terms of their relations with students' well-being. *Learning and Individual Differences*, 104, 102288. <https://doi.org/10.1016/j.lindif.2023.102288>
- Kumar, B., & Pal, S. (2011). Mining Educational Data to Analyze Students Performance. *International Journal of Advanced Computer Science and Applications*, 2(6). <https://doi.org/10.14569/ijacsa.2011.020609>
- Lagman, A. C. (2015). Embedding Logistic Regression Model in Decision Support Software for Student Graduation Prediction. *Proceedings Journal of Interdisciplinary Research*, 2, 104-110. <https://doi.org/10.21016/irrc.2015.au05ef81o>
- Lang, C., Siemens, G., Wise, A., & Gasevic, D. (Eds.). (2017). *Handbook of Learning Analytics*. <https://doi.org/10.18608/hla17>
- Lehti, H. (2023). Parental Unemployment and Children's Educational Outcomes – A Literature Review. *International Encyclopedia of Education (Fourth Edition)*, 118-127. <https://doi.org/10.1016/b978-0-12-818630-5.01019-8>
- Li, Z., & Qiu, Z. (2018). How Does Family Background Affect Children's Educational Achievement? Evidence from Contemporary China. *The Journal of Chinese Sociology*, 5(1). <https://doi.org/10.1186/s40711-018-0083-8>
- Liu, R. (2015). Variations in Learning Rate: Student Classification Based on Systematic Residual Error Patterns across Practice Opportunities. Retrieved from <https://api.semanticscholar.org/CorpusID:11413105>
- Liu, R., & Hannum, E. (2023). Parental Absence and Student Academic Performance in Cross-National Perspective: Heterogeneous Forms of Family Separation and the Buffering Possibilities of Grandparents. *International Journal of Educational Development*, 103, 102898. <https://doi.org/10.1016/j.ijedudev.2023.102898>
- Lucey, S., & Grydaki, M. (2022). University Attendance and Academic Performance: Encouraging Student Engagement. *Scottish Journal of Political Economy*, 70(2), 180-199. <https://doi.org/10.1111/sjpe.12334>
- Márquez-Vera, C., Cano, A., Romero, C., & Ventura, S. (2012). Predicting Student Failure at School Using Genetic Programming and Different Data Mining Approaches with High Dimensional and Imbalanced Data. *Applied Intelligence*, 38(3), 315-330. <https://doi.org/10.1007/s10489-012-0374-8>
- Mastour, H., Dehghani, T., Moradi, E., & Eslami, S. (2023). Early Prediction of Medical Students' Performance in High-Stakes Examinations Using Machine Learning Approaches. *Heliyon*, 9(7), e18248. <https://doi.org/10.1016/j.heliyon.2023.e18248>
- Matavo, J. M., & Huang, S. (2014). Prediction of Students' Academic Performance: Adapt a Methodology of Predictive Modeling for a Small Sample Size. 2014 IEEE Frontiers in Education Conference (FIE) Proceedings. <https://doi.org/10.1109/fie.2014.7044287>
- Mengash, H. A. (2020). Using Data Mining Techniques to Predict Student Performance to Support Decision Making in University Admission Systems. *IEEE Access*, 8, 55462-55470. <https://doi.org/10.1109/access.2020.2981905>
- Mulyana, A. F., Puspita, W., & Jumanto, J. (2023). Increased Accuracy in Predicting Student Academic Performance Using Random Forest Classifier. *Journal of Student Research Exploration*, 1(2), 94-103. <https://doi.org/10.52465/josre.v1i2.169>
- Nawang, H., Makhtar, M., & Hamza, W. M. A. F. W. (2021). A Systematic Literature Review on Student Performance Predictions. *International Journal of Advanced Technology and Engineering Exploration*, 8(84). <https://doi.org/10.19101/ijatee.2021.874521>
- Nugroho, A., Riady, O. R., Calvin, A., & Suhartono, D. (2020). Identification of Student Academic Performance Using the KNN Algorithm. *Engineering, Mathematics and Computer Science (EMACS) Journal*, 2(3), 115-122. <https://doi.org/10.21512/emacsjournal.v2i3.6537>
- Priscilla, C. V., & Prabha, D. P. (2021). A two-phase feature selection technique using mutual information and XGB-RFE for credit card fraud detection. *International Journal of Advanced Technology and Engineering Exploration*, 8(85). <https://doi.org/10.19101/ijatee.2021.874615>



- QIN, F., ZHU, L. Q., CHENG, Z. K., & ZHANG, Q. (2017). Research on Student Performance Evaluation Based on Random Forest. *DEStech Transactions on Engineering and Technology Research*. <https://doi.org/10.12783/dtettr/eeta2017/7762>
- Rabelo, A., Rodrigues, M. W., Nobre, C., Isotani, S., & Zárate, L. (2023). Educational data mining and learning analytics: a review of educational management in e-learning. *Information Discovery and Delivery*. <https://doi.org/10.1108/idd-10-2022-0099>
- Rahman, L., Setiawan, N. A., & Permijereari, A. E. (2017). Feature selection methods in improving accuracy of classifying students' academic performance. 2017 2nd International Conferences on Information Technology, Information Systems and Electrical Engineering (ICITISEE). <https://doi.org/10.1109/icitisee.2017.8285509>
- Rajendran, S., Chamundeswari, S., & Sinha, A. A. (2022). Predicting the academic performance of middle- and high-school students using machine learning algorithms. *Social Sciences & Humanities Open*, 6(1), 100357. <https://doi.org/10.1016/j.ssaho.2022.100357>
- Romero, C., & Ventura, S. (2010). Educational Data Mining: A Review of the State of the Art. *IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews)*, 40(6), 601-618. <https://doi.org/10.1109/tsmcc.2010.2053532>
- Sawangarreerak, S., & Thanathamathsee, P. (2020). Random Forest with Sampling Techniques for Handling Imbalanced Prediction of University Student Depression. *Information*, 11(11), 519. <https://doi.org/10.3390/info11110519>
- Schalk, P. D., Wick, D. P., Turner, P. R., & Ramsdell, M. W. (2011). Predictive assessment of student performance for early strategic guidance. 2011 Frontiers in Education Conference (FIE). <https://doi.org/10.1109/fie.2011.6143086>
- Tantoh, M. C. (2023). Parental Level of Education and its Implications of their Expectations towards their Children Academic Performance. *International Journal of Psychology and Cognitive Education*, 2(1), 1-20. <https://doi.org/10.58425/ijpce.v2i1.109>
- Uylaş, N. (2018). Semi-Supervised Classification in Educational Data Mining: Students' Performance Case Study. *International Journal of Computer Applications*, 179(26), 13-17. <https://doi.org/10.5120/ijca2018916549>
- Wang, Y., & Wang, Y. (2023). Exploring the relationship between educational ICT resources, student engagement, and academic performance: A multilevel structural equation analysis based on PISA 2018 data. *Studies in Educational Evaluation*, 79, 101308. <https://doi.org/10.1016/j.stueduc.2023.101308>
- Xu, J., Han, Y., Marcu, D., & Van der Schaar, M. (2017). Progressive Prediction of Student Performance in College Programs. *Proceedings of the AAAI Conference on Artificial Intelligence*, 31(1). <https://doi.org/10.1609/aaai.v31i1.10713>
- Yohannes, E., & Ahmed, S. (2018). Prediction of Student Academic Performance using Neural Network, Linear Regression and Support Vector Regression: A Case Study. *International Journal of Computer Applications*, 180(40), 39-47. <https://doi.org/10.5120/ijca2018917057>
- Zaffar, M., Hashmani, M. A., & Savita, K. S. (2017). Performance analysis of feature selection algorithm for educational data mining. 2017 IEEE Conference on Big Data and Analytics (ICBDA). <https://doi.org/10.1109/icbdaa.2017.8284099>
- Zhang, Y., & Liu, Y. (2021). The Research of Predicting Student's Academic Performance Based on Educational Data. 2021 5th International Conference on Computer Science and Artificial Intelligence. <https://doi.org/10.1145/3507548.3507578>



ARTIFICIAL INTELLIGENCE AND STUDENT ENGAGEMENT IN VIRTUAL LEARNING SETTINGS

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Abstract

This study explores the influence of artificial intelligence (AI) on student engagement in virtual learning settings in tertiary institutions. The study provided answers to two research questions. One null hypothesis was tested. The study adopted a descriptive survey design. The population of the study comprised 926 business education students in universities offering business education in Kwara State, Nigeria. A sample of 272 was drawn from the population. Data were collected through a duly validated structured questionnaire tagged Artificial Intelligence and Student Engagement Questionnaire (AISEQ) designed by the researcher. The AISEQ has a Cronbach Alpha reliability coefficient of 0.92. The research questions were answered using mean and standard deviation. The hypothesis was tested using Multivariate Analysis of Variance (MANOVA) at a 0.05 level of significance. The findings of the study reveal that artificial intelligence has a very high extent influence on the frequency of communication (mean = 3.43), participation in the discussion forum (mean = 3.67), and quality of feedback (mean = 3.69). This means that there was no significant difference between male and female respondents regarding their perceptions of AI's influence on the frequency of communication, participation in the discussion forums and quality of feedback ($F(1, 348) = 1.920$, $P = 0.103$; Wilk's $\Lambda = 0.975$). The study concludes that artificial intelligence has a positive 'very high extent' on student engagement dimensions (frequency of communication, participation in discussion forums, and quality of feedback) measured in this study. It was recommended that there is a need for tertiary institutions and policymakers to prioritize the integration of AI technologies in virtual learning. By leveraging AI effectively, the frequency of student-lecturer communication will be increased, which will ultimately lead to improved educational outcomes, management of tertiary institutions should implement comprehensive training programmes for educators to effectively integrate AI tools into their teaching practices, this will motivate the students to participate in the discussion forums.

Keywords: Artificial, intelligence, Student engagement, virtual, learning

Introduction

The fast expansion of virtual learning platforms has altered the educational environment worldwide, including in Nigeria. As the need for flexible and accessible education grows, educators and institutions are increasingly using artificial intelligence (AI) to improve student engagement. This integration attempts to enhance educational results while also addressing Nigeria's particular constraints, such as high student-to-teacher ratios, limited resources, and different degrees of technology infrastructure (Muhammad & Emre, 2021). The adoption of virtual learning in Nigeria accelerated with the COVID-19 epidemic, which forced a transition to distant education (Adedoyin & Soykan, 2020). Previous attempts, such as the National Open University of Nigeria, had paved the way for distant learning, but interactions remained essentially traditional and one-dimensional (Ogunleye, 2019). Incorporating AI technology has the ability to increase



customization, feedback, and engagement, all of which are critical for developing meaningful interactions between learners and lecturers.

Recent AI breakthroughs have enabled the creation of intelligent tutoring systems, chatbots, and adaptive learning platforms that allow learners to communicate in real time and get individualized guidance (Dada et al., 2021). For example, chatbots can help professors answer commonly requested inquiries, allowing them to focus on more sophisticated student demands (Eze et al., 2022). Furthermore, AI-driven analytics can assist lecturers in identifying at-risk pupils and tailoring teaching tactics appropriately, hence increasing learner engagement and success rates (Nwankwo et al., 2023). The use of artificial intelligence (AI) in virtual education has been a focus of study in industrialized nations, yielding significant insights that may be applied in Nigeria. AI technologies have shown potential for improving interactions in virtual learning contexts. Graesser et al. (2018) found that intelligent tutoring systems may adjust to individual student needs, offering individualized feedback and assistance that increases engagement. These tools let teachers better understand student performance and modify their teaching approaches accordingly. Similarly, D'Mello and Graesser (2015) discovered that AI-powered conversational agents may greatly increase interaction quality by providing rapid replies and encouraging more participatory learning.

Despite the potential benefits, various obstacles prevent the efficient implementation of AI in educational contexts. Luckin et al. (2016) highlighted many challenges in their study, including the requirement for robust infrastructure, data privacy concerns, and the need for lecturers to acquire proper AI tool training. These difficulties are especially relevant in poor countries like Nigeria, where resources may be limited. Furthermore, the quality of AI applications might vary, affecting their dependability and influence on learning (Zawacki-Richter et al. 2019). AI has significant ethical concerns in education, particularly in terms of fairness and access. Selwyn (2019) highlights how AI might unintentionally perpetuate current prejudices if not applied carefully. In environments like Nigeria, where inequities in access to technology exist, the danger of expanding the educational disparity is substantial. Ensuring that AI technologies are built and applied with fairness in mind is critical to promoting inclusive education. Cultural attitudes toward technology can potentially impact the usefulness of artificial intelligence in education. Erstad (2013) underlines the significance of taking into account local settings when deploying educational technology. Understanding how cultural perceptions influence AI tool adoption in Nigeria might lead to improved student engagement in virtual learning.

Garrison, Anderson, and Archer (2000) developed the Community of Inquiry (Col) Framework, which emphasizes the importance of three interdependent factors in virtual learning environments: social presence, cognitive presence, and teacher presence. Social presence refers to a learner's ability to project oneself socially and emotionally in a learning community, while cognitive presence refers to the ability to generate meaning through critical thinking and reflection. AI technology can improve several aspects of the Col Framework. AI-powered chatbots and virtual assistants, for example, can boost social presence by allowing learners and lecturers to communicate in real time, promoting a feeling of community (Lowenthal, 2010). Furthermore, AI may enhance cognitive presence by evaluating learner data and providing insights that improve instructional tactics, allowing lecturers to better interact with students' needs. This study uses the Col Framework to analyze how AI technologies affect the three presences in Nigerian virtual learning settings. Understanding the relationship between AI, social presence, cognitive presence, and teaching presence can help improve student-lecturer relationships and overall educational success.



Social Presence Theory highlights the value of social interaction in virtual learning contexts. According to Gunawardena and Zittle (1997), social presence is the degree to which a person is viewed as "real" during mediated conversation. A strong social presence may boost student happiness, engagement, and cooperation. AI technology can improve social presence by enabling real-time interactions and individualized communication between students and teachers. AI chatbots and virtual assistants, for example, may respond immediately to learner inquiries, generating a sense of responsiveness and support that boosts social presence. Lowenthal (2010) found that using technology to enhance social presence can have a major influence on student satisfaction and engagement in virtual courses. In Nigeria, where educational resources are low, using AI to boost social presence might assist in bridging gaps in student-lecturer contact, eventually enhancing educational results.

Despite the potential benefits, various hurdles prevent AI from being effectively integrated into virtual learning in Nigeria. The digital gap is still a major challenge, with many students missing access to dependable internet and gadgets (Afolabi et al., 2021). Furthermore, educators require training and professional development to properly integrate AI tools into their teaching methods (Zhang, Liao, Bellamy, 2020). Ethical issues, such as data privacy and the possibility of bias in AI systems, provide additional problems that must be carefully navigated (Akintayo et al., 2022). This study seeks to investigate the function of AI in improving student engagement in Nigeria's virtual learning setting. By assessing current practices, problems, and possibilities, the research hopes to give insights that might help educators and policymakers better leverage AI to enhance educational results and encourage a more engaging learning experience.

This study examines the influence of AI on three dimensions of student engagement; frequency of communication, participation in discussion forums, and quality of feedback. The frequency of communication refers to the number of encounters between individuals or groups. Frequent communication has been highlighted as an important aspect of good student engagement in online learning. Deng et al. (2021) found that increasing frequency of interaction between students and instructors correlates with improved student satisfaction and perceived learning results. The study stresses that timely feedback and regular check-ins may considerably improve students' dedication to their studies.

Discussion boards allow students to exchange ideas, ask questions, and engage in debate. Brown et al. (2021) argue that online forums improve collaborative learning by allowing students to participate asynchronously, fitting a variety of schedules and learning styles. Creating a feeling of community is critical for increasing student participation in online learning. Kim et al. (2023) investigated how discussion forums contribute to social presence, or the sense of being linked with people in the learning environment. Their findings indicate that regular involvement in forums increases students' sense of belonging, which is an important component of engagement.

Feedback is an important part of the learning process since it helps students understand their performance and identify areas for improvement. Hattie and Timperley (2020) underline that providing high-quality feedback may considerably improve student comprehension and engagement. Their study shows that feedback should be detailed, timely, and constructive in order to successfully assist student development. Gonzalez et al. (2021) describe how formative feedback, which is given regularly during the course, promotes a continuous learning cycle, encouraging students to engage more thoroughly with the topic.

The incorporation of artificial intelligence (AI) into virtual learning settings creates both benefits and problems, particularly in the context of Nigeria's educational system. Despite AI's potential to improve student engagement, major constraints prevent its effective adoption. These issues are worsened by Nigeria's distinct socioeconomic and technical landscape, which includes



discrepancies in access to digital resources, varied degrees of digital literacy among lecturers and students, and infrastructure deficiencies (Afolabi et al., 2021; Adedoyin & Soykan, 2020). As virtual learning grows more popular, particularly following the COVID-19 epidemic, the necessity for successful interactions between learners and lecturers has never been greater. AI technology, such as chatbots and intelligent tutoring systems, have been found to increase engagement and deliver tailored help. However, many Nigerian educational institutions lack the infrastructure and resources required to properly use these technologies (Zhang, Liao, Bellamy, 2020). For example, the digital gap is a big barrier since many students in rural regions lack consistent access to the internet or sophisticated technologies (Afolabi et al., 2021).

AI has the potential to improve communication and feedback mechanisms, but educators lack the necessary training to use these technologies successfully (Zhang, Liao, Bellamy, 2020). Many lecturers may lack the necessary abilities to incorporate AI into their teaching techniques, limiting the potential benefits of such technology. Furthermore, worries about data privacy and algorithmic bias pose ethical problems concerning the use of AI in education (Akintayo et al., 2022). These difficulties lead to a reluctance to implement AI-powered solutions, resulting in missed chances to improve student-lecturer engagement. Despite the widely acknowledged potential of AI to revolutionize educational experiences, empirical study is scarce on its implications for student-lecturer interaction in Nigeria's virtual learning setting. Existing research frequently overlooks the sociocultural elements that impact technology adoption in education (Nwankwo et al., 2023). This gap underlines the need for specialized study into how AI might be effectively used to build meaningful connections between learners and lecturers, hence improving educational results in Nigeria. It is as a result of these reasons that this study was conducted to examine the influence of artificial intelligence on student-lecturer interaction in virtual learning in Nigeria.

Research Questions

1. What is the extent of the influence of Artificial Intelligence (AI) on the frequency of communication as a dimension of student-lecturer interaction in a virtual learning setting?
2. What is the extent of the influence of Artificial Intelligence (AI) on participation in discussion forums as a dimension of student-lecturer interaction in a virtual learning setting?
3. What is the extent of the influence of Artificial Intelligence (AI) on the quality of feedback as a dimension of student-lecturer interaction in a virtual learning setting?

Hypothesis

There is no significant difference between the mean ratings of male and female respondents regarding the extent of the influence of Artificial Intelligence (AI) on the frequency of communication, participation in discussion forums, and quality of feedback as dimensions of student-lecturer interaction in a virtual learning setting.

Method

The study adopts the descriptive survey design. The study was a survey of the opinion of students regarding the influence of artificial intelligence on student engagement in online learning settings. The population of the study comprised 926 business education students in universities offering business education in Kwara State, Nigeria. A sample of 272 was drawn from the population using The Research Advisor (2006). The total sample was 266 respondents. The researcher believes that students are in a better position to provide information regarding the influence of artificial intelligence on student engagement in online learning settings. A structured questionnaire tagged Artificial Intelligence and Student Engagement Questionnaire (AISEQ) designed by the researcher and duly validated by three experts with a Cronbach Alpha reliability



coefficient of 0.92 was used to gather data for the study. The AISEQ consists of 30 items raised after an extensive review of the literature. The items were placed on a four-point rating scale of Very High Extent (SA) = 4, High Extent (A) = 3, Low Extent (D) = 2, and Very Low Extent (SA) = 1. A total of 272 copies of AISEQ were administered with the help of four research assistants and all were retrieved, representing a 100% return rate. The data collected to answer the research questions were analyzed using mean, and standard deviation. The hypothesis was tested using Multivariate Analysis of Variance (MANOVA) statistics at a 0.05 level of significance. The following boundary limits were used for item options of research the questionnaire: Very High Extent (VHE) (3.25-4.00), High Extent (HE) (2.50-3.24), Low Extent (LE) (1.75 - 2.49), and Very Low Extent (VLE) (1.00-1.74). The hypothesis was rejected when the observed p-value was less than the fixed p-value of 0.05. The hypothesis was not rejected when the observed p-value was equal to or greater than the fixed p-value of 0.05.

Results

Research Question One: What is the extent of the influence of Artificial Intelligence (AI) on the frequency of communication as a dimension of student-lecturer interaction in a virtual learning setting?

Table 1.
Extent of the Influence of Artificial Intelligence on Student-Lecturer Communication Frequency in Virtual Learning Setting

S/N	Items	Mean Value	Std Dev.	Remark
1	AI tools have significantly increased my confidence to communicate with my lecturer frequently.	3.85	0.50	Very High Extent
2	I receive quicker responses from my lecturer due to AI assistance in communication.	3.70	0.60	Very High Extent
3	AI chatbots enhance my interaction with my lecturer during online classes.	3.40	0.75	Very High Extent
4	The use of AI has made it easier for me to ask questions and seek help from my lecturer.	3.80	0.45	Very High Extent
5	AI-driven platforms encourage more frequent discussions with my lecturer.	2.95	0.80	High Extent
6	I feel more comfortable communicating with my lecturer thanks to AI technology.	3.55	0.55	Very High Extent
7	The integration of AI in our course has led to more regular check-ins with my lecturer.	3.25	0.70	Very High Extent
8	AI tools help me keep track of my communication with my lecturer effectively.	3.90	0.40	Very High Extent
9	AI has improved the overall quality of my interactions with my lecturer.	3.75	0.50	Very High Extent
10	The presence of AI in my learning has significantly helped me to write easily thereby enhancing my communication with my lecturer.	3.10	0.80	Low Extent
Weighted Mean		3.43		Very High Extent

Table 1 shows that the majority of items indicate a strong positive perception of AI's influence on communication frequency between students and lecturers. Items 1, 4, 8, and 9 score in the "Very



High Extent" category, suggesting that students widely recognize significant benefits from AI. Item 1, with a mean of 3.85, indicates that students believe AI tools greatly enhance their communication capabilities with lecturers. The low standard deviation (0.50) suggests a solid consensus among respondents. Item 2 scores a mean of 3.70, reflecting that students perceive AI as contributing to faster response times from lecturers. The standard deviation of 0.60 indicates moderate agreement, suggesting some variability in perceptions. Item 3, with a mean of 3.40, shows that while students see value in AI chatbots for enhancing interactions, the extent is slightly lower compared to other items, indicating some diversity in experiences. Item 5, with a mean of 2.95 and categorized as "Low Extent," suggests that students do not feel AI-driven platforms significantly encourage more frequent discussions with lecturers, indicating a gap in this area. Item 6 has a mean of 3.55, indicating that AI technology contributes positively to students' comfort levels when communicating with lecturers, which is crucial for effective interactions. Item 7, with a mean of 3.25, suggests that AI integration leads to more regular check-ins with lecturers, reflecting a positive impact on communication practices. Item 8 has a very high mean of 3.90, indicating that students find AI tools highly effective for keeping track of their communications, which may enhance their engagement. Item 9, with a mean of 3.75, suggests that students believe AI positively impacts the quality of their interactions, reinforcing the overall positive sentiment towards AI. Item 10, with a mean of 3.10 and categorized as "High Extent," indicates that students feel that the presence of AI in learning has significantly helped them to write easily thereby enhancing my communication with my lecturer. In summary, the result of the research question indicates that students generally perceive AI as a significant enhancer of communication frequency and quality in virtual learning settings (mean = 3.43).

Research question two: What is the extent of the influence of Artificial Intelligence (AI) on participation in discussion forums as a dimension of student-lecturer interaction in a virtual learning setting?

Table 2
Influence of Artificial Intelligence on Student Participation in Discussion Forums within Virtual Learning Settings

S/N	Items	Mean Value	Std Dev.	Remark
11	AI tools have increased my willingness to participate in discussion forums with my lecturer.	3.85	0.50	Very High Extent
12	I find that AI-generated prompts help me contribute more effectively in discussion forums.	3.70	0.60	High Extent
13	AI chatbots facilitate meaningful interactions in discussion forums with my lecturer.	3.55	0.65	High Extent
14	The use of AI has positively influenced my frequency of contributions in discussion forums.	3.80	0.45	Very High Extent
15	AI analytics provide valuable insights that enhance my engagement in discussion forums.	3.40	0.75	High Extent
16	I feel more motivated to share my views in discussion forums because of AI support.	3.60	0.55	High Extent
17	AI tools help me identify topics that are relevant and interesting for discussion.	3.50	0.70	High Extent



18	The integration of AI in our virtual learning setting has led to increased interaction in forums.	3.90	0.40	Very High Extent
19	I believe AI enhances the quality of discussions in forums with my lecturer.	3.75	0.50	Very High Extent
20	The presence of AI has made discussion forums a more enjoyable space for interaction.	3.65	0.65	High Extent
Weighted Mean		3.67	Very High Extent	

The data presented in Table 1 reflects students' perceptions of the influence of Artificial Intelligence (AI) on their participation in discussion forums within virtual learning settings. The responses indicate a predominantly positive view regarding the influence of AI on student engagement. Item 1, with a mean of 3.85, suggests that students feel AI tools increase their willingness to engage in discussions with lecturers. The low standard deviation (0.50) indicates a consensus among respondents. Item 2, which has a mean of 3.70, reveals that AI-generated prompts are perceived as helpful for contributing effectively to discussions. The standard deviation of 0.60 indicates moderate variability in student experiences. Item 3, with a mean of 3.55, indicates that students perceive AI chatbots as facilitating meaningful interactions in forums, further enhancing the quality of engagement. Item 4, scoring a mean of 3.80, suggests that the use of AI positively influences the frequency of students' contributions, showing that students feel more inclined to participate regularly. Item 5, with a mean of 3.40, indicates that AI analytics provide insights that enhance engagement, although this score suggests that there may be room for improvement in how these insights are utilized. Item 6, with a mean of 3.60, shows that AI support contributes to students' motivation to share their opinions in discussion forums, which is essential for fostering engagement. Item 7, with a mean of 3.50, suggests that AI tools help students identify relevant discussion topics. This reflects a positive impact but indicates potential areas for enhancing topic relevance. Item 9, with a mean of 3.75, reinforces the idea that students believe AI enhances the overall quality of discussions within forums, indicating a strong endorsement of AI's role. Item 10, with a mean of 3.65, indicates that AI has made discussion forums a more enjoyable space for interaction, further promoting student engagement. In summary, the findings in Table 2 suggest that students generally perceive AI as an influence on their participation in discussion forums within virtual learning to a very high extent.

Research question three: What is the extent of the influence of Artificial Intelligence (AI) on the quality of feedback as a dimension of student-lecturer interaction in a virtual learning setting?

Table 3
Influence of Artificial Intelligence on the Quality of Feedback in Student Engagement within Virtual Learning Settings

S/N	Items	Mean Value	Std Dev.	Remark
21	AI tools have significantly improved the quality of feedback I receive from my lecturer.	3.85	0.50	Very High Extent
22	I find AI-generated feedback to be more detailed and helpful than traditional feedback.	3.70	0.60	High Extent
23	AI helps to provide timely feedback that enhances my learning experience.	3.80	0.45	Very High Extent



24	The use of AI in feedback processes makes it easier for me to understand my mistakes.	3.75	0.55	Very High Extent
25	AI analytics help my lecturer tailor feedback to my individual learning needs.	3.40	0.70	High Extent
26	I feel more motivated to improve my work due to the quality of AI-generated feedback.	3.55	0.65	High Extent
27	AI tools help identify specific areas where I need to improve based on feedback.	3.50	0.75	High Extent
28	The integration of AI has led to more constructive feedback from my lecturer.	3.90	0.40	Very High Extent
29	I believe AI enhances the overall feedback quality in my learning setting.	3.80	0.50	Very High Extent
30	The presence of AI has made the feedback process more engaging and interactive.	3.65	0.55	High Extent
Weighted Mean		3.69		Very High Extent

The data presented in Table 3 reflect students' perceptions of the influence of Artificial Intelligence (AI) on the quality of feedback received from lecturers in virtual learning settings. The responses indicate a predominantly positive view regarding the extent of the influence of AI on feedback quality. Item 1, with a mean of 3.85, suggests that students feel AI tools have significantly improved the quality of feedback. The low standard deviation (0.50) indicates a strong consensus among respondents. Item 2, which has a mean of 3.70, reveals that students find AI-generated feedback to be more detailed and helpful than traditional feedback, indicating a clear advantage of incorporating AI. Item 3, with a mean of 3.80, indicates that students perceive AI as providing timely feedback, which is crucial for enhancing their learning experience. Item 4, scoring a mean of 3.75, suggests that AI in feedback processes helps students better understand their mistakes, contributing to a more effective learning process. Item 5, with a mean of 3.40, indicates that AI analytics enable lecturers to tailor feedback to individual learning needs, which reflects a positive impact but suggests there may be room for improvement in this area. Item 6, with a mean of 3.55, shows that students feel more motivated to improve their work due to the quality of AI-generated feedback, highlighting the motivational aspect of effective feedback. Item 7, with a mean of 3.50, indicates that AI tools help identify specific areas needing improvement, which is essential for focused learning. Item 8, with a mean of 3.90, reinforces the idea that AI integration has led to more constructive feedback from lecturers, indicating strong support for AI's role in enhancing feedback quality. Item 10, with a mean of 3.65, suggests that the presence of AI has made the feedback process more engaging and interactive, further promoting student engagement and learning. In summary, the findings in Table 3 suggest that students generally perceive AI as a significant enhancer of the quality of feedback in their interactions with lecturers in virtual learning settings.

Hypothesis

There is no significant difference between the mean ratings of male and female respondents regarding the extent of the influence of Artificial Intelligence (AI) on the frequency of communication, participation in discussion forums, and quality of feedback as dimensions of student-lecturer interaction in a virtual learning setting.



Table 1:
Multivariate Analysis of Variance (MANOVA) of the difference between mean ratings of male and female respondents on the influence of Artificial Intelligence (AI) on student-lecturer interaction

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.924	1051.021a	4.000	346.000	0.000
	Wilks' Lambda	.076	1051.021a	4.000	346.000	0.000
	Hotelling's Trace	12.151	1051.021a	4.000	346.000	0.000
	Roy's Largest Root	12.151	1051.021a	4.000	346.000	0.000
Group	Pillai's Trace	.025	1.920a	4.000	346.000	0.103
	Wilks' Lambda	.975	1.920a	4.000	346.000	0.103
	Hotelling's Trace	.025	1.920a	4.000	346.000	0.103
	Roy's Largest Root	.025	1.920a	4.000	346.000	0.103

Table 4 shows that the intercept values indicate a significant overall effect of the model ($p < .000$), suggesting that the combination of the dependent variables is significantly influenced by factors outside the gender grouping. The results show a Wilks' Lambda value of 0.981 and a p-value of 0.103, which is above the alpha level of .05. This means that there was no significant difference between male and female respondents regarding their perceptions of AI's influence on the frequency of communication, participation in discussion forums and quality of feedback ($F(1, 348) = 1.920$, $P = 0.103$; Wilk's $\Lambda = 0.975$). This is because the observed probability level is greater than the fixed probability level ($P > 0.05$). This implied that male and female respondents did not differ statistically significantly in their responses regarding the three dependent variables (frequency of communication, participation in discussion forums, and quality of feedback) tested in the study.

**Table 2: Test of Between Subjects**

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
GROUP	Frequency of Communication	3.20	1	3.20	1.20	0.273	.010
	Participation in Discussion Forums	2.50	1	2.50	0.85	0.356	.008
	Quality of Feedback	3.00	1	3.00	1.50	0.220	.012

The results in Table 5 indicate no significant differences among the dependent variables related to AI's influence based on gender (Frequency of communication $F(1,348) = 1.20$ $p = 0.273$, $\eta^2 = 0.010$, participation in discussion forum ($F(1,348) = 0.85$ $p = 0.356$, $\eta^2 = 0.008$) and quality of feedback ($F(1,348) = 1.50$ $p = 0.220$, $\eta^2 = 0.012$). The F-values are low (1.200 for Frequency of Communication, 0.850 for Participation in Discussion Forums) and significance values exceed 0.05, confirming that gender does not influence the ratings.

Table 6: Estimated Marginal Means

Dependent Variable	Group	Mean	Std. Error
Frequency of Communication	Male	3.50	.120
	Female	3.48	.060
Participation in Discussion Forums	Male	3.20	.100
	Female	3.20	.050
Quality of Feedback	Male	3.31	.110
	Female	3.30	.055

The estimated marginal means in Table 6 show that both male and female respondents rated the dependent variables very closely related across the board. For instance, the male group rated "Frequency of Communication" at 3.50 and 3.48 for the female group indicating a consensus irrespective of gender. This uniformity in ratings reinforces the hypothesis that there is no significant difference in perceptions based on gender regarding AI's influence on student-lecturer engagement.



Discussion

The study's findings provide valuable insights into how AI influences communication frequency, participation in discussion forums, and feedback quality, which are consistent with current research on the issue. The findings show that AI technologies have significantly increased the frequency of communication between students and instructors. With a weighted mean of 3.43 for the impact of AI on communication, students expressed improved confidence in contacting their instructors and obtaining faster answers as a result of AI support (Table 1). This conclusion is consistent with Graesser et al. (2018), who underlined that intelligent tutoring systems may adapt to specific student needs, allowing for more timely interactions. The capacity of AI chatbots to respond immediately allows lecturers to focus on more complicated questions, thus improving the entire communication dynamic (Eze et al., 2022). Furthermore, the study is consistent with the Community of Inquiry (CoI) Framework presented by Garrison, Anderson, and Archer (2000), which holds that successful communication in virtual settings is crucial for building a feeling of community among learners. The findings indicate that AI technology can improve social presence, allowing students to feel more connected and engaged in their educational experiences (Lowenthal, 2010). This increased participation is especially important in Nigeria, where high student-to-teacher ratios impede efficient communication, as stated by Muhammad and Emre (2021).

The study emphasizes AI's significance in promoting more involvement in discussion forums. With a weighted mean of 3.67, students said that AI tools have enhanced their willingness to participate in conversations while also providing significant insights that improve their contributions (Table 2). This study backs up the work of Dada et al. (2021), who proposed that AI-generated questions can drive meaningful exchanges in online debates. The perceived usefulness of AI in encouraging students to express their opinions suggests a good move toward more active learning settings.

The statistics show that AI technologies enable students to select important debate topics and contribute more effectively, improving the overall quality of conversation (Item 9, mean = 3.75). This is consistent with Gunawardena and Zittle's (1997) argument that social presence predicts happiness in virtual learning situations. AI helps to create a more engaging learning setting, which is important for student happiness and retention.

Regarding feedback quality, the data show a significantly favourable view of AI's effect, with a weighted mean of 3.69 (Table 3). Students claimed that AI technologies increase the quality and timeliness of feedback, allowing them to better comprehend their faults and improve their work.

This is consistent with the findings of D'Mello and Graesser (2015), who said that AI-powered systems may give comprehensive feedback that promotes deeper learning experiences.

AI's capacity to identify particular areas for development based on feedback highlights its potential to personalize educational experiences to individual student requirements, which is critical for fostering effective learning outcomes (Zhang et al., 2020). The study's findings suggest that AI not only aids in providing constructive feedback but also makes the feedback process more engaging, thereby motivating students to take ownership of their learning journey (Item 10, mean = 3.65).

Conclusion

The study's findings show that AI technologies significantly increase the frequency and quality of contact between students and professors, resulting in a more engaging and supportive educational setting. Students reported feeling more confident in their interactions, receiving quicker responses from lecturers, and being more inclined to join in conversations, all of which led to a more lively learning setting. The study concludes that artificial intelligence has a positive



'very high extent' on learner engagement dimensions (frequency of communication, participation in discussion forums, and quality of feedback) measured in this study. Furthermore, AI's capacity to deliver timely, targeted feedback has been demonstrated to help students identify their strengths and areas for growth, therefore improving their learning experience. The positive evaluations of AI's ability to facilitate constructive feedback emphasize its importance in inspiring students and encouraging a proactive attitude to learning. These results have major consequences for Nigerian educators and policymakers. To begin, there is a definite requirement for ongoing investment in AI infrastructure and instructor training to fully realize the benefits of these technologies. Addressing financial gaps and digital divides is critical for ensuring fair access to AI technologies across varied educational contexts.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. There is a need for tertiary institutions and policymakers to prioritize the integration of AI technologies in virtual learning. By leveraging AI effectively, the frequency of student-lecturer communication will be increased, which will ultimately lead to improved educational outcomes.
2. Management of tertiary institutions should implement comprehensive training programmes for educators to effectively integrate AI tools into their teaching practices, this will motivate the students to participate in discussion forums.
3. Lecturers should encourage the use of AI to facilitate collaborative projects and discussions among students, this will go a long way to improve the quality of feedback in their communication.

References

- Adedoyin, O. B., & Soykan, E. (2020). COVID-19 Pandemic and Virtual Learning: The Challenges and Opportunities. *Interactive Learning Settings*, 29(6), 1-12.
- Afolabi, O., Oladipo, O., & Abidoye, R. (2021). The Digital Divide in Nigeria: Implications for Virtual Learning During COVID-19. *Journal of Educational Technology*, 12(2), 45-58.
- Akintayo, A., Adeyemi, A., & Ojo, J. (2022). Ethical Implications of Artificial Intelligence in Education: A Nigerian Perspective. *Journal of Education and Practice*, 13(5), 78-89.
- Brown, A., Johnson, L., & Lee, S. (2021). The role of discussion forums in student engagement. *International Journal of Educational Technology*, 14(2), 78-91.
- Muhammad, A.C., & Emre, K., (2021). Artificial Intelligence in Education (AIEd): a high-level academic and industry note 2021. *AI and Ethics* (2022) 2:157-165. <https://doi.org/10.1007/s43681-021-00074-z>
- Dada, O., Adebayo, A., & Alabi, O. (2021). Utilizing AI for Enhancing Student Engagement in Virtual Learning. *Journal of Educational Computing Research*, 59(3), 451-470.
- Deng, X., Zhang, Y., & Li, H. (2021). The impact of instructor communication on student engagement in online learning. *Journal of Educational Technology*, 12(3), 45-60.
- D'Mello, S. K., & Graesser, A. C. (2015). Feeling, Thinking, and Computing: A Review of Affective Computing and its Impact on Learning. *Educational Psychologist*, 50(1), 1-20.
- Erstad, O. (2013). The Role of Digital Technology in Student Engagement and Learning. *Journal of Computer Assisted Learning*, 29(3), 209-220.
- Eze, S. C., Chinedu, E., & Ugochukwu, C. (2022). Chatbots in Education: Potentials and Challenges in Nigeria. *International Journal of Educational Technology*, 13(1), 112-125.
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education. *The Internet and Higher Education*, 2(2), 87-105.



- Graesser, A. C., McNamara, D. S., & VanLehn, K. (2018). Scaffolding Deep Learning in Virtual Education: The Role of Artificial Intelligence. *Journal of Educational Psychology*, 110(3), 387-399.
- Gunawardena, C. N., & Zittle, F. J. (1997). Social Presence as a Predictor of Satisfaction in Virtual Learning. *International Journal of E-Learning & Distance Education*, 12(2), 1-16.
- Gonzalez, R., Smith, P., & Lee, J. (2021). Formative feedback as a tool for enhancing student engagement. *International Journal of E-Learning Studies*, 16(2), 112-128.
- Hattie, J., & Timperley, H. (2020). The power of feedback. *Review of Educational Research*, 77(1), 81-112.
- Kim, H., Park, S., & Lee, J. (2023). Enhancing social presence through discussion forums in online education. *Journal of Distance Education*, 22(3), 15-30.
- Lowenthal, P. R. (2010). The Evolution and Role of Social Presence in Virtual Learning. *International Journal of E-Learning & Distance Education*, 24(2), 1-15.
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence Unleashed: An Argument for AI in Education*. Pearson Education.
- Nwankwo, C., Nwafor, J., & Okeke, C. (2023). AI-Driven Analytics for Identifying At-Risk Students in Virtual Learning Environments. *International Journal of Educational Research*, 120, 102-115.
- Ogunleye, A. (2019). Distance Learning in Nigeria: A Historical Overview and Future Prospects. *Journal of Open Learning*, 34(2), 100-115.
- Selwyn, N. (2019). *Should Robots Replace Teachers? AI and the Future of Education*. Thrive Global.
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic Review of Research on Artificial Intelligence in Higher Education: Research Landscape and Future Directions. *International Journal of Educational Technology in Higher Education*, 16(1), 39.
- Zhang, Y., Liao, Q.V., Bellamy, R.K.E., (2020). Effect of confidence and explanation on accuracy and trust calibration in AI-assisted decision making. In: Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency. arXiv:2001.02114.



INTEGRATING AI INTO BUSINESS EDUCATION: OPPORTUNITIES AND CHALLENGES

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Abstract

Business Education is an aspect of learning that prepares students success in business life by instilling in them theories, skills, attitude, competence and best practices for sustainable employability and expertise in business world, management functions and entrepreneurial activities. The objective of business education is to integrate students into the changing world of business and hence, the introduction of technology brought about the acquisition of essential knowledge on the manipulation of the innovation. The increasing adoption of Artificial Intelligence (AI) in business also initiates corresponding evolution in business education. This paper explores the opportunities and challenges of integrating Artificial Intelligence (AI) into business education curricula. On one hand, AI integration can enhance decision-making, personalize learning, and prepare students for the world of business. On the other hand, challenges arise in curriculum development, faculty training, resource allocation, ethics, and students' readiness. This paper discusses strategies for effective AI integration, essential AI skills for business students, and probable solutions to overcome these challenges. By examining the relationship between AI and business education, we can appreciate the significance of AI in shaping the mindset of future business leaders for Sustainability.

Keywords: Artificial Intelligence, Business Education, Curriculum Integration, Opportunities, Challenges, Sustainability.

Introduction

Business Education is an aspect of learning that prepares students for roles in world of work and offers them with knowledge for and about business. It is an educational programme taught students in higher institutions and prepares them for careers in business. It is also a specialized programme of instruction designed to provide learners with knowledge, skills, competence and attributes leading to employability for sustainable economic development.

In Ademiluyi (2020), it was stated that business education is seen as training in any subject or field designed to develop general business knowledge, contrary to the confusion with business



teacher education. He further said that because education is designed as a course involves in teaching students the fundamentals, theories, process and best practices of business where students are prepared for careers in business, fundamental institutions that help them to assume their economic roles as consumers, workers and citizens while the third division is background instructions which assist students to prepare for professional careers.

Technology plays a major role in the mainstream of business education. The evolution of office technology brought about the rise of business education in the areas of electronic typewriter, mass production of desk-top computer and computer software gave a major overhaul for business curricula, introduction of new facilities and platforms for teaching-learning process which encouraged young citizens to go into business occupations (Okwuanoso and Nwazor cited in Ademiluyi, 2020). The equilibrium between AI and Business Education is all about hitting the balance between technological advancement and human-centric learning which includes emphasis on creativity, critical thinking, empathy, human understanding, innovation, emotional intelligence, ethical sensibility, adaptation, complex problem-solving, effective communication skills and lifelong learning ability. When educators focus on these skills, the students will be more ready to accept and incorporate AI in their daily academic performance by making use of their unique strengths to drive innovation, productivity and new knowledge that will make positive impact ethically.

Information Communication and Technology Skills and Introduction of Artificial Intelligence

Business Education in Nigeria has not been given its right visibility because of societal misconception of the programme. Today, the confluence of pedagogy, technological and Socio-economic factors bring business education into limelight with the consciousness of scholars and policy makers coming to its acceptance (Ademiluyi, 2020). The mandatory use of keyboard with desktop computers has made keyboarding an indispensable business education offering, a subject with universal demand. He further said that every University student should master the art of keyboarding in order to be able to manipulate keyboard well, even, if it is laptop. The impact of ICT is becoming more pronounced worldwide to the extent that rarely can anything be done in the academia without reference to this type of technology. ICT cuts across all sectors and it is becoming a driving force for an effective and efficient operation of commerce, governance, medicine, education, human resources development, arts, agriculture, national security and other areas of human endeavour (Nwabufu and Tony-okeme (2020). Today, as technology is developing, AI is emerging, bringing more comfort and enlarged knowledge to the academic world.

Artificial Intelligence (AI)

It is a process of developing computer systems to a level of performance by human intelligence. It is called artificial intelligence because of the ability to replicate human tasks at a faster rate. Artificial Intelligence has dominated the areas of learning, problem-solving, reasoning, perception and language understanding. It is so amazing what AI can do in the area of learning in this generation.

Integrating Artificial Intelligence into Business Education Curriculum

Artificial Intelligence can be integrated into business education curriculum in so many different ways which include and not limited to:

1. Foundation courses
AI can be introduced as a concept which involves machine learning and data science.
2. Specialized courses



AI can be applied as an application in marketing, finance, office administration and management.

3. **Case Studies and projects**
This is about bringing real-world examples into the teaching and projects that demonstrate AI applications in business. Experts in AI can be invited from industries as a teamwork to facilitate students' learning.
4. **Tools and Software**
AI-Powered tools and software in courses that include data analytics platforms, AI-driven simulation software, machine learning library and others.
5. **Guest Lectures and Collaboration**
Industry experts and AI-focused organizations should collaborate with academic institutions for expanded programmes to enhance effectiveness of teaching-learning process of AI integration into business education.
6. **AI-related Class Projects**
Students should be encouraged to work on AI-related projects which includes business models that proffer solutions to business challenges.
7. **Interdisciplinary strategy of teaching**
Faculty members should endeavor to combine AI with other disciplines including Law and Science to provide a comprehensive understanding of the operations of AI.

AI-related skills for Business Education

The following skills are very important for business education students to acquire:

- Data analysis and interpretation
- Machine learning fundamentals
- Programming skills
- Data visualization and communication
- AI ethics and responsible AI adoption
- Business process automation and optimization
- AI-driven decision-making and strategy

When academic institutions integrate AI into Business Education curriculum, students will be prepared to enter into AI-driven business world and perform effectively.

Intersection of AI and Business Education

This is the point where AI and Business Education meet together for effective performance. AI is the development and usage of intelligent computers that can perform operations majorly reserved for human intelligence while Business Education is that training designed to teach students theories, best practices, competences, attitudes and skills required to become successful business owners, business educators or business executives for sustainable economic development.

Business Education has long been focusing on equipping students with knowledge, skills and competencies (Ogunjobi, 2020). However, AI's unprecedented rise transforms the business environment. It is therefore, imperative for Business Education to adapt to prepare students for AI-driven future (Bharadwaj and Kettinger (2020). This goal can be achieved by using AI to enhance teaching strategies, improve academic achievement, develop AI-related skills, preparing students for AI-driven business world, engaging students with ethical issues in the use of AI in business.

Opportunities of Integrating AI in Business Education

Business Education, being a multidisciplinary programme has a lot of opportunities to accrue from integrating AI into its curriculum. These opportunities are highlighted below:

1. **Enhanced Analytics**, that is, datasets are vastly analyzed by AI-powered tools.



2. Personalized learning: learning is appropriately adapted to suit diverse and inclusive education through the use of AI-driven learning systems.
3. Simulated Business Environment: real-world events are replicated by AI.
4. Experiential Learning: students are given various practical experiences that are made possible by AI-enabled projects.

Challenges of Integrating AI into Business Education

As many as the opportunities of AI integration, there are also challenges which are enumerated below:

1. Curriculum Development: the issue of update of the new development serves as a challenge.
 2. Faculty Expertise: there is need to continually train the members of faculty, that is business educators on any new development in the technology.
 3. Resource Allocation: there is need to invest enormously in the integration of AI as a result its cost implications.
- Implementation strategies
1. Collaborations: there is need for institutions to partner with AI-driven industries to impact on students and their lecturers.
 2. Interdisciplinary Approaches: there is need to make the integration to cut across all disciplines in institution for effectiveness and efficiency.

Ethical considerations in AI

The followings are the ethics in AI as highlighted below:

1. Transparency
2. Accountability
3. Fairness
4. Privacy
5. Responsibility

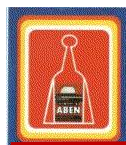
The Business Educators should ensure that ethical considerations in using AI are emphasized to accommodate diversity and inclusivity.

Conclusion and Recommendations

Business Education needs to be real-world compliant. This can only be achieved by using a seasoned and AI-compliant so that the students on graduation can fit into the changing world of business and compete favourably. The Business Educators should be well skilled to teach the trends and ethical considerations should be emphasized.

References

- Ademiluyi, L.F. and Oyedede, J.F. (2020). Business Education: Status Quo, Challenges and Opportunities in the 21st Century. Kwara State, Nigeria: Integrity Publications.
- Ogunjobi, O. (2020). Integrating AI into business education in Nigeria. *Journal of Entrepreneurship and Innovation*, 9(1), 34-43.
- Ojo, T. (2020). Integrating Artificial Intelligence into business education in Nigerian universities. Unpublished master's thesis. University of Ibadan.
- Okwuanaso, S.I. and Nwasor, J.C. (2000). Instructional Strategies in Business Education. Awka, Nigeria: Ikenga Publishers
- Nwabuifo, B.N. and Tony-Okeme, A.F. (2020). Benefits and Challenges of using Information and Communication Technology Resources for Teaching Office Technology and Management in Nigeria Polytechnics. Kwara State, Nigeria: Integrity Publishers



APPLICATION OF ARTIFICIAL INTELLIGENCE IN TEACHING AND LEARNING OF BUSINESS EDUCATION IN UNIVERSITIES IN ENUGU STATE

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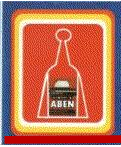
Abstract

The study examined the application of artificial intelligence in teaching and learning of Business Education in universities in Enugu State. The study was guided by two research questions and two null hypotheses. Descriptive survey design was adopted for the study. The population of the study was 195 Business Educators and students offering Business Education programme in Universities in Enugu State. Since the population was manageable, there was no sampling. A 20 items structured questionnaire validated by two experts in the field of Business Education and one expert in measurement and evaluation was used for the study. A reliability index of 0.78 was established using Cronbach Alpha Coefficient. The data collected were analyzed using mean to answer the research questions, standard deviation to ascertain the closeness and homogeneity of the responses while t-test was used to test the null hypotheses at .05 level of significance. Findings showed among others that Artificial Intelligence is applied to a high extent in teaching and learning of Business Education in universities in Enugu state. They agreed to all the items as challenges faced in teaching and learning of Business Education in universities in Enugu state. The findings further showed no significant difference in the mean ratings of Business Educators and Business Education students on application of AI in teaching and learning of Business Education in universities in Enugu state. It was concluded that application of AI in teaching and learning was to a high extent and faced by many challenges. It was recommended among others that Universities should apply AI tools more systematically into the Business Education curriculum to leverage their full potential. This includes developing a clear strategy for incorporating AI in teaching methods, assessments, and administrative processes. This is important since a structured approach to AI integration will ensure that both educators and students can effectively utilize AI resources, improving overall educational outcomes. Government should encourage and support the use of AI in academic research within the Business Education field.

Keywords: Artificial Intelligence, Business Education, Teaching, Learning, Technology

Introduction

Technological advancements have led to significant changes in the society which have brought about tremendous changes in the educational system and mode of instructional delivery. Technology is a tool that sharpens the global economy and equips Business Educators with quality and efficient teaching and learning. Every facet of human endeavor is now revolutionized with digital technology. The traditional pedagogical practices of lecturing in educational institutions are gradually paving way for new technological system of instructional delivery. In line

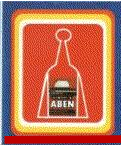


with the above view, Harry (2023) noted that the application of various technological systems in teaching and learning is rapidly becoming one of the most important and widely discussed issues in contemporary education policy. This will improve the quality of programmes. Technology holds great promise to improve education in addition to shaping workforce opportunities. A more recent technological development is the emergence of the term Artificial Intelligence (AI) which is currently starting to steal attention as a tool to act like human. AI has been transforming various industries and education is no exception.

The technology of artificial intelligence (AI), sometimes called machine intelligence is intelligence demonstrated by machine in contrast to natural intelligence displayed by humans. According to Fitria (2023), Artificial Intelligence is the process of modelling human thinking and designing a machine so that it can behave like humans or other terms called cognitive tasks, namely how machines can learn automatically from programmed and information. Fitria further stated that artificial intelligence technology refers to machines that can think, weight the actions to be taken, and can make decisions as humans do and is currently being developed on a large scale so that this technology will imitate and even take over the work normally done by humans in for of programs and robots. Yeruva (2023) stated that AI has the potential to revolutionized the way we learn and teach making it more personalized, engaging and efficient. It is gradually changing the landscape of the education system across the work.

Similarly, Thompson and Zhao (2023) explained that artificial intelligence is the theory and development of computer systems capable of performing tasks that historically required human intelligence, such as recognizing speech, making decisions, identifying patterns. Coursera further stated that artificial intelligence encompasses a wide varies of technologies, including machine learning, deep learning, natural language processing, speech recognition and machine vision. Fitria (2021) noted that Artificial Intelligence systems work by ingesting large amounts of labelled training data, analyzing the data for correlations and patterns, and using these patterns to make predictions about future states. It can create realistic text, images, music and other media. Fitria postulated four cognitive skills artificial intelligence focusses on, which include: learning and it involves acquiring data and creating rules for how to turn it into actionable information. The rules which are called algorithms provide computing devices with step-by-step instructions for how to complete a specific task. Reasoning which focusses on choosing the right algorithm to reach a desired outcome. Self-correction which is designed to continually fine-tune algorithms and ensure they provide the most accurate results possible to address issues in AI output and creativity which uses neural networks, rules-based systems, statistical methods and other AI techniques to generate new images, new text, new music and new ideas. In the same vein, Maccorduck (2014) stated that the ability to reason logically is an important aspect of intelligence and has always been a major focus of artificial intelligence.

According to Maccorduck (2014) artificial intelligence has four main components known as expert system, heuristic problem solving, natural language processing and vision. Expert system is a machine system in which useful human knowledge is added in machine memory in order to give intelligence advice and offer explanation and justification of its decisions or demand. Expert system relies on a large database of well-defined specialized knowledge about a particular area. It handles the situation as an expert and gives performance. Heuristic problem solving is meant to evaluate small range of solutions. When it sees impossible to tackle a specific problem with a step-by-step approach, heuristics are utilized in artificial intelligence. Heuristic functions in AI prioritize speed above accuracy, hence they are frequently paired with optimization techniques to provide better outcome. Natural language processing provides communication between human and machine in natural language. This is the ability of AI technology to understand human



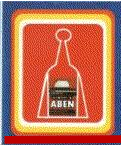
language as its spoken and written. Computer vision is a field of Artificial Intelligence that enables AI to interpret and analyze visual data and derives meaningful information from digital images, videos and other visual inputs. It has the ability to recognize shapes and features automatically.

AI application are widely used today by learners and teachers. Johnson (2023) stated that AI facilitates personalized learning and provide universal access to all levels and types of quality education beyond all limitations as well as promotes distance, open online and digital education. AI cannot replace human teachers but yet it can deal with teaching and learning to a great extent. Furthermore, Jackson and Wilson (2024) referred to artificial intelligence in education as the use of AI technologies, such as machine learning and natural language processing to enhance the learning experience. It involves the use of algorithms that analyze data, identify patterns and make predictions, enabling educators to personalise learning for each student. According to Harry (2023) Artificial Intelligence can be applied in education to design and analyze the mechanical elements on basis of size limitations, greater assistance to humans, greater advance in technology, development of better safety and peace, greater assistance in education. Michael further stated that in classrooms, machines can be used to properly teaching and answer on the spot questions in a universally accepted manner, and it can collaborate with virtual networks to make a perfect learning environment to students.

AI represents progress in education, offering benefits on multiple levels, and stimulates the evolution of teaching and learning through technologies like robots, chat bots, automated assessment, digitized artifacts, intelligent tutoring systems, despite occasional organizational challenges (Chiu et al, 2023). Yu (2023) noted that Robots is a machine that is programmed to perform specific tasks autonomously or remotely, often in a repetitive or dangerous environment. Robots can be powered by electricity, hydraulics or pneumatics and are commonly used in industries and educational institutions. Robots are designed to improve efficiency, productivity and safety in various industries and applications. Yu further stated the benefits of Robot in teaching and learning to include: consistency reducing variability in teaching quality. Personalization- Robots can be programmed to adapt to individual learning styles and abilities. Accessibility: Robots can reach remote or underserved areas, expanding access to education. Efficiency: Robots can automate routine tasks, freeing up human instructors for more interactive and creative aspects of teaching. Scalability: Robots can handle large classes and multiple sections, reducing the need for multiple instructors. Robots can be used as pre-recorded video lecture, virtual teaching assistants, animated avatars, live streaming, adaptive learning, virtual reality and chatbots (Yu, 2023).

In the same vein, Abdellatif et al (2020) noted that chat bots are used in artificial intelligence technology and is a software program which acts like a human when interacted with via message or voice over the internet to simulate a conversation in a scripted way and understands human language and reply to conversation automatically. Chatbots can be used to provide instant support and answers to students queries. The requirements of chatbot design include accurate knowledge representation, strategy for answering and predefined responses to reply when input is not understood or not in a system (Augello, Gentile & Dignum, 2018).

According to Ferguson (2017), adaptive learning is a pedagogical approach that utilizes advanced technologies, particularly machine learning algorithms to tailor educational content, instructional strategies, and assessment methods to individual learners. It aims to adapt the learning process in real time, based on each learner's performance, preferences, knowledge level and learning style. Through continuous analysis of learner data, including assessment results, interaction patterns and progress tracking, adaptive learning systems can provide timely and targeted interventions, ensuring that learners receive the most relevant and effective educational



materials and activities. Because they can convey education information and change to meet the requirements of certain students, adaptive learning systems are becoming more popular (Kizilcec, Desai & Kizilcec, 2017). Adaptive learning uses data-driven algorithms and artificial intelligence to adjust the content, the delivery and the pace of instruction based on learning academic performance and activities and it promotes efficiency in instructional delivery, and enhances the achievement of educational objectives. Adapting learning experiences sustains student progress and engagement in virtual environments, promoting skills development (Khosravi et al, 2022). There is need to incorporate emerging technologies such as artificial intelligence among others in Business Education programme (Marc & Marjorie, 2022).

Business Education exposes its recipients to diversity curricula, hence, it is that type of education that inculcates in its recipients' attitudes, knowledge, skills, and values that are required in business world. According to Emeasoba and Nwatalari, (2021) business education at university level is concerned mainly with the development of relevant saleable skills and knowledge that would enable an individual to function effectively in the world of works. Business Education is one of the most important programmes offered in the university which can engineer students' interest on range specialties including realization of the different talents, opportunities and future roles; provision of trained manpower in the applied sciences, technology and commerce at sub-professional grades: provision of technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development, organization, human resources management and marketing and so forth (Ganyaupfu, 2017). For Business Education programmes to remain relevant in providing the needs of the individuals and that of the society, it must embrace current trends in academic and economic demands of the society. Ufodu and Obi (2023) noted that artificial intelligence can be applied in Business Education by offering courses that delve deeper into AI concepts, algorithms and applications in business, assign hands-on projects that require students to apply AI techniques to solve real-world business problems, use case studies from various industries to illustrate how AI has been successfully integrated into business strategies, partner with business that are actively using AI to provide students with internship opportunities, guest lectures and real-world projects among others. According to Ali, Wardat and Qahtani (2023) artificial intelligence enables intelligence tutoring system that uses natural language processing and machine learning techniques to evaluate student response and determine individual progress by analyzing their learning behaviours. AI also automate the grading and assessment process by providing instant feedback to students and saving educators time and efforts.

Business Education is one of the courses taught in Nigerian universities. University education provides high level skills and competencies that are required for the labour market. It promotes better career opportunities, clear advancement and enhancement of personal growth among others (Enang, 2016). It exposes students to technological skills that will empower them to fit into the world of work and compete with its counterparts globally for economic development. Universities in Enugu is made up of public and private universities. Public universities are made up of Federal and State Universities. Federal Universities are sponsored by the Federal Government while the state universities are sponsored by State government. Private universities are owned by individual or faith-based organisations. There is need for Business Education programs to sustain its relevance in providing the needs of individuals and that of the society. In order to achieve this, it must embrace current trends of AI application in the academic demands of the society by encouraging the AI in teaching and learning of Business Education in universities. Thus the drive to determine the application of artificial intelligence (AI) in teaching and learning of Business Education in universities in Enugu State.



Statement of the Problem

The application of Artificial Intelligence (AI) technologies in teaching and learning has become increasingly prevalent in educational institutions globally. AI has offered new opportunities for Business Education to function effectively in information technology-based organizations and institutions, innovation and economic growth. Business Education on the other hand, is a skill acquisition course that focuses on fundamental management principles, financial knowledge, entrepreneurs and marketing strategies to prepare its recipients for technological proficiency and opportunity for economic development and innovation. However, there is a disparity between the demand for AI technologies in Business Education programme and skills acquired by its graduates. This imbalance highlights the urgent need to apply AI training into Business Education programme to ensure that its graduates are well-equipped with AI tools and technologies effectively to enhance entrepreneurial and economic development. More theoretical concept of new technologies are being taught than practical. In the light of this, this study is poised to determine the extent AI is applied in teaching and learning of Business Education in universities in Enugu State.

Purpose of the study

The purpose of the study was to determine the application of artificial intelligence in teaching and learning of Business Education in Universities in Enugu State. Specifically, the study determined the;

1. Extent of application of Artificial Intelligence in teaching and learning of Business Education in Universities in Enugu State.
2. Extent of challenges facing the application of Artificial Intelligence in teaching and learning of Business Education in Universities in Enugu State.

Research Questions

The following research questions guided the study:

3. What is the extent of application of Artificial Intelligence in teaching and learning of Business Education in universities in Enugu State?
4. What are the challenges facing the application of Artificial Intelligence in teaching and learning of Business Education in universities in Enugu State?

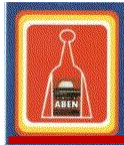
Hypotheses

The following null hypotheses were formulated to guide the study and were tested at .05 level of significance.

- Ho₁ There is no significant difference between the mean ratings of Business Educators and Business Education students on the extent Artificial Intelligence is applied in teaching and learning of Business Education in universities in Enugu State.
- Ho₂ There is no significant difference between the mean ratings of Business Educators and Business Education students on the challenges facing the application of Artificial Intelligence in teaching and learning of Business Education in universities in Enugu State.

Method

The study adopted descriptive survey research design. The study was carried out in public Universities in Enugu State. The population was 195 Business Educators and students in public universities in Enugu state offering Business Education programme. No sampling technique was adopted as the population for the study was sizeable and manageable. A validated structured questionnaire titled "Questionnaire on Application of Artificial Intelligence in teaching and learning of Business Education programme" (QAAITLBEP) was developed by the researchers. The instrument is a four-point rating scale of: Very High Extent (VHE), High Extent (HE), Low Extent



(LE) and Very Low Extent (VLE) and Strongly Agree (SA); Agree (A); Disagree (D); Strongly Disagree (SD) with values of 4,3, 2 and 1 respectively. The instrument was validated by three experts in Business Education and measurement and evaluation from Michael Okpara University of Agriculture, Umudike. Cronbach Alpha Coefficient was used to measure the internal consistency of the instrument and co-efficient of 0.76 and 0.78 were obtained respectively. Mean was used to answer the research questions, standard deviation was used to ascertain the closeness and homogeneity of the responses while t-test of independence was used to test the null hypotheses at .05 level of significance. The decision was based on the cluster mean score in relation to the boundary mean score of 2.50. A cluster with mean score equal to or above 2.50 was high extent or agreed while mean score less than 2.50 was low extent or disagreed. In testing the hypothesis of no significant difference using t-test, the decision rule for the hypotheses was that any hypothesis with a t-calculated value less than the t-critical value is considered not rejected whereas if the t-calculated value is more than the t-critical value it is considered rejected.

Results:

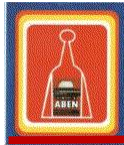
Research Question 1: What is the extent of application of Artificial Intelligence in teaching and learning of Business Education in universities in Enugu state?

Table 1: Respondents' Mean and Standard Deviation Scores on the extent of application of AI in teaching and learning of Business Education Programme

S/N	The following AI application in teaching and learning of Business Education programme are as follows:	Business Educators		Rmk	Business students		Rmks
		X ₁	SD ₁		X ₂	SD ₂	
1	AI serves as an educational partner that enhance content and competencies in Business Education.	3.84	0.63	HE	3.75	0.42	HE
2	AI is used to improve students understanding of complex concepts and topics in Business Education	3.92	0.54	HE	3.82	0.52	HE
3	AI is used in assessments and administrative services in Business Education programme	3.64	0.76	HE	3.56	0.56	HE
4	AI provides feedback after students' assessment process that supports students in improving skills.	3.76	0.51	HE	3.63	0.41	HE
5	Integrated AI technologies is applied into traditional Business Education curriculum.	3.22	0.88	HE	3.12	0.52	HE
6	Business Educators make use of AI tools in teaching and learning of Business Education.	2.23	0.92	LE	2.14	0.53	LE
7	AI is applied in research work in Business Education programme	2.44	0.75	LE	2.31	0.61	LE
8	AI is used in fostering creative thinking and problem solving in Business Education programme	3.42	0.66	HE	3.36	0.67	HE
9	Students' skills are enhanced through the use of AI in Business Education.	3.83	0.42	HE	3.94	0.56	HE
10	AI enhances students' freedom in asking questions and seeking clarification from AI	3.51	0.58	HE	3.43	0.63	HE
	Grand mean score	3.38	0.67	HE	3.31	0.54	HE

Source(s): Author Construction from SPSS version 27 computation, 2024. Critical mean score = 2.50

Note: HE = High extent and LE - Low Extent.

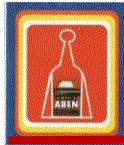


The result in Table 1 shows that both groups consistently rated AI applications positively, with most items receiving a "High Extent" (HE) remark, indicating that AI is viewed as significantly enhancing the educational process. Specifically, both Business Educators and Business Education students rated AI application in teaching and learning of the Business Education program to a high extent in item questions No. 1, 2, 3, 4, 5, 8, 9, and 10, with mean scores greater than 3.00. The highest mean score for Business Educators was 3.92, attributed to the use of AI in improving students' understanding of complex concepts and topics in Business Education. For Business Education students, the highest mean score was 3.94, reflecting the enhancement of students' skills through AI in Business Education. Conversely, the use of AI tools by Business Educators (item No. 6) and AI's application in research (item No. 7) received lower scores, falling into the "Low Extent" (LE) category, with mean scores below 2.50. This suggests that these areas may need further development or integration. The overall grand mean scores were 3.38 for educators and 3.31 for students, both within the "High Extent" range, reflecting a generally positive perception of AI's role in Business Education among both educators and students. The standard deviation was relatively small and shows that responses clustered around the mean. This further implies that the inter-rating of the questions by the respondents was close. Thus, both Business educators and Business education students concurred on the significance of AI applications in enhancing the teaching and learning processes of Business Education program.

Research Question 2: What are the challenges facing the application of Artificial Intelligence in teaching and learning of Business Education in universities in Enugu state?

Table 2: Respondents' Mean and Standard Deviation Scores on the challenges facing the application of AI in teaching and learning of Business Education Programme

S/N	Challenges facing AI application in teaching and learning of Business Education programme are as follows:	Business Educators			Business Education students		
		X ₁	SD ₁	Rmks	X ₂	SD ₂	Rmks
1	Lack of human interaction and feeling	3.73	0.61	A	3.85	0.55	A
2	Lack understanding of decision-making logic and its description in human terms	3.62	0.52	A	3.81	0.63	A
3	Artificial Intelligence enhancing automation is also causing huge job losses around the world	3.56	0.71	A	3.75	0.76	A
4	Misuse of AI can be deadly and devastating	2.26	0.93	D	2.32	0.81	D
5	Heavy regulations and cautions are involved in usage of AI	3.82	0.61	A	3.74	0.57	A
6	It requires more and more training for Business Educators thereby involving a huge sum of money	3.45	0.81	A	3.62	0.72	A
7	Lack of understanding the functioning of AI algorithms and technology.	3.32	0.73	A	3.66	0.66	A
8	Lack of funds to set up and implement Artificial Intelligence and invest in it.	3.55	0.62	A	3.62	0.58	A
9	Religious intolerance can seriously militate against AI technology	2.36	0.81	D	2.44	0.93	D
10	Shortage of data science skills within humans to get maximum output from artificial intelligence.	3.62	0.53	A	3.76	0.62	A
Grand mean score		3.33	0.69	A	3.46	0.68	A



Source(s): Author Construction from SPSS version 27 computation, 2024. Critical mean score = 2.50

Note: A = Agreed; D = Disagreed

The result in Table 2 shows that both groups consistently rated the challenges facing the application of AI in the teaching and learning of the Business Education program, with most items receiving an "Agreed" (A) remark, indicating that these challenges are viewed as significant by both Business Educators and Business Education students. Specifically, both groups rated the challenges listed in items No. 1, 2, 3, 5, 6, 7, 8, and 10 as significant, with mean scores greater than 3.00. The highest mean score for Business Educators was 3.82, attributed to the challenge of heavy regulations and cautions involved in the use of AI. For Business Education students, the highest mean score was 3.85, reflecting the concern over the lack of human interaction and feeling in AI applications. Conversely, the challenges related to the misuse of AI (item No. 4) and religious intolerance (item No. 9) received lower scores, falling into the "Disagreed" (D) category, with mean scores below 2.50. This suggests that these areas are perceived as less critical concerns by both groups. The overall grand mean scores were 3.33 for Business Educators and 3.46 for Business Education students, both within the "Agreed" range, reflecting a generally consistent recognition of the challenges associated with AI in the Business Education program. The standard deviations were relatively small, indicating that the responses were closely clustered around the mean. This further implies that both Business Educators and Business Education students shared a common understanding of the significant challenges posed by AI applications in their educational context.

Test of Hypotheses

The three null hypotheses of the study were tested using paired samples t-test. The null hypotheses were tested at 0.05 level of significance.

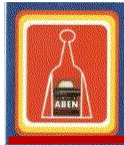
Hypotheses 1: There is no significant difference between the mean ratings of Business Educators and Business Education students on the extent Artificial Intelligence is applied in teaching and learning of Business Education in universities in Enugu State.

Table 3: t-test analysis of significant difference in the mean ratings of Business Educators and Business Education students on the extent Artificial Intelligence is applied in teaching and learning of Business Education in universities in Enugu State.

Groups	Number	Mean	SD	df	t-cal	t-tab	Level of Sig.	Decision
Business Educators	25	3.38	0.67	193	0.51	1.96	0.62	Not Rejected
Business Education Students	170	3.31	0.54					

Source(s): Author Construction from SPSS version 27 computation, 2024. $P \leq 0.05$

Table 3 shows that Business Educators and Business Education students in universities in Enugu State reported similar mean ratings for the extent to which Artificial Intelligence (AI) is applied in teaching and learning. Business Educators had a mean score of 3.38 with a standard deviation of 0.65, while Business Education students had a mean score of 3.31 with a standard deviation of 0.61. The calculated t-value was 1.94 (df = 193), and the observed p-value was 0.645. This p-



value is higher than the significance level of 0.05 ($P \leq 0.05$). Therefore, the null hypothesis was not rejected, indicating that there was no significant difference between the mean ratings of Business Educators and Business Education students regarding the extent of AI application in their teaching and learning contexts. This implies that both groups perceive the application of AI in teaching and learning in a similar manner, suggesting a consistent view on the integration and impact of AI within their educational settings in Enugu State.

Hypotheses 2: There is no significant difference between the mean ratings of Business Educators and Business Education students on the challenges facing the application of Artificial Intelligence is applied in teaching and learning of Business Education in universities in Enugu State.

Table 4: t-test analysis of significant difference in the mean ratings of Business Educators and Business Education students on the challenges facing the application of Artificial Intelligence in teaching and learning of Business Education in universities in Enugu State.

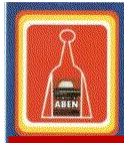
Groups	N	Mean	SD	df	t-cal	t-tab	Level Sig.	of	Decision
Business Educators	25	3.33	0.69	193	-0.88	1.96	0.385		Not Rejected
Business Education Students	170	3.46	0.68						

Source(s): Author Construction from SPSS version 27 computation, 2024. $P \leq 0.05$

Table 4 shows that Business Educators and Business Education students in universities in Enugu State reported different mean ratings concerning the challenges facing the application of Artificial Intelligence (AI) in teaching and learning. Business Educators had a mean score of 3.33 with a standard deviation of 0.69, while Business Education students had a mean score of 3.46 with a standard deviation of 0.68. The calculated t-value was -0.88 ($df = 193$), and the observed p-value was 0.385. This p-value is higher than the significance level of 0.05 ($P \leq 0.05$). Therefore, the null hypothesis was not rejected, indicating that there was no significant difference between the mean ratings of Business Educators and Business Education students regarding the challenges of AI application in their teaching and learning contexts. This implies that despite the slight difference in mean scores, both groups perceive the challenges associated with AI in teaching and learning similarly, suggesting a common level of concern or awareness about the issues posed by AI in their educational settings in Enugu State.

Discussion of findings

From the findings of the study, the result showed that the study offers a nuanced understanding of the application and challenges of Artificial Intelligence (AI) in teaching and learning within Business Education programs at universities in Enugu State. The results reveal significant insights into the extent of AI's integration into educational practices and the challenges that both educators and students face. This discussion contextualizes these results within the broader



framework of AI's role in education and its implications for enhancing Business Education programs.

Extent of AI Application

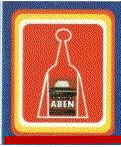
The results indicate that both Business Educators and Business Education students perceive AI as a valuable tool in enhancing the teaching and learning experience. AI's role in improving students' understanding of complex concepts and enhancing their skills is particularly noteworthy. This positive perception aligns with previous research that highlights AI's capacity to personalize learning, provide timely feedback, and support complex problem-solving (Johnson et al., 2023; Wang & He, 2024). The high ratings for AI's contribution to enhancing understanding and skills suggest a growing recognition of AI's potential to address educational challenges. AI tools, such as intelligent tutoring systems and adaptive learning platforms, have been shown to improve educational outcomes by tailoring content to individual learning needs and providing interactive learning experiences (Smith & Hill, 2022). These findings reflect a shift towards recognizing AI's role not just as a supplementary tool but as an integral component of the educational process. However, the lower ratings concerning the use of AI tools by educators and in research suggest areas for further development. While AI's potential in research and tool usage is acknowledged, its practical integration into everyday teaching practices and research activities appears limited. This discrepancy highlights the need for targeted professional development and resource allocation to better equip educators with AI tools and foster their application in research (Thompson & Zhao, 2023).

Challenges in AI Application

The study identifies several challenges associated with the application of AI in Business Education. The concerns about lack of human interaction, understanding AI decision-making processes, and heavy regulations reflect broader apprehensions about AI's integration into educational settings. These challenges are consistent with the findings of recent studies that emphasize the need for transparency and ethical considerations in AI applications (Lee et al., 2023; Kaur & Sethi, 2024). The lack of human interaction is a significant concern, as it can impact the quality of student engagement and the relational aspects of teaching. AI's role in replacing or supplementing human interaction remains a contentious issue, with some studies suggesting that while AI can enhance learning, it cannot fully replicate the interpersonal dynamics of face-to-face education (Williams et al., 2023). The challenge of understanding AI's decision-making logic also underscores the need for educators and students to have a clear understanding of how AI systems function to effectively utilize them (Brown & Davis, 2024). The heavy regulations and need for extensive training further complicate the integration of AI in education. These challenges highlight the need for policy frameworks and institutional support to facilitate the adoption and effective use of AI technologies. Ensuring that educators are adequately trained and supported can mitigate these challenges and enhance the overall effectiveness of AI in education (Miller & Singh, 2024). Conversely, concerns about the misuse of AI and religious intolerance were rated as less critical. This suggests a consensus that while these issues are relevant, they may not be as immediate or significant as other challenges identified. This perception could reflect a broader awareness of the ethical implications of AI and a recognition that these issues, while important, are secondary to more pressing operational and pedagogical concerns (Jackson & Wilson, 2024).

Conclusion

Based on the findings obtained, the authors concluded that both Business Educators and Business Education students perceive AI positively, recognizing its significant role in enhancing



educational processes. More so, the high extent of agreement on AI's ability to improve understanding of complex concepts, provide valuable feedback, and support skill development underscores its potential to enrich the Business Education curriculum. However, the study also highlights critical areas for improvement. While AI's potential is acknowledged, the current utilization of AI tools by Business Educators and its application in research are relatively low. This disparity suggests that despite the positive perceptions, practical integration and application of AI remain limited. The study also identifies several challenges, such as the lack of human interaction, the need for substantial training, and the heavy regulations surrounding AI use, which hinder its full potential. The consistency in responses between Business Educators and Business Education students regarding both the extent of AI application and the challenges suggests a unified perspective on AI's role and the issues that need to be addressed. The lack of significant differences in their views implies a shared recognition of the strengths and weaknesses of AI in Business Education.

Recommendations

Based on the findings and conclusion of the study, the following recommendations were made;

1. Universities should integrate AI tools more systematically into the Business Education curriculum to leverage their full potential. This includes developing a clear strategy for incorporating AI in teaching methods, assessments, and administrative processes. This is important since a structured approach to AI integration will ensure that both educators and students can effectively utilize AI resources, improving overall educational outcomes.
2. Institutions should invest in comprehensive training programs for Business Educators to build proficiency in using AI tools. These programs should include workshops, seminars, and continuous professional development opportunities. Such training will equip educators with the skills needed to effectively use AI, thus enhancing their teaching practices and fostering a more AI-adept educational environment.

References

- Abdellatif, A., Costa, D., Badran, K., Abdalkaree, R. & Shihab, E. (2020). Challenges in chatbot development: A study of stack overflow posts. In proceedings of the 17th International conference on mining software repositories. <https://doi.org/10.1145/3379597.338>.
- Ali, R., Wardat, Y. & Al-Qahtani, M. (2023). SWOM strategy and influence of its using on developing mathematical thinking skills and on metacognitive thinking among gifted tenth-grade students. *EURASIA Journal of Mathematics, Science and Technology Education*, 19(3), 2238-2242.
- Augello, A, Gentile, M & Dignum, F. (2018). An overview of open-source chatbots social skills. In S. Diplaris, A. Satsiou, A. Folstad, M. Vafopoulos & T. Vilarinho (Eds), <https://doi.org/10.1007/978-3-319-77547-0-18>.
- Brown, J., & Davis, L. (2024). *Understanding AI decision-making in educational contexts*. Educational Technology Research & Development.
- Chie, T. Xia, Q., Zhou, X., Chai, C.S. & Cheng, M. (2023). Systematic literature review on opportunities, challenges and future research recommendations of Artificial Intelligence in education. *Computers and Education: Artificial Intelligence*. <https://doi.org/10.1016/j.caeai.2023.100118>.
- Emeasoba N. C. & Nwatarali, C. N. (2021). Capacity Building Needs of Business Education Lecturers for Professionalism in Public Universities in South East Nigeria. *Nigerian Journal of Business Education (NIGJBED)*. 8(2), 24-37
- Enang, C.E. (2016). Widening access to Business Education Programme through Distance Learning in Nigerian Universities. *Nigerian Journal of Business Education*, 3(2), 351-361.
- Ferguson, P. (2017). Artificial intelligence and machine learning in higher education. *EDUCAUSE Review*, 52(1), 71-82.



- Fitria, T. N. (2021). Artificial Intelligence (AI) In Education: Using AI Tools for Teaching and Learning Process. Prosiding Seminar Nasional & Call for Paper STIE AAS, 4(1), 134-147. <https://prosiding.stie-aas.ac.id/index.php/prosenas/article/view/106> Fitria
- Fitria, T. N. (2023). Artificial Intelligence (AI) Technology in OpenAI ChatGPT Application: A Review of ChatGPT in Writing English Essay. *ELT Forum: Journal of English Language Teaching*, 12, 44-58. <https://doi.org/10.15294/elt.v12i1.64069>
- Ganyaupfu, E. (2017). Factors influencing academic achievement in quantitative courses among business students of private higher education institutions. *Journal of Education and Practice*, 4(15) 20-32.
- Harry, A. (2023). Role of Artificial Intelligence in Education. *Interdisciplinary Journal and Humanity*, 2(3), 260-268.
- Jackson, M., & Wilson, R. (2024). *Ethical implications of AI in education: A review*. *Journal of Educational Ethics*.
- Johnson, H., Wang, X., & He, Y. (2023). *Personalized learning through AI: Current trends and future directions*. *International Journal of Educational Technology*.
- Kaur, G., & Sethi, A. (2024). *Challenges and opportunities in AI-enhanced education*. *Journal of Educational Technology & Society*.
- Khosravi, H., Shu, S.B., Chen, G., Conati, C., Tsai, Y.S, Kay, J., Knight, S., Artinez-alonado, R., Sadig, S. & Gasevic, D. (2022). Explainable Artificial Intelligence in education. *Computers and Education: Artificial Intelligence*, 3(100074), 1-22. <https://doi.org/10.1016/j.caeai.2022.100074>.
- Kizilcec, R.F., Desai, M. & Kizilcec, B.F. (2017). Adaptive learning with learning analytics: A review of the literature. *Journal of Educational Technology Development and Exchange (JETDE)*, 10(3), 135-154.
- Lee, S., Smith, T., & Hill, R. (2023). *AI in the classroom: Enhancing engagement and learning outcomes*. *Computers & Education*.
- McCorduck, P. (2014). Machines who think. *Artificial intelligence*. 340-400.
- Marc, S. & Marjorie, M. (2022). Artificial Intelligence and Business Education: What should be taught. *The international Journal of Management Education*. <http://www.ijme.2022.100720>.
- Miller, A., & Singh, P. (2024). *Policy frameworks for AI in education: Navigating challenges and opportunities*. *Educational Policy Review*.
- Smith, J., & Hill, K. (2022). *Adaptive learning technologies: Impact on student achievement and engagement*. *Learning Analytics Review*.
- Thompson, J., & Zhao, Y. (2023). Integrating AI tools into educational practices: Best practices and strategies. *Journal of Educational Technology Development & Exchange*.
- Ufondu, C.C. & Obi, O.C (2023). Revolutionizing Business Education curriculum: the extent of integrating Artificial Intelligence, Data Analytics and Digital Marketing Innovations. *ABEN Conference Proceedings*, 10(1), 494-501.
- Wang, J., & He, M. (2024). *AI in higher education: A comprehensive review of applications and impacts*. *Higher Education Research & Development*.
- Williams, R., Brown, E., & Davis, T. (2023). *AI and human interaction in educational settings: A critical analysis*. *Journal of Learning Analytics*.
- Yeruva, A. R. (2023). Providing A Personalized Healthcare Service to the patients using AIOPs monitoring. *Eduvest-Journal of Universal Studies*, 3(2), 327-334.
- Yu, H. (2023). Artificial Intelligence and Information Processing: A Systematic Literature Review. Retrieved from <https://www.mdpi.com/journal/mathematics>



ARTIFICIAL INTELLIGENCE SKILLS REQUIRED OF BUSINESS EDUCATION STUDENTS FOR JOB PERFORMANCE IN THE NEW ERA

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Abstract

The paper sought to determine artificial intelligence skills required of business education students for job performance in the new era. Two research questions and two null hypotheses guided the study. The study adopted a descriptive survey research design. Area of the study was in Rivers state. The population of the study comprised 36,427 of senior civil servants from 26 ministries. The sample size was 380. A structured questionnaire was used. The instrument was validated by three experts, two in Business Education and one in Measurement and Evaluation. Reliability of the research instrument was obtained using Pearson's Product Moment Correlation Coefficient. The overall reliability index for the instrument was .78. 380 copies of the instrument were administered to the respondents but 364 were retrieved representing 96% of the instrument. The data collection was analysed using Mean and Standard deviation for the research questions while the hypotheses were tested at .05 level of significance using t-test. The findings of the study shows that the senior civil servants in organisations were of the opinion that AI accounting and AI electronic office skills were highly required of Business Education Students. Based on the findings, it was concluded that AI accounting and AI electronic office skills were very highly required of Business Education students for job performance in organisations in a digital era. The researchers also recommended that Business education students should equip themselves with AI accounting and AI electronic office skills to make them relevance in the world of work in the new era.

Keywords: Artificial intelligence, Business education, Skills, and Job Performance

Introduction

Artificial intelligence (AI) is revolutionizing the business landscape, necessitating a review of the skills required for job performance in organizations. Business education students are required to develop artificial intelligence related skills to remain competitive in the job market. Traditionally, Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and learn like humans. (Kurzweil, 2005) in the modern perspective, Russell and Norvig (2010) sees AI as a multidisciplinary field that combines computer science, mathematics, and engineering to create intelligent machines that can perform tasks that typically



require human intelligence. Is a tool that can be used to augment human capabilities, automate tasks, and improve decision-making.

Business education refers to the academic discipline that focuses on the study of business and commerce. It encompasses various aspects of business which includes accounting, business administration, management, electronic office, marketing, finance, entrepreneurship, human resources, international business, supply chain management, and business ethics (Okoli, 2013). Abdulkadir (2011) added that the goals of business education are preparing students for careers in business and management, developing entrepreneurial skills and mindset, providing knowledge and skills for effective leadership and management, fostering critical thinking, problem-solving, and decision-making abilities, encouraging ethical and socially responsible business practices.

According to Manyika *et al.*, (2017) AI is transforming business operations, driving demand for AI-related skills. Business education programs for students need to develop skills in areas like data analysis and interpretation, machine learning and programming, critical thinking, problem-solving, emotional intelligence, and communication (Baker, 2020; Goleman, 2019; World Economic Forum, 2020). Integrating technology and experiential learning into business education can enhance student engagement and learning outcomes (Graham, 2018).

Accounting remains one of the important skills in business education which learners perform basic bookkeeping and accounting function. They are regarded as entry level workers in accounting profession. Accounting skills are indispensable for business decision-making and financial management (Weygandt *et al.*, 2018). Research highlights the importance of accounting education in developing skills like financial analysis, budgeting, and financial reporting (Arens *et al.*, 2017).

Electronic office skills refer to the proficiency in using digital tools and software to perform various tasks and functions in an office setting. Electronic office skills are crucial in today's digital work environment, enhancing productivity and efficiency (Katz, 2017). Proficiency in software applications like Microsoft Office and Google Suite is essential for effective communication, collaboration, and data management (Latham, 2019). Onojaife (2006) state that office systems have moved from typewriters, handwriting and manual operational procedures to artificial intelligence. AI digital powered machine have reduced the long hours of office business to a mere pressing of buttons to attain a more effective and efficient output such as time management, report generation, virtual assistant.

Job performance in the new era is mostly showcase in organisations. Organisation according to Jones and George cited in Oduma and Ile (2012) is seen as an institution, an industry or business, the civil service, department or government ministry, church, social club, or even non-governmental organizations (NGOs). Organisational skills deal with existence organised methodical and capable to blueprint work to come across target, deadlines and observe improvement of work. Job performance in organisations is the train or the machine that drives productivity which other elements like motivation and skill grease the engine. Job performance is influenced by factors like employee motivation, job satisfaction, and organizational support (Luthans, 2005). Research emphasizes the importance of continuous learning and skill development in enhancing job performance and career advancement (London, 2017). Job performance is relevant that it cannot be ignored in the industrial background.

The new era of business education students comprises changing skill sets, digital native, diversity and inclusion, experiential learning, entrepreneurship programmes, sustainability and social responsibility (Bishop, 2019; Dugan *et al.*, 2018; Bae *et al.*, 2017; Porter & Kramer, 2019). Business education students are required to focus on developing artificial intelligence skills.



Business education students lack AI-related skills, hindering their job performance in organizations and organizations struggle to find graduates with the necessary AI skills to drive business growth. There is also a disconnect between business education curricula and industry demands for AI skills.

Empirical studies on AI skills required of business education students for job performance in organizations are essential to understand the evolving needs of the industry. One study determined that accounting and problem-solving skills are highly required of business education students for job performance in organisations (Nwaokokorom&Ikpeama, 2023). Another systematic review examined AI in higher education and found that AI is being used for assessment, prediction, AI assistant, intelligent tutoring system, and managing student learning. While there is no specific study on AI skills required of business education students for job performance, these studies indicate that business education students should equip themselves with skills like accounting, electronic office, communication, entrepreneurial, problem-solving, and AI to be relevant in the job market.

The purpose of this study was to determine artificial intelligence skills required of business education students for job performance in the new era. Specifically, objective of the study determined:

1. AI accounting skills required of Business Education students for job performance in the new era.
2. AI electronic office skills required of Business Education students for job performance in the new era.

The following research questions were formulated to guide the study:

1. What are the AI accounting skills required of Business Education students for job performance in the new era?
2. What are the AI electronic office skills required of Business Education students for job performance in the new era?

The following null hypotheses were formulated and tested at .05 level of significance:

Ho₁: There is no significant difference in the mean ratings of male and female senior civil servants on the AI accounting skills required of Business Education students for job performance in the new era.

Ho₂: There is no significant difference between the mean ratings of male and female senior civil servants on the AI electronic office skills required of Business Education students for job performance in the new era.

Methodology

The researcher adopted a descriptive survey research design. Area of the study was Rivers state. Population of the study comprised 36,427 of senior civil servants from 26 ministries. The sample size was 380, utilising Krejcie and Morgan formula (Nwaokokorom&Ikpeama, 2023).. The instrument used for data collection was a structured questionnaire designed to elicit response based on the research questions set for the study. The instrument was validated by three experts, two in Business Education and one in Measurement and Evaluation. Reliability of the research instrument was obtained using Pearson's Product Moment Correlation Coefficient. The overall reliability index for the instrument was .78. The data collection was analysed by using Mean with Standard deviation for the research questions and t-test for the hypotheses at .05 level of significance. The decision rule for answering the research questions was based on real limit of



numbers, thus: Very Highly Required at 4 points (3.50 - 4.00), Highly Required at 3 points (2.50 - 3.49), Lowly Required at 2 points (1.50 - 2.45), and Very Lowly Required at 1 point (1.00 - 1.49).

Results

Research Question 1

What are the AI accounting skills required of Business Education students for job in the new era?

Table 1: Responses of Senior Civil Servants on AI accounting skills required of Business Education students for job performance in the new era

S/N	ITEM DESCRIPTION	$\bar{X}$	SD	REMARK
Custer 1: AI Accounting skills.Ability to use AI to;				
1	analyse data	3.72	0.46	VHR
2	interpret large dataset	3.44	0.62	HR
3	analyse financial statement	3.52	0.50	VHR
4	manage automated accounting system	3.49	0.53	HR
5	implement accounting system	3.75	0.44	VHR
6	understand accounting software	3.72	0.46	VHR
7	collect data	3.60	0.49	VHR
8	identify trends	3.58	0.49	VHR
9	predict future financial performance	3.63	0.63	VHR
10	understand auditing tools	3.50	0.70	VHR
11	identify potential auditing risks	3.48	0.66	HR
12	analyse tax laws	3.61	0.67	VHR
13	regulate tax savings opportunities	3.60	0.64	VHR
14	optimize tax strategies	3.66	0.48	VHR
15	forecast future financial performance	3.63	0.51	VHR
16	develop mitigation strategies	3.64	0.62	VHR
17	ensure compliance with accounting standards	3.58	0.58	VHR
18	improve accounting efficiency and effectiveness	3.64	0.50	VHR
19	improve accounting communication	3.69	0.49	VHR
20	apply machine learning to accounting problems	3.43	0.62	HR
Custer Mean		3.59	0.16	VHR

$\bar{X}$ = Mean, SD = Standard Deviation, N= 364

Source: Field Survey, 2024

The data presented in Table 1 indicates that, the Senior Civil Servants responses have cluster mean of 3.59, and standard deviation of 0.16. This means that, the senior civil servants are homogenous in their responses, and they are in agreement that 16 items are Very Highly Required (VHR) AI accounting skills required of business Education students for job performance in the new era organisations. While 3 items are Highly Required (HR). Therefore, according to the Senior Civil Servants all items in Table 1 are AI accounting skills required of business Education students for job performance in the new era organizations.

Null Hypothesis 1

There is no significant difference between the mean ratings of male and female senior civil servants on the AI accounting skills required of business Education students for job performance in the new era.

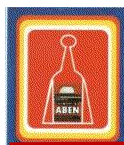


Table 2: The t-test result of the mean responses of Male and Female Senior Civil Servants on AI accounting skills required of business Education students for job performance in the new era.

Gender	N	$\bar{X}$	SD	Df	t-cal	t-crit	Decision
Males	213	3.59	0.16	362	0.59	1.96	Not significant
Females	151	3.58	0.16				

The result in Table 2 shows that t-cal is 0.59 and t-crit is 1.96 at .05 significant level. This indicates that t-cal (0.59) is less than t-crit (1.96). As a result, the stated null hypothesis that, there is no significant difference between the mean ratings of Male and Female senior civil servants regarding the AI accounting skills required of Business Education students for job performance in the new era organisations is not rejected.

Research Question 2

What are the AI electronic office skills required of Business Education students for job performance in the new era?

Table 3: Responses of Senior Civil Servants on AI electronic office skills required of Business Education students for job performance in the new era?

S/N	ITEM DESCRIPTION	$\bar{X}$	SD	REMARK
Cluster 2: AI Electronic Office skills. Ability to use AI to;				
21	automate meeting scheduling	3.59	0.68	VHR
22	automate report generation	3.42	0.33	HR
23	automate data entry and processing	3.74	0.45	VHR
24	virtual assistants	3.67	0.49	VHR
25	intelligent document management	3.73	0.48	VHR
26	chatbots for customer support and services	3.57	0.47	VHR
27	use google assistant to schedules	3.74	0.44	VHR
28	design and presentation tools	3.78	0.42	VHR
29	digital calendar organisation	3.54	0.62	VHR
30	predict text and language processing	3.81	0.40	VHR
31	email management	3.82	0.48	VHR
32	time management	3.73	0.53	VHR
33	bookkeeping and accounting	3.78	0.42	VHR
34	Intelligent customer relationship management	3.85	0.36	VHR
35	Intelligent task management	3.83	0.38	VHR
Cluster Mean		3.71	0.19	VHR

$\bar{X}$ = Mean, SD = Standard Deviation, N = 364

Source: Field Survey, 2024

The data presented in Table 3 shows that, the Senior Civil Servants responses have a cluster mean of 3.71, and standard deviation of 0.19. This implies that, the Senior Civil Servants are unanimous in their responses, and they agree that 14 items are Very Highly Required (VHR) AI electronic office skills required of Business Education students for job performance in organizations in the new era. While 1 is Highly Required (HR). Therefore, according to the Senior Civil Servants all items in Table 3 are AI electronic office required of Business Education students for job performance in the new era organizations.



Null Hypothesis 2

There is no significant difference between the mean ratings of male and female senior civil servants on the AI electronic office skills required of Business Education students for job performance in the new era.

Table 3: The t-test result of the mean responses of Male and Female Senior Civil Servants on AI electronic office skills required of Business Education students for job performance in the new era.

Gender	N	$\bar{X}$	SD	Df	t-cal	t-crit	Decision
Males	213	3.70	0.18	362	0.51	1.96	Not significant
Females	151	3.71	0.19				

The result in Table 3 shows that t-cal is 0.51 and t-crit is 1.96 at .05 significant level. This indicates that, t-cal (0.51) is less than t-crit (1.96). As a result, the stated null hypothesis that, there is no significant difference between the mean ratings of male and female senior civil servants regarding the AI electronic office skills required of Business Education students for job performance in the new era organisations is not rejected.

Discussion of the Findings

Respondents from 26 ministries agreed to the very highly required that AI accounting skills are required of Business Education students for job performance in the new era organisations. This finding is in line with that of Nwaokokorom and Ikpeama, (2023) that AI accounting and problem-solving skills are highly required of business education students for job performance in organizations. The knowledge skills will enable the students to hold the understanding of business management while the technical skills will enable them to run the day-to-day activity of this enterprise.

Another finding revealed that AI electronic office skills are very highly required of business education students for job performance in the new era organisations. This is in line with This finding agreed with the result obtained from Onojaife (2006) that office systems have moved from typewriters, handwriting and manual operational procedures to artificial intelligence of most offices where such terms as word processing, data processing and micrographics are used to describe many technological processes. Katz (2017) also stated that electronic office skills are crucial in today's digital work environment, enhancing productivity and efficiency. With AI electronic skills in organisation the system will progress efficiently.

Conclusion

Based on the findings of this study, the researchers concluded that AI accounting skills and AI electronic office skills are very highly required of Business Education students for job performance in organisations in the new era.. It was also concluded that there is no significant difference in mean ratings of male and female senior civil servants regarding the AI accounting and AI electronic office skills required of Business Education students for job performance in organisations in the new era.

Recommendations

Based on the findings, the following recommendations were made:

1. Business education students should venture to prepare themselves with all the applicable artificial intelligence accounting skills required for them to create and maintain their customers' needs.



2. Business education students should develop themselves with related artificial intelligence electronic office skills.

References

- Abdulkadir, A. (2011). *Relevance of business education in promoting entrepreneurial culture in Nigeria*. Association of Business Educators of Nigeria Book of Readings, 1(11), 88-93.
- Arens, A. A., Elder, R. J., & Beasley, M. S. (2017). *Auditing and assurance services*. Pearson.
- Bae, T. J., Qian, S., & Miao, C. (2017). Entrepreneurship education and entrepreneurial intention. *Journal of Entrepreneurship Education*, 20(1), 35-50.
- Baker, R. (2020). Artificial intelligence in education: A review of the literature. *Journal of Educational Data Mining*, 12(1), 1-35.
- Bishop, J. (2019). The future of business education. *Journal of Business Education*, 94(1), 12-18.
- Dugan, L. F., Herring, C., & Thomas, K. M. (2018). Diversity, equity, and inclusion in business education. *Academy of Management Learning & Education*, 17(2), 151-167.
- Goleman, D. (2019). Emotional intelligence in the age of artificial intelligence. *Harvard Business Review*, 97(10), 123-126.
- Graham, C. R. (2018). Experiential learning in business education. *Journal of Experiential Education*, 41(1), 31-44.
- Katz, D. L. (2017). The impact of electronic office skills on employee productivity. *Journal of Business and Psychology*, 32(2), 147-155.
- Kurzweil, R. (2005). *The singularity is near: When humans transcend biology*. Penguin.
- Latham, G. P. (2019). The importance of electronic office skills in the workplace. *Journal of Business Research*, 98(1), 241-248.
- London, M. (2017). Continuous learning and job performance. *Journal of Applied Psychology*, 102(2), 231-244.
- Luthans, F. (2005). *Organizational behavior*. McGraw-Hill.
- Manyika, J., Chui, M., Bisson, P., Bughin, J., Woetzel, J., & Stolyar, K. (2017). *A future that works: Automation, employment, and productivity*. McKinsey Global Institute.
- Nwaokokorom, O. W., & Ikpeama, F. U. (2023). Accounting and problem-solving skills required of business education students for job performance in organisations in digital era. *Nigerian Journal of Business Education* 10(1), 20 - 26.
- Oduma, C. A., & Ile, C. M. (2012). Employment opportunities for business education graduates in the information age. *Journal of Vocational and Adult Education*, 4(1), 125 – 135.
- Okoli, B. E. (2013). *Business education and entrepreneurial development: Issues and challenges*. Nigerian Journal of Business Education, 1(2), 1-11.
- Onojaife, C. A. (2006). Effect of modern information and communication technology on secretarial workers. *Journal of Office Management and Technology*, 1(1), 51-58.
- Porter, M. E., & Kramer, M. R. (2019). Creating shared value. *Harvard Business Review*, 97(1/2), 10-17.
- Russell, S. J., & Norvig, P. (2010). *Artificial intelligence: A modern approach*. Prentice Hall.
- Weygandt, J. J., Kieso, D. E., & Warfield, T. D. (2018). *Intermediate accounting*. John Wiley & Sons.
- World Economic Forum (2020). The future of jobs report 2020. Retrieved on 31/08/2024



UTILIZING AI TOOLS TO PROMOTE ACTIVE LEARNING: AN INVESTIGATION INTO THE ADOPTION BY PRE-SERVICE TEACHERS

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Abstract

The integration of AI tools in education offers innovative ways to enhance teaching and learning experiences. This study explored pre-service teachers' adoption of AI tools for active learning. The study examined the perceived usefulness and ease of use of AI tools. The study utilized descriptive research of the survey type. A total 425 pre-service teachers responded to instrument from the University of Lagos. Stratified random sampling was used to select based on gender and departments. Data was collected using Google form and the collected were analysed using descriptive statistics. The study revealed that AI enhanced student engagement, improved formative assessments, and increased personalized learning experiences. However, concerns emerged around data privacy, ethical implications, and AI potentially perpetuating biases. The study concluded that pre-service teachers' AI tool adoption is for fostering active learning environments and improve learning outcome. The study recommended that pre-service teacher's adoption of AI should be moderated and monitored for proper usage.

Keywords: AI tools, Active learning, Pre-service teachers, Student engagement and Higher-order thinking skills

Introduction

The integration of artificial intelligence (AI) tools in education has emerged as a transformative approach to enhance teaching and learning experiences, offering new avenues for knowledge transmission (Zawacki-Richter et al., 2019; Adamu & Achuen, 2022). These innovative tools possess the potential to revolutionize the way active learning strategies are facilitated, fostering increased student engagement and development of higher-order thinking skills (Popenici & Kerr, 2017; Ogunlade & Biobaku, 2021). While the principles of active learning pedagogy are well-established, the advent of AI technology presents an opportunity to amplify its impact in unprecedented ways, particularly in the realm of teacher training programs (Luckin et al., 2016; Oye et al., 2012).

Active learning is a student-centered approach that actively engages students in the learning process through activities, discussions, and hands-on experiences, rather than passive reception of information (Prince, 2004; Freeman et al., 2014). In the study "Leveraging AI Tools to Foster Active Learning: A Study of Pre-Service Teachers' Adoption and Outcomes," active learning strategies are central to the research focus.

Knowledge transmission in educational settings has relied heavily on conventional methods, such as lectures, textbooks, and static instructional materials. However, these approaches often struggle to fully engage learners and facilitate the deep understanding and application of concepts (Tight, 2020). AI tools offer a powerful solution by providing personalized, adaptive, and interactive learning experiences tailored to individual student needs and learning styles, enhancing the transmission of knowledge through dynamic and immersive means (Timms, 2016). Traditionally, knowledge transmission in educational settings has relied heavily on conventional methods, such as lectures, textbooks, and static instructional materials. However,



these approaches often struggle to fully engage learners and facilitate the deep understanding and application of concepts in the Nigerian context (Tight, 2020; Okebukola, 2008). AI tools offer a powerful solution by providing personalized, adaptive, and interactive learning experiences tailored to individual student needs and learning styles, enhancing the transmission of knowledge through dynamic and immersive means (Timms, 2016; Jegede & Hameed, 2020).

Moreover, the integration of AI in teacher education programs holds immense promise for preparing future educators to effectively harness these cutting-edge tools and create dynamic, student-centered learning environments in Nigeria. By equipping pre-service teachers with the knowledge and skills to leverage AI for active learning, they can better engage students, enhance formative assessments, and foster personalized learning journeys, ultimately optimizing the transmission of knowledge and skills (Scherer et al., 2019; Adubu & Yusuf, 2021). However, as with any disruptive technology, the adoption and implementation of AI tools in education are not without challenges in the Nigerian context. Concerns surrounding data privacy, ethical implications, and the potential perpetuation of biases through AI algorithms must be carefully addressed (Zawacki-Richter et al., 2019; Popenici & Kerr, 2017; Omoregbe & Azeta, 2019). Additionally, factors such as perceived ease of use, usefulness, and technological self-efficacy may influence pre-service teachers' willingness to embrace and integrate AI tools into their teaching practices, impacting the effective transmission of knowledge (Venkatesh et al., 2003; Bandura, 1997; Adeosun & Olaopa, 2021).

The integration of AI in teacher education programs holds immense promise for preparing future educators to effectively harness these cutting-edge tools and create dynamic, student-centered learning environments. By equipping pre-service teachers with the knowledge and skills to leverage AI for active learning, they can better engage students, enhance formative assessments, and foster personalized learning journeys, ultimately optimizing the transmission of knowledge and skills (Scherer et al., 2019). However, as with any disruptive technology, the adoption and implementation of AI tools in education are not without challenges. Concerns surrounding data privacy, ethical implications, and the potential perpetuation of biases through AI algorithms must be carefully addressed (Zawacki-Richter et al., 2019; Popenici & Kerr, 2017). Additionally, factors such as perceived ease of use, usefulness, and technological self-efficacy may influence pre-service teachers' willingness to embrace and integrate AI tools into their teaching practices, impacting the effective transmission of knowledge (Venkatesh et al., 2003; Bandura, 1997).

As AI continues to permeate the educational landscape, it is crucial to understand its role in amplifying active learning strategies and facilitating effective knowledge transmission, as well as to explore the factors that impact its adoption by pre-service teachers. By investigating these aspects, teacher education programs, policymakers, and technology developers can make informed decisions and develop strategies to cultivate more engaging and student-centered learning experiences, ultimately preparing future educators to effectively leverage the potential of AI for enhancing teaching and learning outcomes and optimizing the transmission of knowledge in the digital age (Tuomi, 2018; Zawacki-Richter et al., 2019).

Statement of the Problem

Despite the growing interest in AI tools for education, there is a lack of empirical evidence on the factors influencing pre-service teachers' adoption and perceived impact of these tools for facilitating active learning strategies. Understanding the motivations, benefits, and challenges associated with AI tool integration in lesson planning and instruction are crucial for effective implementation and cultivation of engaging and student-centered learning experiences.



The purpose of this study was to examine pre-service teachers' perception of the adoption of AI tools in facilitating active learning. Specifically, the study examined perception of pre-service teachers on the ease of use of AI tools for active learning *and* perception of pre-service teachers on the usefulness of AI tools for active learning

Research Questions

1. What is the perception of pre-service teachers on the ease of use of AI tools for active learning?
2. What is the perception of pre-service teachers on the usefulness of AI tools for active learning?

Method

The study is a descriptive study of the cross-sectional type. The descriptive survey research enables a researcher to collect information about study. This is considered appropriate for this study because it give the researcher the opportunity to ascertain the outcome of the study. This research was conducted in University of Lagos. Lagos state has 21 Local Government Areas. Each education district has minimum of three local governments. The population of the study was all pre-service teachers in the University of Lagos. Structured research designed questionnaire was used for data collection in this study. The questionnaire comprises of two sections. Section A is made up of information on personal data of the respondent e.g gender while section B obtain the opinion of the respondent on the perceived usefulness and perceived ease of use. The pointing rating scale of Strongly Agree (SA) - 4, Agree (A) -3, Strongly Disagree (SD) -2, Disagree (D) -1, will be used for the study. The instrument was given to the experts in the Department of Technology and Vocational Education for face and content validation. The corrections were effected and tested for reliability. The instrument was administered to 20 preservice teachers in at Lagos State University of Education (LASUED) who were not part of the study. The reliability test was analyzed using Cronbach Alpha to determine reliability co-efficient of the instrument and the co-efficient value was 0.87 index. The questionnaire was administered to all pre-service teachers in university of Lagos, Faculty of Education after which the completed copies of the instrument which was administered via google form were collected by the researcher for data analysis. The data collected for the study was subjected to both the descriptive statistical analyses. Percentage was used to describe the demographic characteristics of the respondents. The research questions were answered using mean.

Results

The result of the study is presented below:

Research Question 1: What is the perception of preservice teachers on the ease of use of AI tools for active learning?



Table 3: Perception of preservice teachers on the ease of use of AI tools for active learning

	Perception of preservice teachers on the ease of use of AI tools for active learning	Mean	SD	Remark
1	Pre-service teachers find AI tools user-friendly for creating interactive learning experiences	3.31	0.92	Agree
2	Many believe AI enhances their ability to design engaging activities for students	3.26	0.89	Agree
3	Some express concerns about the learning curve associated with AI tools	2.31	0.38	Disagree
4	Pre-service teachers see AI as useful for personalizing instruction and assessment	2.69	0.67	Agree
5	Technological self-efficacy varies widely among pre-service teachers regarding AI use	2.63	0.64	Agree
6	Many feel AI tools increase their productivity in lesson planning and resource creation	2.34	0.39	Disagree
7	Some worry about overreliance on AI affecting their teaching skills development	3.04	0.79	Agree
8	Pre-service teachers appreciate AI's potential for creating diverse learning materials quickly	3.21	0.99	Agree
9	Many express a need for more training to effectively integrate AI tools	3.23	0.92	Agree
10	Some view AI as a valuable supplement to, not replacement for, traditional teaching methods	3.24	1.03	Agree

The data in Table 3 reveals a mixed perception among pre-service teachers regarding the ease of use of AI tools for active learning. The highest mean score of 3.31 (SD = 0.92) indicates that pre-service teachers generally find AI tools user-friendly for creating interactive learning experiences. This is closely followed by the belief that AI enhances their ability to design engaging activities for students (M = 3.26, SD = 0.89). Pre-service teachers also appreciate AI's potential for creating diverse learning materials quickly (M = 3.21, SD = 0.99) and view AI as a valuable supplement to traditional teaching methods (M = 3.24, SD = 1.03). However, there's a notable concern about the potential overreliance on AI affecting their teaching skills development (M = 3.04, SD = 0.79).

Interestingly, the data shows lower mean scores for some aspects of AI use. Pre-service teachers express moderate concerns about the learning curve associated with AI tools (M = 2.31, SD = 0.38), suggesting that while they find AI user-friendly, they still perceive challenges in mastering these tools. The perception of AI's usefulness for personalizing instruction and assessment is also moderate (M = 2.69, SD = 0.67), as is the technological self-efficacy regarding AI use (M =



2.63, SD = 0.64). Notably, the feeling that AI tools increase productivity in lesson planning and resource creation has a relatively low mean score ($M = 2.34$, $SD = 0.39$), indicating that pre-service teachers may not fully perceive the efficiency benefits of AI in these areas yet. This aligns with the high mean score ($M = 3.23$, $SD = 0.92$) for expressing a need for more training to effectively integrate AI tools, suggesting that while pre-service teachers see the potential of AI, they feel they need more support to fully leverage these tools in their teaching practice.

Research Question 2: What is the perception of pre-service teachers on the usefulness of AI tools for active learning?

Table 4: Perception of pre-service teachers on the usefulness of AI tools for active learning

	Perception of pre-service teachers on the usefulness of AI tools for active learning	Mean	SD	Remark
1	Pre-service teachers show mixed feelings about AI tools in active learning environments	3.21	0.99	Agree
2	Many see AI as potentially enhancing student engagement and personalized learning experiences	3.23	0.92	Agree
3	Some express concerns about AI replacing traditional teaching methods and human interaction	3.24	1.03	Agree
4	Pre-service teachers often lack training in effectively integrating AI for active learning	3.28	0.97	Agree
5	Adoption rates vary based on individual comfort levels with technology and AI	3.20	0.94	Agree
6	Some view AI tools as time-savers for administrative tasks, freeing time for active learning	2.31	0.38	Disagree
7	Concerns about data privacy and ethical use of AI in education persist	2.69	0.67	Agree
8	Pre-service teachers recognize AI's potential for creating interactive and adaptive learning experiences	2.63	0.64	Agree
9	Many desire more guidance on selecting appropriate AI tools for specific learning objectives	2.34	0.39	Disagree
10	Some worry about over-reliance on AI, potentially hindering critical thinking skills development	2.98	0.78	Agree

Table 4 reveals a nuanced perspective among pre-service teachers regarding the usefulness of AI tools for active learning. The highest mean score of 3.28 ($SD = 0.97$) indicates that pre-service teachers often lack training in effectively integrating AI for active learning, suggesting a significant need for professional development in this area. Despite this, there's a generally positive outlook on AI's potential, with high mean scores for AI enhancing student engagement and personalized learning experiences ($M = 3.23$, $SD = 0.92$) and AI's potential for creating interactive and adaptive learning experiences ($M = 2.63$, $SD = 0.64$). However, this optimism is tempered by concerns about AI replacing traditional teaching methods and human interaction ($M = 3.24$, $SD = 1.03$), reflecting a tension between embracing new technology and preserving valued aspects of traditional education.



The data also highlights several areas of concern and variation in perceptions. Pre-service teachers show mixed feelings about AI tools in active learning environments ($M = 3.21$, $SD = 0.99$), and adoption rates vary based on individual comfort levels with technology and AI ($M = 3.20$, $SD = 0.94$). There are persistent concerns about data privacy and ethical use of AI in education ($M = 2.69$, $SD = 0.67$), suggesting a need for clear guidelines and policies in this area. Interestingly, the perception of AI tools as time-savers for administrative tasks has a relatively low mean score ($M = 2.31$, $SD = 0.38$), indicating that pre-service teachers may not fully recognize or experience this potential benefit. There's also a notable desire for more guidance on selecting appropriate AI tools for specific learning objectives ($M = 2.34$, $SD = 0.39$), which aligns with the earlier indication of a lack of training. Lastly, there's a moderate concern about over-reliance on AI potentially hindering critical thinking skills development ($M = 2.98$, $SD = 0.78$), highlighting the need for a balanced approach to AI integration in education.

Discussion of Findings

Perception of pre-service teachers on the ease of use of AI tools for active learning

The findings reveal a complex picture of pre-service teachers' perceptions regarding the ease of use of AI tools for active learning. On one hand, there's a generally positive outlook, with pre-service teachers finding AI tools user-friendly for creating interactive learning experiences ($M = 3.31$, $SD = 0.92$) and believing that AI enhances their ability to design engaging activities ($M = 3.26$, $SD = 0.89$). This suggests that pre-service teachers see potential in AI tools and are open to their integration in education.

However, this positive perception is tempered by several concerns. There's a notable worry about overreliance on AI affecting teaching skills development ($M = 3.04$, $SD = 0.79$), indicating that pre-service teachers are cautious about becoming too dependent on these tools. Additionally, the relatively low mean scores for AI's usefulness in personalizing instruction ($M = 2.69$, $SD = 0.67$) and increasing productivity in lesson planning ($M = 2.34$, $SD = 0.39$) suggest that pre-service teachers may not fully recognize or experience these potential benefits of AI tools.

Importantly, there's a strong indication that pre-service teachers feel they need more training to effectively integrate AI tools ($M = 3.23$, $SD = 0.92$). This finding highlights a gap between the perceived potential of AI and the current ability of pre-service teachers to fully leverage these tools in their practice.

Perception of pre-service teachers on the usefulness of AI tools for active learning

The findings regarding the usefulness of AI tools for active learning reveal both enthusiasm and caution among pre-service teachers. There's recognition of AI's potential to enhance student engagement and create personalized learning experiences ($M = 3.23$, $SD = 0.92$), suggesting that pre-service teachers see value in these tools for improving educational outcomes.

However, this positive outlook is balanced by significant concerns. The highest mean score in this section ($M = 3.28$, $SD = 0.97$) indicates that pre-service teachers often lack training in effectively integrating AI for active learning. This aligns with the findings from the first research question and underscores the need for more comprehensive professional development in this area.

There are also worries about AI replacing traditional teaching methods and human interaction ($M = 3.24$, $SD = 1.03$), as well as concerns about data privacy and ethical use of AI in education ($M = 2.69$, $SD = 0.67$). These findings suggest that while pre-service teachers see the potential of AI, they are also aware of its possible drawbacks and ethical implications.

Interestingly, the perception of AI tools as time-savers for administrative tasks has a low mean score ($M = 2.31$, $SD = 0.38$), indicating that pre-service teachers may not fully recognize this potential benefit. This could be due to lack of exposure or training in using AI for such purposes.



Conclusion

Taken together, these findings paint a picture of pre-service teachers who are cautiously optimistic about the use of AI tools in education. They recognize the potential benefits in terms of creating interactive learning experiences and enhancing student engagement. However, they also have significant concerns about the impact on their own teaching skills, the ethical implications of AI use, and the potential for over-reliance on technology.

A key theme that emerges across both research questions is the need for more training and support. Pre-service teachers consistently express a desire for more guidance on how to effectively integrate AI tools into their teaching practice. This suggests that teacher education programs may need to place greater emphasis on preparing future educators to work with AI technologies.

The findings also highlight the importance of addressing ethical concerns and ensuring that the integration of AI in education is done in a way that complements, rather than replaces, human interaction and critical thinking. As AI tools become more prevalent in educational settings, it will be crucial to develop guidelines and best practices that address these concerns.

In conclusion, while pre-service teachers see potential in AI tools for active learning, there is a clear need for more comprehensive training, clearer guidelines on ethical use, and strategies to ensure that AI enhances rather than diminishes the role of educators. Future research could focus on developing and evaluating training programs for pre-service teachers in AI integration, as well as exploring ways to address the ethical and practical concerns raised in this study.

Recommendations

1. Integrate structured, hands-on training on AI tools into teacher education curricula to enhance perceived ease of use. By providing pre-service teachers with opportunities to explore and practice using AI tools in a low-risk environment, their confidence and competence with these technologies will improve. Simulations, guided tutorials, and peer-supported learning should be used to demystify complex AI tools and promote intuitive interaction.
2. Demonstrate the practical benefits of AI tools in promoting active learning by embedding them into lesson planning, instructional delivery, and student engagement activities. Encourage pre-service teachers to engage in reflective practice and action research to evaluate how AI enhances learner participation, feedback, and personalized learning. Provide case studies and real-world examples showing measurable improvements in learning outcomes due to AI integration.

References

- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W.H. Freeman.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Thousand Oaks, CA: Sage.
- Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). Thousand Oaks, CA: Sage.
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence Unleashed: An argument for AI in Education*. Retrieved from <https://www.pearson.com/content/dam/corporate/global/pearson-dot-com/files/innovation/Intelligence-Unleashed-Publication.pdf>



- Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning*, 12(1), 22.
- Scherer, R., Tondeur, J., Siddiq, F., & Baran, E. (2019). The importance of attitudes toward technology for pre-service teachers' technological, pedagogical, and content knowledge: Comparing structural equation modeling approaches. *Computers in Human Behavior*, 94, 22-33.
- Tuomi, I. (2018). The impact of artificial intelligence on learning, teaching, and education. Retrieved from <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/impact-artificial-intelligence-learning-teaching-and-education>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators?. *International Journal of Educational Technology in Higher Education*, 16(1), 39.



IMPACT OF ARTIFICIAL INTELLIGENCE ON INSTRUCTIONAL PREPARATION, DELIVERY AND EVALUATION IN NIGERIA HIGHER EDUCATIONAL INSTITUTION

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Abstract

The study investigated impact of artificial intelligence (AI) on instructional preparation, delivery, and evaluation in Nigerian higher educational institution adopting descriptive survey research design. Population comprised 81 Business educators from Federal and State Universities offering Business Education in South-west Nigeria. No sampling since the total population is manageable. A30-item questionnaire tagged "Impact of AI on instructional preparation, delivery and instruction in Business Education (IAIIPDIIBE)" validated by three experts was used. Reliability of instrument was determined by test-retest method using Pearson Product Moment Correlation Co-efficient which yielded 0.82. Responses were weighted on Strongly Agreed (SA)/Very Great Extent (VGE) - 4 points, Agreed (A)/Great Extent (GE) - 3 points, Disagreed (D)/Low Extent (LE) - 2 points and Strongly Disagreed (SD)/Very Low Extent (VLE) - 1 point. Data collected were analysed using descriptive statistics of mean and standard deviation. Decision rule was 2.50. Findings highlight AI's potential to improve educational efficiency, address scalability challenges while considering ethical implications of its integration in education; use of AI in assessment has increase the accuracy of evaluation, provide timely and constructive feedback to students, helps in identifying patterns and trends in students' performance. However, the continued importance of human mentorship and face-to-face interactions in developing business leaders was emphasised. The study recommends among others that AI literacy be integrated into business curricula to prepare students for an AI-driven business world, Business educators to avail themselves for training on AI, and sufficient resources be provided by the institutions for effective use of AI teaching and learning processes.

Keywords: Artificial Intelligence, Instructional Preparation, Delivery, Evaluation.

Introduction

Artificial intelligence (AI) is increasingly transforming various sectors, and education is no exception. Artificial Intelligence (AI) refers to the field of computer science dedicated to creating systems capable of performing tasks that typically require human intelligence. These tasks include learning from experience, reasoning, problem-solving, understanding natural language, and perception. AI systems can range from simple rule-based algorithms to complex machine learning models (Russell & Norvig, 2023; Goodfellow, Bengio, & Courville, 2023). In the opinion of Boucher(2020), AI are systems that display intelligent behaviour by analysing their environment and taking action with some degree of autonomy to achieve specific goals. That is, there are specific roles performed by human being that AI are now conveniently performing in this era.

Before the evolution of artificial intelligence, instructional preparation, delivery and evaluation had been a tedious task for lecturers in Nigeria higher educational institutions because



it has to be done manually. As AI technologies evolve, they offer innovative solutions for enhancing instructional practices. Recent advancements in AI have led to significant improvements in the preparation, delivery, and evaluation of instructional content (Huang & Hew, 2022). Corroborating this view, Kira and Weitz (2023) said AI-driven tools are now capable of personalizing learning experiences, automating routine tasks, and providing real-time feedback, thereby reshaping traditional educational methodologies.

Instructional preparation in education involves designing and organizing educational materials, activities, and strategies to effectively teach students. This includes creating lesson plans, selecting resources, and developing assessment tools. It aims at ensuring that teaching is coherent, engaging, and aligned with learning objectives (Marzano & Kendall, 2022). Instructional design as defined by Morrison, Ross and Kemp (2022), is the systematic process of planning, developing, and delivering educational experiences that help learners achieve specific learning outcomes. It emphasizes the importance of aligning content, activities, and assessments with instructional goals. Wiggins and McTighe (2023); Schmidt and Prawat (2023) define lesson planning as the process of creating and organizing a coherent course of study that aligns with educational standards and goals. To Guskey (2023), instructional planning is the process of structuring and organizing instructional activities, including formative assessments, to monitor student progress and adjust teaching strategies accordingly.

In instructional preparation, AI assists in designing curricula and generating educational materials tailored to individual student needs. This adaptability addresses diverse learning styles and speeds, enhancing overall educational effectiveness (Zhang, Zhao & Zhang, 2023). During instruction delivery, AI technologies such as intelligent tutoring systems (ITS) and adaptive learning platforms offer interactive and engaging learning experiences, enabling personalized support and immediate feedback (Chen, 2024). Furthermore, AI plays a crucial role in evaluating instructional effectiveness through automated grading systems and comprehensive learning analytics, which provide valuable insights into student performance and learning outcomes (Smith & Johnson, 2023).

Instructional delivery simply means presentation of instruction to the students. Hattie and Yates (2023) defined instruction delivery as the methods and strategies used by educators to present content, facilitate learning, and engage students in the educational process. It encompasses a variety of teaching practices and techniques aimed at ensuring that students understand and apply the material effectively. This includes direct instruction, interactive methods, multimedia use, and differentiated instruction. Moreover, in the words of Miller and Veatch (2023), Schmidt and Moust (2023), instructional delivery are the methods and techniques used by educators to present content to students, facilitate learning, and engage students in the educational process. It encompasses various teaching strategies, the use of instructional materials, and the management of the learning environment to achieve educational goals effectively. Okiridu and Godpower (2021) see instructional delivery as the various methods a teacher or trainer adopts in explaining lessons to a student for better understanding. In the light of the foregoing, adoption of artificial intelligence would ease teacher's presentation of instruction and enhance the student's better understanding of instruction which would eventually improve upon their academic performance.

Evaluation in education involves assessing the effectiveness, quality, and impact of educational programmes, teaching practices, and student learning. It encompasses various methods and approaches to measure educational outcomes, inform instructional decisions, and improve educational practices (Stiggins, 2023); Black & Wiliam, 2023). Assessing students, especially in large classes is a very tedious assignment using manual method. Adoption of AI



will however, simplify evaluation of students on the part of the teacher and enable the student to get prompt feedback from their teachers. It is against this backdrop that this paper aims at exploring these dimensions of AI in education, examining how these technologies influence instructional practices and addressing both the opportunities and challenges they present. By analyzing current AI applications and their impact on education, this study seeks to contribute to a deeper understanding of AI's potential at revolutionising educational paradigms.

Statement of the Problem

The integration of artificial intelligence (AI) into educational practices has the potential to transform instructional preparation, delivery, and evaluation in Nigerian higher educational institutions. However, there is a significant gap in understanding how AI is currently being utilized and its impact on these critical areas of education. Challenges such as limited technological infrastructure, lack of trained personnel, and resistance to change hinders effective implementation. Moreover, the disparity in access to AI tools across institutions raises concerns about equity in educational opportunities. This study seeks to explore these challenges while assessing the actual impact of AI on enhancing teaching and learning processes in Nigeria's diverse educational landscape.

Research Questions

1. What is the impact of AI integration on instructional preparation in Nigerian higher educational institutions?
2. To what extent have AI tools effectively enhanced the delivery of instructional content, and what is their impact on student engagement and learning outcomes?
3. In what ways does AI contribute to the evaluation processes of student performance and feedback mechanisms in higher education?

Methods

The study adopted descriptive survey research design. The population comprised 81 Business educators from seven Federal and State Universities offering Business Education in South-west Nigeria which include Adeyemi Federal University of Education, Ondo, Bamidele Olumilua University, Ikere-Ekiti; Ekiti State University, Ado-Ekiti; Emmanuel Alayande University, Oyo State; Olabisi Onabanjo University, Ogun State; Osun State University, Ilesa and Lagos State University of Education, Epe. Three research questions guided the study. A 30-item structured questionnaire tagged "Impact of AI on instructional preparation, delivery and instruction in Business Education (IAIPDIBE)" generated from the research questions was the instrument for data collection. Four-point rating scale was adopted. The responses were weighted on the following: Strongly Agreed (SA)/Very Great Extent (VGE) - 4 points, Agreed (A)/Great Extent (GE) - 3 points, Disagreed (D)/Low Extent (LE) - 2 points and Strongly Disagreed (SD)/Very Low Extent (VLE) - 1 point. The instrument was validated by three experts. A test-retest method was used to determine the reliability of the instrument using Pearson Product Moment Correlation Co-efficient which yielded 0.77.

A total of 81 respondents were reached via AI (Google form)/hard copies of the questionnaire out of which 75 responses were harvested representing 92.6% return. The data collected to answer the research questions were analysed using mean scores and standard deviation. The research questions were adjudged on the following basis: 3.50-4.00 Strongly Agreed (SA)/Very Great Extent (VGE), 2.50-3.49 Agreed (A)/Great Extent (GE), 1.50-2.49 Disagreed (D)/Low Extent (LE) and less than or equal to 1.00-1.49 Strongly Disagreed (SD)/Very Low Extent (VLE). The decision rule was that any item with a mean score of 2.50 and above was



accepted as Agreed (A)/Great Extent (GE) while any item with mean score below 2.50 was regarded as Disagreed (D)/Low Extent (LE) respectively.

Results

Research Question 1:What is the impact of AI integration on instructional preparation in Nigerian higher educational institutions?

Table 1: Respondents' ratings on the impact of AI integration on instructional preparation in Nigerian higher educational institutions.

S/N	Items	Mean	SD	Decision
AI in Instruction Preparation				
1	AI tools have made the process of creating instructional materials more efficient.	3.35	0.75	Agreed
2	I rely on AI for generating course content and educational resources.	2.84	0.74	Agreed
3	AI-driven content generators provide high-quality material for my courses.	2.73	0.93	Agreed
4	The integration of AI in instructional preparation has reduced my workload.	3.27	0.78	Agreed
5	I have faced challenges in using AI tools due to technical issues.	2.35	0.81	Agreed
6	Training on AI tools for instruction preparation is readily available.	2.60	0.93	Agreed
7	AI tools help in creating personalized learning materials for diverse student needs.	3.24	0.62	Agreed
8	I feel confident in using AI tools for instructional design.	3.19	0.75	Agreed
9	AI has enhanced my ability to update and revise instructional materials quickly.	3.31	0.65	Agreed
10	There is a lack of support from my institution for integrating AI in instruction preparation.	2.67	0.80	Agreed
Weighted Mean/Standard Deviation		2.95	0.83	Agreed

Source: Field Survey, 2024.

The results in Table 1 above revealed that all the mean scores are above the cutoff point (2.50), with the mean score ranging from 2.35 to 3.35. This is an indication that the responses are positive, meaning that the business educators have found AI tools impactful in instructional preparation with the weighted mean score of 2.95.

Research Question 2: To what extent have AI tools effectively enhanced the delivery of instructional content, and what is their impact on student engagement and learning outcomes?



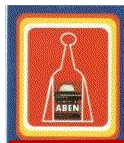
Table 2: Respondents' ratings on the extent of AI tools' effectiveness in the delivery of instructional content and their impact on students' engagement and learning outcomes.

S/N	Items	Mean	SD	Decision
AI in Instruction Delivery				
11	AI-based tools enhance the delivery of lectures and classes.	2.99	0.78	Great Extent
12	I use AI-driven virtual assistants during my teaching sessions.	2.00	0.89	Low Extent
13	AI tools help in managing classroom activities more effectively.	2.17	1.01	Low Extent
14	Students interact more actively with AI-enhanced learning environments.	2.89	0.83	Great Extent
15	AI tools provide real-time feedback to students during lectures.	2.68	1.06	Great Extent
16	The use of AI in instruction delivery has improved student engagement.	2.96	0.91	Great Extent
17	AI systems support diverse learning styles and needs in the classroom.	3.12	0.71	Great Extent
18	I am satisfied with the AI tools available for instruction delivery.	2.60	0.68	Great Extent
19	There are technical issues that hinder the effective use of AI during instruction delivery.	2.80	0.92	Great Extent
20	AI tools have made lectures more interactive and engaging.	3.05	0.66	Great Extent
21	AI tools assist in the grading and evaluation of student work.	2.76	0.79	Great Extent
Weighted Mean/Standard Deviation		2.71	0.92	Great Extent

Source: Field Survey, 2024.

Results in Table 2 above showed that nine of the mean scores are above the cutoff point (2.50), with the mean scores ranging from 2.60 to 3.05, while two of the mean scores are below the cutoff point with the mean scores ranging from 2.00 to 2.17. This is an indication that 81.82% responses are positive, meaning that many business educators have found AI tools enhancing the delivery of lectures and classes to a great extent with the weighted mean score of 2.71, while 8.18% responses are at variance. It could be deduced from the results that some business educators are yet to integrate AI tools totally in instruction delivery.

Research Question 3: In what ways does AI contribute to the evaluation processes of student performance and feedback mechanisms in higher education?

**Table 3:** Respondents' ratings on the contribution of AI integration on evaluation processes of student performance and feedback mechanisms in higher education.

S/N	Items	Mean	SD	Decision
AI in Instruction Evaluation				
22	The use of AI for student assessment has increased the accuracy of evaluations.	2.84	0.91	Agreed
23	AI-driven feedback tools provide timely and constructive feedback to students.	2.93	1.00	Agreed
24	AI tools help in identifying patterns and trends in student performance.	2.73	0.91	Agreed
25	There are concerns about the fairness of AI-based evaluations.	2.80	0.71	Agreed
26	I trust the results of AI-generated assessments and evaluations.	2.88	0.69	Agreed
27	AI tools have reduced the time required for evaluating student performance.	3.03	0.73	Agreed
28	The integration of AI in evaluations aligns with ethical standards.	3.00	0.76	Agreed
29	Students receive adequate support and clarification on AI-driven evaluations.	2.99	0.69	Agreed
30	My institution provides sufficient resources for effective use of AI in evaluations.	1.97	0.89	Disagreed
Weighted Mean/Standard Deviation		2.78	0.90	Agreed

Source: Field Survey, 2024.

The results in Table 3 above revealed that all the mean scores are above the cutoff point (2.50), with the mean score ranging from 2.73 to 3.03 except one with a means score of 1.97. This is an indication that the responses are positive, meaning that the business educators attested positively to the contribution of AI integration on evaluation processes of student performance and feedback mechanisms in higher education with the weighted mean score of 2.78.

Discussion of Findings

The results in Table 1 above revealed that Business Educators have found AI tools impactful in instructional preparation by making the process of creating instructional materials more efficient. This is in tandem with the opinion of Zhang, Zhao and Zhang (2023) that AI assists in designing curricula and generating educational materials tailored to individual student needs. This adaptability addresses diverse learning styles and speeds, enhancing overall educational effectiveness. Corroborating this, Wiggins and McTighe (2023) attest that integrating AI into instruction preparation emphasizes the importance of aligning content, activities, and assessments with instructional goals. AI equally assists in creating and organizing a coherent course of study that aligns with educational standards and goals (Schmidt & Prawat, 2023). In essence, integrating AI into instruction preparation will widen the horizon of Business Educators in preparing an all-embracing/encompassing instruction aligning with ethical standard.

Results in Table 2 above showed that many Business Educators have found AI tools enhancing the delivery of lectures in classes to a great extent. This is supported by findings of various researchers such as Li and Zhang (2023) who found that business students using intelligent tutoring systems showed an average improvement of 0.4 standard deviations in performance compared to traditional instruction methods. AI-enhanced virtual and augmented reality simulations technologies are creating immersive learning experiences for business students. These simulations allow students to practice decision-making in realistic business scenarios. In line with the above, Patel et al. (2024) reported that students who participated in AI-driven VR business simulations demonstrated a 30% improvement in applying theoretical



concepts to practical situations compared to those who used traditional case study methods. In addition, AI-powered chatbots and virtual assistants are being deployed to provide all round support to business students, answering questions about course content, deadlines, and administrative issues. Thompson (2023) also found that 78% of students reported increased satisfaction with their learning experience when they had access to AI assistants. However, the result showed that some business educators are yet to integrate AI tools totally in instruction delivery. There is the need for everyone to move with the tide in order to be on the same page globally. However, Rodriguez et al. (2023) emphasised the continued importance of human mentorship and face-to-face interactions in developing business leaders.

The results in Table 3 above revealed that the use of AI in student assessment has increase the accuracy of evaluation, provide timely and constructive feedback to students, help in identifying patterns and trends in students' performance. This is in line with the assertions of Stiggins (2023) and Black & Wiliam (2023) that adopting AI in evaluation will enhance assessment of the effectiveness, quality, and impact of educational programmes, teaching practices, and student learning. This is also supported by Ademiluyi and Olupayimo (2022) that assessing students especially in large classes for skilled-based courses is a very tedious assignment using manual method hence, the need for integration of AI. This is supported by the findings of a study by Nguyen et al. (2024) that AI grading systems achieved a 92% agreement rate with human graders for business case analyses, while providing feedback 75% faster. Moreover, the result revealed that adoption of AI will simplify evaluation of students on the part of the teacher and enables the student to get prompt feedback from their teachers.

Conclusion

Based on the research findings, it was concluded that integrating artificial intelligence has the potential to significantly enhance business education, but its successful integration requires careful planning, ongoing evaluation, and a balanced approach that preserves the essential human elements of teaching and learning. As AI continues to evolve so also the approach of Business educators to leveraging on its potentials for instructional preparation, delivery and evaluation in Universities offering Business education in the South-western Nigeria.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Business educators to avail themselves for training on artificial intelligence tools to enhance its integration into instruction preparation and also maintain opportunities for face-to face interaction and mentorship to develop crucial soft skills.
2. Incorporate AI literacy into business curricula to prepare students for an AI-driven business world; continuously assess the impact of AI integration on learning outcomes and student satisfaction, making adjustments as necessary.
3. Sufficient resources be provided by the institutions for effective use of AI in evaluations and partner with businesses to ensure that AI implementation in education aligns with industry needs and practices.

References

- Ademiluyi, L. F. & Olupayimo, E. O. (2022). Application of demonstration strategy and computer aided instruction on students' acquisition of keyboarding skills: A review of its effects. *Journal of Education and Practice (JEP)*, 6(4), 12-29.
- Black, P., & Wiliam, D. (2023). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan*, 105(6), 15-21. <https://doi.org/10.1177/00317217231122527>.



- Boucher, P. (2020). Artificial intelligence: How does it work, why does it matter, and what can we do about it? *European Parliamentary Research Service*, <http://www.europarl.europa.eu/stoa> (STOA website)
- Chen, L. (2024). Adaptive learning and intelligent tutoring systems: A review of recent advancements. *Journal of Educational Technology*, 15(1), 45-60.
- Goodfellow, I., Bengio, Y., & Courville, A. (2023). *Deep learning* (2nd ed.). MIT Press.
- Guskey, T. R. (2023). *The case for formative assessment*. Association for Supervision and Curriculum Development (ASCD).
- Hattie, J., & Yates, G. C. R. (2023). *Visible learning: Feedback*. Routledge.
- Huang, R., & Hew, K. F. (2022). The impact of artificial intelligence on education: A review of the literature. *Educational Technology Research and Development*, 70(2), 215-236.
- Kira, D., & Weitz, D. (2023). Personalized learning through AI: Innovations and implications. *International Journal of Educational Technology*, 12(3), 102-118.
- Li, X. & Zhang, Y. (2023). The effectiveness of AI-powered tutoring systems in business education: A meta-analysis. *Educational Technology Research and Development*, 71(4), 1025-1048.
- Marzano, R. J., & Kendall, J. S. (2022). *The new taxonomy of educational objectives*. Corwin.
- Miller, D., & Veatch, N. (2023). Effective instructional delivery: Strategies and best practices. *Teaching and Teacher Education*, 109, 103598. <https://doi.org/10.1016/j.tate.2022.103598>.
- Morrison, G. R., Ross, S. M., & Kemp, J. E. (2022). *Designing effective instruction* (8th ed.). Wiley.
- Nguyen, T., Brown, A. & Lee, K. (2024). Comparative analysis of AI and human grading in business case evaluations. *Assessment & Evaluation in Higher Education*, 49(3), 412-428.
- Okiridu, O. S. F. & Godpower, Y. J. (2021). Teachers' workload and effective instructional delivery of Business Education courses in Rivers State Universities. *International Journal of Innovative Social & Science Education Research*, 9(1), 60-66.
- Patel, R., Singh, A. & Kumar, V. (2024). Enhancing decision-making skills through AI-driven VR simulations in business education. *Simulation & Gaming*, 55(2), 178-195.
- Rodriguez, M., Lee, S. & Chen, X. (2023). The human touch in AI-driven business education: A qualitative exploration. *Journal of Management Education*, 47(5), 678-695.
- Russell, S., & Norvig, P. (2023). *Artificial intelligence: A modern approach* (4th ed.). Pearson.
- Smith, R., & Johnson, T. (2023). Automated assessment and learning analytics: Transformations in educational evaluation. *Assessment & Evaluation in Higher Education*, 48(4), 325-339.
- Schmidt, W. H., & Prawat, R. S. (2023). *Curriculum development: Perspectives and practices*. Routledge.
- Schmidt, H. G., & Moust, J. H. C. (2023). Instructional delivery in higher education: Evidence-based approaches. *Journal of Educational Psychology*, 115(3), 456-470. <https://doi.org/10.1037/edu0000594>
- Stiggins, R. J. (2023). *Assessment Literacy for Educators in a Hurry*. Teachers College Press.
- Thompson, E. (2023). Student perceptions of AI assistants in business education: A survey study. *Technology, Knowledge and Learning*, 28(4), 1245.
- Wiggins, G., & McTighe, J. (2023). *Understanding by design* (3rd ed.). Association for Supervision and Curriculum Development (ASCD).
- Zhang, L., Zhao, Y., & Zhang, J. (2023). AI in curriculum design and instruction: Emerging trends and future directions. *Journal of Curriculum Studies*, 55(2), 167-183.



IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE (AI) AMONG SMALL AND MEDIUM ENTERPRISES (SMEs) IN ONDO CENTRAL, ONDO STATE

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Abstract

This study examines implementation of artificial intelligence (AI) in business among Small and Medium Enterprises (SMEs) in Ondo central. The purpose of the study was to examine challenges encountered by SMEs in implementing AI in business. Three research questions guided the study and no hypothesis were formulated. Descriptive survey research design was adopted for the study. The population of the study comprised of 150 managers and employees of small and medium enterprises in Ondo central. There was no sample since the population size was manageable. The instrument for data collection was a 23-items structured questionnaire titled: Implementation of AI among small and Medium Enterprises (SMEs) Questionnaire (IAISMESQ) and was validated by experts and was further subjected to internal consistency testing using Cronbach Alpha statistics which yielded a reliability coefficient of 0.74. The instrument was further administered to the respondents by the researchers. Mean and standard deviation were employed to analyze the data gathered. Findings revealed that AI offers significant value to small, local and service industries by enhancing efficiency, improving customer experience and creating new business opportunities. Challenges such as lack of data privacy, high cost and lack of expertise were revealed. Coping strategies such as using low cost or open source AI tools, outsourcing AI implementation to service providers were also revealed. It was concluded that AI is a powerful tool for small businesses to thrive in competitive markets. It was therefore recommended that there is need for small and medium enterprises (SMEs) managers to work toward effective implementation of artificial intelligence (AI) into their business operation in order to foster economic growth and development.

Keywords: Artificial Intelligence (AI), Challenges, Coping Strategies, implementation and Small and Medium enterprises (SMEs).

Introduction

Small and medium enterprises have contributed in very important ways to Nigeria's economic development. SMEs play a pivotal role in economic growth, industrial output, and employment creation in a country. It is believed that SMEs are the backbone of the industrial and economic growth of a nation and also make a significant contribution to employment creation. SMEs have transformed to succeed in the emerging digital world (Chan, Morgan, et al., 2018; Chan, Teoh, et al., 2018; Ulas, 2019). Indeed, digital technologies aided by Artificial Intelligence (AI) have transformed the nature and scope of entrepreneurial activity in SMEs (Hansen & Bøgh,



2021; Ulas, 2019). Many individuals come in contact with AI in their day to day lives, whether it is known or not. A large majority of AI developments have been driven traditionally by the private sector, especially larger companies such as Amazon, Google, IBM, and Facebook Artificial intelligence (AI) have emerged as a transformative force in the business world, offering significant opportunities for innovation, efficiency and competitive advantages.

Artificial intelligence refers to the stimulation of human intelligence by machines, especially computer systems. It involves creating a system that can perform tasks that typically require human intelligence such as learning, reasoning, problem solving, perception and natural language processing. An AI system is comprised of three key elements: sensors, operational logic and actuators. Raw data from the environment is collected by sensors. Data is then processed according to a given set of objectives that are encoded into an operational logic. An AI model constitutes an important part of the operational logic as it reflects the environment and describes its structure and/or its internal dynamics. An AI model can be built based on knowledge and data generated by humans, automated tools, or a combination of both. Model inference shapes the model outcomes in the form of prediction, recommendations or decisions.

Businesses have recently been using AI for chatbots to communicate with their customers. Chan et al. (2018) in their study stated that AI enhances the performance (efficiency) of SMEs by increasing their productivity. AI in SMEs helps to track user activities and consumer behaviour and provides recommendations, and media communication, boosts trade activities, improving organizational performance by reducing cost and time for business processes and automating them. Recent application of AI in SMEs includes QR code technology, which is used worldwide for inventory management, data recording, accounting, identifying consumer preferences, and predicting future demands of consumers through data analysis. A plethora of studies have described the ability of SMEs to transform by digitally integrating AI technologies due to their precise business operations (Lu et al., 2022; Drydakis, 2022; Polas et al., 2022). According to Hansen and Bøgh (2021), machine learning and data analytics methods are used to apply to Internet of Things (IoT) sensors, as IoT sensors have a great capacity to store massive data. SMEs are usually presented as less capable of adopting AI, a factor of lacking resources.

However, certain tasks such as scheduling meetings, responding to general queries of users, and marketing campaigns to enhance consumer purchasing decisions can be automated through AI software in SMEs (Fan et al., 2020). Thus, there is a high potential for SMEs to improve their business capabilities through the integration of AI. With these merits, AI becomes a motivation for businesses to operate intelligently, reducing labour costs and increasing accuracy. The most effective AI application of SMEs is in marketing, in which the systems embed machine learning algorithms for data training and analysis for targeting customers and constructing communication channels through behaviour analysis (Canhoto & Clear, 2020). It also automates the tracking of marketing expenditures minimizing the time spent on the manual tracking process of marketing campaigns (Drydakis, 2022).

Moreover, AI enhances sales, which is recognized as a revenue generator for a business. SMEs have induced AI tools in sales to identify the best strategies used by sales representatives compared with the rest. This application of AI software helps in training salespeople to communicate like affluent sellers enhancing their operational performance and productivity. Thus, AI marketing is direct marketing evolution based on data analytics with AI models. Moreover, the chatbots scale up customer engagement reducing the resources to interact with them, reflecting the efficient and successful application of AI in SMEs. Online chatbots drive customer engagement and retention by automatically communicating with them for their queries and reducing the waste of time consumers are waiting for an immediate response



(Hoikkala& Ojala, 2022). Determining purchasing patterns, consumer preferences, and responses to a certain product helps businesses to make better decisions to enhance product quality (Selamat &Windasari, 2021).

As far as a competitive advantage is concerned, it is difficult for businesses to manually track the daily amount of data produced by comparative businesses related to strategies (Conick, 2017). However, AI tools and software provide a broad scope to address the challenge by tracking business operations through social media sites, applications, and websites, including pricing strategies, PR activities, and technological initiatives. Collectively with natural language processing, the business metrics propose evolving trends in SMEs and competing markets. Moreover, business gaps, quality assurance, strengths, and weakness leads to businesses developing their strategy for enhanced production and performance. Irrespective of the growing opportunities, cyber security in SMEs serve as the major challenge that jeopardizes an organization's reputation. With the increasing AI proficiencies, cyber attackers also evolve with techniques to steal data. AI-based systems work on large data and process it according to business needs, which is a risk factor for security risk (Drydakís, 2022). AI systems merge with machine learning to integrate special security systems in software and applications. Machine learning algorithms enable the system to detect anomalous activity from any user, improving the security aspects and preventing cyber threats that large SMEs are facing (Chan et al., 2019).

Despite the promising benefits of AI, SMEs face several challenges to its effective implementation. Challenges such as lack of data culture, lack of awareness about what AI could bring, need for retraining managers and workers; high sunk costs for internalising AI, plus a need for engaging complementary investments; few evidence and little visibility on the returns on investment; and reputational and legal risks.

Moreover, lack of technical skills is the main challenge as highlighted in the study conducted by Black and van Esch (2020), who proposed another useful tactic by providing jobs and recruiting intelligently from AI software in SMEs. It has been a strategic concern for SMEs to recruit talented and skillful individuals to perform job duties. The process application reduces mistakes by increasing efficiency and accuracy by automating recruitment (Hamilton & Davidson, 2018). Therefore, AI aids by processing information of the candidate for screening, interviewing, and communicating. Besides the immeasurable advantages, SMEs do not usually opt for an organization's use of AI-based technology. The main concerns involve security and privacy issues, lack of skill practice among SME employees, and lack of resources to implement AI. However, according to the OECD (2021), SMEs have a higher capability to attain change promptly as compared to larger firms for having limited layers of management. Onu and Mbohwa (2021) proposed that SMEs operating on a smaller scale have minimal access to markets and resources, and the cost applied to the integration of AI projects is much higher. It raises the concern of increased cost and a fear of difficulty in adopting the system (Chatterjee et al., 2021).

The users in SMEs, due to lack of practice and training, vacillate between adopting AI-empowered products (software), although there is a great need for SMEs to manage information efficiently and perform analysis to reduce cost and make appropriate decisions for business processes. Manually performed tasks need to be transformed into automatic processes to reduce the manual workforce and project innovative measures against traditional business practices of SMEs. Drydakís (2022) studied the various aspects of AI applications, including cyber security, automated communication, cash flow, pricing, and prediction of consumer needs. These applications are advantageous, but on the other hand, SMEs do not implement AI in their business processes at the initial stage of high cost and requirement of technical skill set.



However, these strategies have been proven to be efficient during external changes affecting business performance.

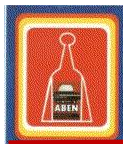
The theory of Technology Acceptance Model (TAM) is applied to this study as it is the most effective model for implementing technological change and acceptance in organizations. Applying this theory to SME business models leads to accepting the changes that can be informed or uninformed, as the perceived ease of use and behavioural intentions are factors that encourage the use of technology across companies (Gamage, 2019). As AI implementation is a form of digital innovation in business, SMEs need to be analyzed based on capacity and budget for adoption.

Coping strategy refers to the methods or techniques individuals or groups use to manage stress, challenges or adversity. These strategies help people deal with difficult situations whether emotional, mental or physical. Copying strategies for the use of AI among SMEs can be tailored to address the specific challenges faced by local businesses in the following ways:

- Using Cloud based AI Solution: Leveraging cloud platform that offer AI-as-a-service can allow SMEs to implement AI solution without heavy infrastructure costs.
- SMEs can apply for government grants, loans or training programme designed to support digital transformation and AI adoption. Initiative from bodies like the Small and Medium Enterprises (SMEDAN) and Ondo State Ministry of Commerce, Industry and Cooperative may offer support.
- Collaborating with educational institution: SMEs can collaborate with these institutions for AI research, training or internships.
- Gradual adoption of AI in Specific use cases: Rather than adopting AI across operations, SMEs can start by using AI for small specific functions such as customer service automation, inventory management or financial forecasting. For example, a retail business in Ondo town begins by using AI chatbots to handle basic customers inquiries and then expands to AI-driven demand forecasting after seeing positive results.
- Using low cost or open source AI tools: SMEs can utilize open source AI services like TensonFlow, Hugging Face or low cost cloud AI services such as Google Cloud AI or to avoid expensive proprietary solutions. These tools offer robust AI capabilities at little or no cost.
- Outsourcing AI implementation to service providers: SMEs can partner with external consultants or tech companies that specialize in AI to implement AI solution tailored to their business needs.
- Accessing industry specific AI platforms: For example, Agric business can use AI tools for crop monitoring while retail businesses can use AI for sales forecasting and customer engagement.

Statement of the Problem

The rapid advancement of Artificial Intelligence (AI) technology has transformed business operation across countries and sectors such as improving operational efficiency, enhancing customers experiences and optimizing decision making. SMEs in Ondo central struggle to fully harness its advantages. The challenges they face include limited access to technical knowledge, inadequate infrastructure and data quality. These challenges limit SME's ability to leverage AI technologies which could otherwise serve as a catalyst for development and help them overcome traditional obstacles. The study therefore seeks to examine the challenges SMEs in Ondo Central face in the adoption and usage of AI and explore coping strategies that can help mitigate these



issues, ensuring that local businesses can benefit from the potentials of AI. Hence, the need for this study.

Purpose of the Study

The main purpose of this study was to assess the implementation of artificial intelligence among small and medium enterprises in Ondo central. Specifically, this study seeks:

1. To assess the benefits of using artificial intelligence in business.
2. To identify the challenges encountered in the implementation of artificial intelligence among small and medium enterprises in Ondo central.
3. To ascertain the coping strategies for effective implementation of artificial intelligence among SMEs in Ondo central.

Research Questions

The following research questions guided the study:

1. What are the benefits of using artificial intelligence in business?
2. What are the challenges encountered in the implementation of artificial intelligence by small and medium enterprises within Ondo central?
3. What are the coping strategies for effective implementation of artificial intelligence among SMEs in Ondo central?

Method

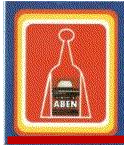
The study adopted a descriptive survey research design while the population consisted of small and medium enterprises (SMEs) within Ondo metropolis. Purposive sampling techniques were used to select 150 respondents. The instrument for data collection was a questionnaire titled: Implementation of Artificial Intelligence among Small and Medium Enterprises Questionnaire (IAISMESQ) and was validated by experts and further subjected to internal consistency testing using Cronbach Alpha statistics which yielded a reliability coefficient of 0.74. The instrument was further administered to the respondents by the researchers. Research questions one consists of ten items that measure benefits of using artificial intelligence in business while research question two consist of six items to ascertain some challenges encountered in the adoption of artificial intelligence and research questions three consist of seven items that measure coping strategies employed for effective implementation of AI. A four-point rating scale of strongly agree (SA) – 4, Agree (A) 2, Disagree (D) - 3 and Strongly Disagree – 1 was used. Mean and standard deviation were used to analyze questions one to three. Mean responses of 2.50 and above was considered as agree while any mean responses below 2.50 was considered as disagree.

Results

Research Question 1: What are the benefits of implementing artificial intelligence among small and medium enterprises?

Table 1: Mean and standard deviation responses on the benefits of implementing artificial intelligence among small and medium enterprises.

S/N	Items	Mean	SD	Remark
1	Fraud detection and security	3.89	0.96	Agree
2	Topersonalised customer experience	3.50	0.95	Agree
3	To target audience online	3.70	0.95	Agree
4	To offer immediate answers to customers	3.70	0.95	Agree



5	To offer cash flow forecasting	3.40	0.95	Agree
6	To collect information on other firms' (competitors) product assortments, i.e., pricing, offers, sales, and public relation activities	3.50	0.95	Agree
7	To combat fake product reviews	3.40	0.95	Agree
8	To protect data, customers' privacy and improve cyber security	3.40	0.95	Agree
9	Improved marketing and advertising	3.50	0.95	Agree
10	For recruitment and human resource activities	3.70	0.96	Agree
Grand Mean		3.57		Agree

Source: Field Survey, 2024

The data in Table 1 reveal the mean and standard deviation of responses on the benefits of implementing artificial intelligence among small and medium enterprises. The table shows that the respondents claimed that artificial intelligent had helped them to detect fraud, enhance security, personalized customer experience, target audience online and offer immediate answers to customers This statement is supported by mean scores of 3.89, 3.50, 3.70 and 3.70 respectively. The responses also stated that offer cash flow forecasting, collect information on other firms' product assortments that is pricing, offers, sales and public relation activities are some of the benefits of implementing artificial intelligence. The mean score for these constructions was 3.40, 3.50 and 3.40 respectively. The respondents further stated that combat fake product reviews, protect data, customers' privacy and improve cyber security, marketing and advertising, recruitment and human resources activities are the benefit of effective implementation of artificial intelligence in business. These assertions were backed up by mean scores of 3.40, 3.40, 3.50 and 3.70 respectively. With a grand mean of 3.57 and standard deviation of 0.95, table 1 revealed that all the items were regarded as benefit of effective implementation of artificial intelligence by small and medium enterprises (SMEs) in Ondo central.

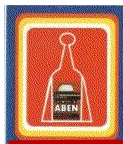
Research Question 2: What are the challenges encountered in the effective implementation of artificial intelligence by small and medium enterprises within Ondo central.

Table 2: Mean and standard deviation of responses on the challenges of effective implementation of artificial intelligence among small and medium enterprises.

S/N	Items	Mean	SD	Remark
11	Poor data quality	3.50	0.95	Agree
12	Inadequate data privacy and security	3.40	0.95	Agree
13	Lack of awarenessand readiness about what AI could bring	3.60	0.95	Agree
14	High costs and uncertainty about AI benefits	3.70	0.96	Agree
15	Shortage of skilled AI professionals	3.50	0.95	Agree
16	Technical complexities	3.50	0.96	Agree
Grand Mean		3.53		Agree

Source: Field Survey, 2024

Table 2 shows that the mean on all the items from 11 – 25 on challenges of effective implementation of artificial intelligence by small and medium enterprises range between 3.70 – 3.40 which indicates that all the items hindered the adoption of artificial intelligence by small and medium enterprises. With a grand mean of 3.53, and standard deviation of 0.95, table 2 also



revealed that all the items were regarded as challenges encountered in the use of AI by SMEs in Ondo central.

Research Question 3:What are the coping strategies for effective implementation of artificial intelligence among SMEs in Ondo central?

Table 3: Mean responses on the coping strategies for effective implementation of artificial intelligence among small and medium enterprises.

S/N	Items	Mean	SD	Remark
17	Effective partnership with technology providers	3.20	0.96	Agree
18	Government grants and subsidies	3.40	0.95	Agree
19	Professional development and training	3.70	0.95	Agree
20	Collaborations with industry experts/educational institutions	3.60	0.96	Agree
21	Decision makers and managers have to be trained	3.40	0.96	Agree
22	Source external knowledge and technology solutions from knowledge markets	3.50	0.96	Agree
23	Sensitization in promoting the acceptance of AI in SMEs.	3.40	0.95	Agree
Grand Mean		3.46		Agree

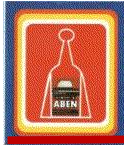
Field Survey, 2024

Data in Table 3 show that the respondents agree that all the items as strategies of improving challenges on effective implementation of artificial intelligence by small and medium enterprises with mean scores ranging from 3.20 to 3.70. This is because the mean scores was above 2.50 which is the cut off point. In addition, Table 3 with a grand mean of 3.46 indicated that the items are coping strategies for effective implementation of artificial intelligence among small and medium enterprises (SMEs) in Ondo central.

Discussion of Findings

Table 1 revealed the benefits of application of AI in business which include automation of routine tasks, personalized customer experience, cost reduction, enhanced customer service, improved marketing and advertising. This finding supported the survey findings of Selamat and Windasari, (2021) which indicated that artificial intelligence helps in determining purchasing patterns, consumer preferences and businesses to make better decisions to enhance product quality. The findings of this study are consistent with that of Drydakis, (2022) which revealed that the status quo, which largely comprises investors, management, and shareholders, is not adequately aware of the potential usefulness of AI.

The findings in Table 2 showed that poor data quality, technical complexity, high cost and uncertainty about AI benefit are some of the challenges confronting SMEs in Ondo central. The finding corroborated the findings of Hansen and Bøgh, (2021) that there is a perception that AI integration will cost organizations a large amount of money, which is true to some extent, but not all areas of AI are costly. Examples of these include data analytics and machine learning, which are demanding in terms of expertise but are not hardware intensive. Therefore, SMEs can adopt AI technologies that are inexpensive and start their journey toward AI integration. Finally, table 3 revealed coping strategies for the use of artificial intelligence by SMEs such as using cloud based AI solution, collaborating with educational institutions, professional development and training among others. The findings are in agreement with that of Becker and Schmid (2022) the



alignment between the corporate and IT strategies is a process of prolonged development and change that includes not only organizational strategy and IT strategy, as well business infrastructure and processes, and IT infrastructure and processes. In this case, the strategic usage of IT will allow the business to maintain developments in the competitive situation (Zaki, 2019).

Conclusion

Based on the findings of the study, it was concluded that AI can greatly benefits small, local and services industries by enhancing efficiency, personalized customer experiences, reducing costs and enabling better decision making. AI has proven to be a great asset for various organizations, and rapid research and development in the area is evidence that this technology will transform businesses in the future While the initial investment in AI may be daunting, the long term benefit of automation, data driven insights and improved customer satisfaction make AI a powerful tool for small businesses to thrive in competitive markets.

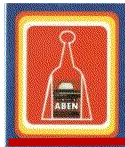
Recommendations

Based on the findings of this study, the following recommendations are made:

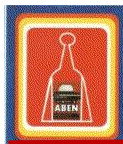
1. There is need for small and medium enterprises (SMEs) managers to work towards creating a smooth implementation of artificial intelligence (AI) into their business operation in order to foster economic growth and development.
2. State and local governments should also co-ordinate actions for reskilling SMEs managers and workers and ensure a participatory approach in redesigning work processes and training AI models.
3. SMEs or retailers can start by using AI chatbots for small specific functions such as customer service automation and inventory management.

References

- Black, J. S., & van Esch, P. (2020). AI-Enabled Recruiting: What is it and How Should a Manager Use It? *Business Horizons*, 63, 215-226.
- Becker, W. & Schmid, O. (2022), The right digital strategy for your business: An empirical analysis of the design and implementation of digital strategies in SMEs and LSEs. *Bus. Res. in press*.
- Canhoto, A., & Clear, F. (2020). Artificial Intelligence and Machine Learning as Business Tools: A Framework for Diagnosing Value Destruction Potential. *Business Horizons*, 63(2), 183-193.
- Chan, C. M. L., Teoh, S. Y., Yeow, A., & Pan, G. (2018a). Agility in Responding to Disruptive Digital Innovation: Case Study of an SME. *Information Systems Journal*, 29(2), 436-455.
- Chan, L., Morgan, I., Simon, H., Alshabanat, F., Ober, D., Gentry, J., Min, D., & Cao, R. (2018). *Survey of AI in Cybersecurity for Information Technology Management. IEEE Technology and Engineering Management Conference*. Atlanta: TEMSCON
- Chan, L., Morgan, I., Simon, H., Alshabanat, F., Ober, D., Gentry, J., Min, D., & Cao, R. (2018). *Survey of AI in Cybersecurity for Information Technology Management. IEEE Technology and Engineering Management Conference*. Atlanta: TEMSCON.
- Chatterjee, S., Chaudhuri, R., Vrontis, D., & Basile, G. (2021). Digital transformation and entrepreneurship process in SMEs of India: A moderating role of adoption of AI-CRM capability and strategic planning. *Journal of Strategy and Management*, 15(3), 416-433. <https://doi.org/10.1108/JSMA-02-2021-0049>



- Conick, H. (2017). The past, present and future of AI in marketing. *Marketing news* 51(1), 26-35.
- Drydakis, N. (2022). Artificial intelligence and reduced SMEs' business risks. A dynamic capabilities analysis during the COVID-19 pandemic (IZA Discussion Paper No. 15065). <https://doi.org/10.2139/ssrn.4114609>
- Fan, X., Ning, N., & Deng, N. (2020). The Impact of the Quality of Intelligent Experience on Smart Retail Engagement. *Marketing Intelligence and Planning*, 38(7), 877-891.
- Gamage, T. C. (2019). Determinants of cloud computing adoption among SMEs in Sri Lanka: A meta theoretical framework. *International Journal of Asian Social Science*, 9(2), 189-203. <https://doi.org/10.18488/journal.1.2019.92.189.203>
- Hamilton, R. H., & Davison, H. K. (2018). The search for skills: Knowledge stars and innovation in the hiring process. *Business Horizons*, 61(3), 409-419. <https://doi.org/10.1016/j.bushor.2018.01.006>
- Hansen, E. B., & Bøgh, S. (2021). Artificial Intelligence and Internet of Things in Small and Medium-Sized Enterprises: A Survey. *Journal of Manufacturing Systems*, 58(B), 362-372.
- Hansen, E. B., & Bøgh, S. (2021). Artificial intelligence and internet of things in small and medium-sized enterprises: A survey. *Journal of Manufacturing Systems*, 58(B), 362-372. <https://doi.org/10.1016/j.jmsy.2020.08.009>
- Hoikkala, I. M. & Ojala, R. (2022). Customer engagement through the use of AI: A qualitative study on SMEs and the use of chatbots. [Master's Thesis Jyväskylä University] <https://jyx.jyu.fi/bitstream/handle/12345678/81663/URN53Afi%3Aaju-202206133272.pdf?sequence=1&isAllowed=y/>
- Lu, X., Wijayarathna, K., Huang, Y., & Qiu, A. (2022). AI-enabled opportunities and transformation challenges for SMEs in the post-pandemic era: A review and research agenda. *Frontiers in Public Health*, 10, Article 885067. <https://doi.org/10.3389/fpubh.2022.885067>
- Onu, P., & Mbohwa, C. (2021). Industry 4.0 opportunities in manufacturing SMEs: Sustainability outlook. *Materials Today: Proceedings*, 44(1), 1925-1930. <https://doi.org/10.1016/j.matpr.2020.12.095>
- Organisation for Economic Co-operation and Development (OECD). (2021). The digital transformation of SMEs (OECD Studies on SMEs and Entrepreneurship). OECD Publishing. <https://doi.org/10.1787/bdb9256a-en>
- Polas, M. R. H., Jahanshahi, A. A., Kabir, A. I., Soheli-Uz-Zaman, A. S. M., Osman, A. R., & Karim, R. (2022). Artificial intelligence, blockchain technology, and risk-taking behavior in the 4.0 IR metaverse era: Evidence from Bangladesh-based SMEs. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), Article 168. <https://doi.org/10.3390/joitmc8030168>
- Schmid, C. (2022). Henri Lefebvre and the theory of production of space. London/New York Verso.
- Selamat, M. A. & Windasari, N. A. (2021). Chatbot for SMEs: Integrating customer and business owner perspectives. *Technology in Society*. 66(6) 101685
- Ulas, D. (2019). Digital Transformation Process and SMEs. *Procedia Computer Science*, 158, 662-671.
- Zaki, M. (2019) Digital transformation: Harnessing digital technologies for the next generation of services. *J. Serv. Mark.*, 33, 429-435.



TRAINING AND RETRAINING OF BUSINESS EDUCATION STUDENTS FOR SKILLS ACQUISITION IN ARTIFICIAL INTELLIGENCE FOR JOB PERFORMANCE IN EKITI STATE, NIGERIA

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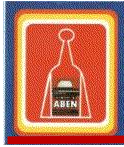
Abstract

The study examined the training and retraining of business education students for skills acquisition in Artificial Intelligence for job performance in Ekiti State. Three research questions were answered while three null hypotheses were tested by the study at 0.05 level of significance. The design that was adopted for the study was a descriptive survey design. The population for the study comprised all the 10 Business Education lecturers in FUOYE and 52 Business studies teachers in public secondary schools in Oye-Ekiti, Ekiti State, totalling 62 respondents. The sample drawn comprised the 62 respondents using the total enumeration technique of census sampling. The instrument used was a self-structured questionnaire titled Training and Retraining of Business Education Students for Artificial Intelligence Knowledge (TRBESAI). It was face and content validated by three experts in the field of Business Education and Measurement and Evaluation. The reliability of the instrument using Cronbach alpha statistics yielded average reliability coefficients of 0.86. Sixty-two copies of the questionnaire were administered to the respondents and all were duly returned representing a 100% return rate and subjected to relevant statistical analyses. The results of the study identified 10 types of skills in Artificial Intelligence, 5 ways through which the training and retraining of business education students yield to the acquisition of Artificial Intelligence for quality job performance and 5 ways through which the acquisition of skills in Artificial Intelligence influence the job performance of business education students. Results of the hypotheses showed that there is no significant ($p < 0.05$) difference between the mean ratings of the responses of Business Education Lecturers in FUOYE and Business Studies Teachers on the types of skills in Artificial Intelligence to be acquired by Business Education students and how the acquisition of skills in Artificial Intelligence influences the job performance of business education students. On the other hand, there is significant ($p < 0.05$) difference between the mean ratings of the responses of Business Education Lecturers in FUOYE and Business Studies Teachers on whether training and retraining of business education students yield to the acquisition of Artificial Intelligence for quality job performance. It was recommended among others, that, Artificial Intelligence (AI) should be more extensively integrated into higher education curricula, and that institutions need to consider the ethical implications of AI in the development and implementation of their programmes.

Keywords: Artificial Intelligence, skills, Acquisition, Job, Performance, Training, Retraining

Introduction

Acquisition of skills in artificial intelligence is presently a necessity for all students across the disciplines as the demand for computer usage in every facet of life has continued to rise by the day. Training and retraining of business education students in the acquisition of artificial intelligence have become an inevitable phenomenon as its integration is now seen as a



requirement for job security, job performance and effective actualization of any organizational goals.

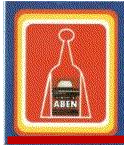
Acquisition of skills in artificial intelligence has become necessary considering the human functions it performs to relieve humans from the rigours of stress. Artificial intelligence (AI) is known to be the simulation of human intelligence processes by machines, especially computer systems. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision which would have stressed humans too. AI is complementary to human effort as scientists see it as the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. This logical statement indicated that for any organization to thrive well in the actualization of its objectives, the place of AI must not be undermined which means for an individual to be eligible for job and quality job performance in any organization, he or she must be knowledgeable in AI. This statement calls for the inevitable integration of AI courses in Business Education for its acquisition by students to brighten their chances of employment in any organization after graduation.

Some researchers have pointed out the types of AI skills required by business education students for effective job performance. For instance, Udie and Nwosu (2023) verified the skills required of Business Education graduates for effective job performance in modern offices in Cross River State and showed that Information and Communication Technology (ICT), and communication skills are required of Business Education graduates for effective job performance in modern offices in Cross River State. Edet et al (2020) determined the skills needed by business education lecturers and the findings are that technology-driven teaching skills significantly predict the effective delivery of the content of business education. Zilu et al (2024) examined an evaluation of the impact of AI on university students' learning and highlighted the sound selection of evaluation criteria in the context of AI educational applications.

Continuing with the types of AI skills required by business education students for effective job performance, Das et al. (2015) mentioned the AI skills to be acquired by business education students for effective job performance to be computer vision, prediction systems, data mining intelligent learning or teaching systems, learning analytics. Al-Zyoud (2020); Han, Park and Lee (2022); and Ley et al. (2023) list them as facial recognition systems, voice or speech recognition systems, virtual laboratories, augmented reality, virtual reality, hearing and sensing technologies, edge computing, virtual personalised assistants, real-time analysis, Artificial Intelligence chatbot, image recognition, personalised learning approach, academic analytics, and adaptive learning method. Acquisition of these AI skills is yet to be known whether they influence the job performance of business education graduates in Ekiti state, Nigeria.

Job performance is defined as an aggregate of employee behaviours that have some expected value to organizations (positive or negative) (Gülduran&Perçin, 2020). Job performance is defined as the total expected value to the organization. It has been asserted that AI boosts employee job performance in an organization and this high level of employee performance enables companies to reach their goals easily. The integration of AI in an organization according to Çakır and Gözoğlu (2019) is a necessity for a healthy execution of organizational functioning. Some researchers such as Yıldız et al.2014; Ay & Keleş, 2017 have noted that the effective and productive working of the employees within the company depends largely on their level of skills in artificial intelligence. No wonder, many organizations these days embark on a series of retreats in the form of training and retraining of their employees for effectiveness and more output to meet up the global demands.

It is an evolution from the above managerial strategies for boosting effectiveness that there are series of training and retraining programmes in most organizations these days to keep



the trend in their productive purpose. Training is the process of modifying the knowledge, attitude and skill of a person through learning for enhanced performance. Training in organisations is intended to change the attitude, knowledge and skills of employees at work to enable them to perform their assigned duties creditably (Nkomo & Abdi 2023). Retraining is the process of learning a new skill or trade, often in response to a change in the work environment. It is also the process of learning a new skill or trade, often in response to a change in the work environment. Generally, it reflects changes within a profession rather than an "upward" movement in the same field. Retraining is seen as a process of updating one's talents and skills to keep up with workplace development (Akaba and Osamuyi, 2022). Retraining in Business Education is nothing but learning a new skill or a new job within your department. Retraining, as the name implies, entails training an employee once again. An employee retraining program serves in re-acquainting an employee with previously learnt skills, recalling and retaining certain potentials and staying updated on the latest skill requirements. Some retraining programs are required to be carried out regularly to avoid employee obsolescence because of technological changes or an individual's knowledge-grasping power.

Research evidence has shown that training and retraining of employees in artificial intelligence influence their job performance. For instance, Agber (2021) investigated training and retraining as precursors' performance in secondary schools in Benue State, Nigeria and published that on-the-job training and retraining opportunities and off-the-job training and retraining opportunities have significance. Oguejiofor and Ezenwanne (2020) focused on training and retraining programmes as a strategy for improving the quality of business education lecturers in public tertiary institutions in Anambra State and revealed that training and retraining programme is a strategy for improving the quality of business education lecturers in tertiary institutions in Anambra State. It is yet to be determined whether training and retraining strategies could aid Business Education graduates' job performance in Ekiti State, Nigeria. It is on this premise that the study is set to investigate the training and retraining of Business Education students for skills acquisition in artificial intelligence for job performance in Ekiti State, Nigeria.

Statement of the Problem

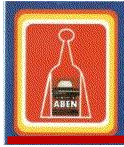
Twentieth (20th) centuries down to the present day have been observed to witness a boost in the performance of jobs by employees across the globe. This welcome development is attributed to the general integration of Artificial Intelligence into the productive aspect of almost all formal organizations. However, it seems to be yet prioritized by the Business Education Department of Nigeria Universities as most of the intake students are not computer compliant acquiring its skills compulsory before graduation.

There are observed complaints from the employers of labour in Nigeria about the poor usage of computers and their related facilities for effective job performance by most business education students. It is doubtful whether this apparent poor knowledge of artificial intelligence by business education students for effective service delivery could be ascribed to the quality of training they received in school or whether it is the students' factor. These discourses among the trainers and employers encourage the researcher to investigate the training and retraining of business education students for skills acquisition in artificial intelligence for job performance in Ekiti State.

Research Questions

The following research questions guided the study:

1. What are the types of skills in Artificial Intelligence to be acquired by business education students for effective job performance?



2. How does training and retraining of business education students yield to the acquisition of Artificial Intelligence for quality job performance?
3. How does the acquisition of skills in Artificial Intelligence influence the job performance of business education students?

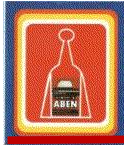
Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

- H0₁:** There is no significant difference in the mean ratings of the responses of Business Education Lecturers in FUOYE and Business Studies Teachers on the types of skills in Artificial Intelligence to be acquired by business education students for effective job performance.
- H0₂:** There is no significant difference in the mean ratings of the responses of Business Education Lecturers in FUOYE and Business Studies Teachers on whether training and retraining of business education students yield to the acquisition of Artificial Intelligence for quality job performance.
- H0₃:** There is no significant difference in the mean ratings of the responses of Business Education Lecturers in FUOYE and Business Studies Teachers on how the acquisition of skills in Artificial Intelligence influences the job performance of business education students.

Research Design

The design that was adopted for the study was a descriptive survey design. This design is often used when a study intends to investigate an ongoing phenomenon. The population for the study comprised all the Business Education lecturers in FUOYE and teachers in public secondary schools in Oye-Ekiti, Ekiti state, Nigeria. According to information from the Personnel Unit of the FUOYE and Ekiti State Teaching Service Board, 2024 show that there are 10 Business Education lecturers in FUOYE and 52 Business Studies teachers across all the public secondary schools in Oye metropolis totalling 62 respondents. The choice of this population is based on their experience as teachers and involvement in teaching the subject which put them in the best position to supply the needed data for the study. The sample drawn for the study comprised 62 participants using the total enumeration technique of census sampling. The choice of this sample is based on the smallness nature of the respondents which is manageable for this kind of study. The instrument that was used for data collection was a self-structured questionnaire titled Training and Retraining of Business Education Students for Artificial Intelligence Knowledge Questionnaire (TRBESAI). The questionnaire had two sections namely; Section A which was used to collect demographic data on the respondents of the study, and Section B which contains 20 items in three clusters. The instrument was responded to on a four-point modified Likert scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) with weighted values of 4, 3, 2 and 1 respectively. The weighted values were summed up and divided by 4 to arrive at the criterion mean score of 2.50 which was used for decision-making. The face and content validity of the instrument was determined by the three experts in the field of Business Education and Measurement and Evaluation in the Faculty of Education, Federal University Oye-Ekiti, Ekiti State. The internal consistency of the instrument was determined using Cronbach alpha statistics. There were twenty respondents outside the sample selected for the study but from university and public secondary schools in Ekiti State who were selected for the reliability test. The choice of Ekiti State was made because schools in Ekiti State share the same attributes and as such it will help give a clear picture of what exists in the state. The reliability coefficients of the three clusters of the instrument were 0.87, 0.81 and 0.89. Averagely, the reliability index of the instrument was 0.86. Data for the study were collected personally by the researcher with the help of three trained



research assistants. There were 62 copies of the questionnaire that were administered to the respondents selected for the study and all were duly returned representing a 100% return rate and subject to relevant statistical analyses. The research questions raised were answered using mean and standard deviation scores. The criterion mean score of 2.50 was used for decision-making on each of the questionnaire items. T-test was used to test the hypothesis and the null hypothesis were upheld and rejected at 0.05 level of significance.

Results

Research Question One

What are the types of skills in artificial intelligence to be acquired by business education students for effective job performance?

Table 1: Types of Skills in Artificial Intelligence to be acquired by Business Education Students for Effective Job Performance (n= 62)

SN	Item Statement	$\bar{X}$	SD	Rmks
1.	Facial recognition systems	3.64	0.48	Agreed
2.	Voice or speech recognition systems	3.80	0.39	“
3.	Intelligent learning or teaching systems	3.64	0.48	“
4.	Prediction systems	3.70	0.45	“
5.	Data mining	3.48	0.50	“
6.	Virtual laboratories	3.45	0.59	“
7.	Image recognition	3.59	0.49	“
8.	Artificial Intelligence chatbot	3.40	0.58	“
9.	Virtual personalized assistants	3.66	0.57	“
10.	Hearing and sensing technologies	3.35	0.65	“
Cluster Summary		3.57	0.61	Agreed

Note: $\bar{X}$ = Mean, SD = Standard Deviation, n = Number of respondents, Rmks= Remarks.

The result in Table 1 showed that the mean values of the respondents on the 10 items ranged from 3.35 to 3.80 which are all greater than the cut-off point value of 2.50 on 4-point rating scale. This indicated that the respondents agreed that the identified 10 items in the table are the types of skills in artificial intelligence to be acquired by business education students for effective job performance. The cluster summary mean of 3.57 was considerably high while the standard deviation values of the 10 items ranged from 0.39 to 0.65 indicated that the responses of the respondents are close to the mean and one another.

Research Question Two

How does training and training of business education students yield to the acquisition of artificial intelligence for quality job performance?

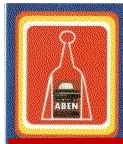


Table 2: How Training and Retraining of Business Education Students Yield to the Acquisition of Artificial Intelligence for Quality Job Performance (n = 62)

SN	Item Statement	$\bar{X}$	SD	Rmks
1.	It makes business education students more effective in the workplace	3.59	0.58	Agreed
2.	It improves their work performance	3.51	0.74	“
3.	It helps business education students become more efficient and effective	3.69	0.46	“
4.	It prepares business education students for higher responsibilities	3.61	0.66	“
5.	It improves their Information Technology and computer skills for quality job performance	3.62	0.57	“
Cluster Summary		3.60	0.52	Agreed

Note: $\bar{X}$ = Mean, SD = Standard Deviation, n = Number of respondents, Rmks= Remarks.

The result in Table 2 revealed that the mean values of the respondents on the 5 items ranged from 3.51 to 3.62 which are all greater than the cut-off point value of 2.50 on 4-point rating scale. This implied that the respondents agreed that the identified 5 items in the table are ways through which training and training of business education students yield to the acquisition of artificial intelligence for quality job performance. The cluster summary mean of 3.60 was appreciably high while the standard deviation values of the 5 items ranged from 0.46 to 0.74 signified that the responses of the respondents are close to the mean and one another.

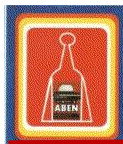
Research Question Three

How does the acquisition of skills in artificial intelligence influence the job performance of business education students?

3: How the Acquisition of Skills in Artificial Intelligence Influence the Job Performance of Business Education Students (n = 62)

S/N	Item Statement	$\bar{X}$	SD	Rmks
1.	Guarantee quality output	3.35	0.79	Agreed
2.	Enhance mass production	3.75	0.43	“
3.	Brings Less fatigue	3.50	0.50	“
4.	Quick actualization of organizational goals	3.54	0.59	“
5.	It increases the competencies of the employees	3.38	0.68	“
Cluster Summary		3.50	0.56	Agreed

Note: $\bar{X}$ = Mean, SD = Standard Deviation, n = Number of respondents, Rmks= Remarks.



From the result in Table 3 above, it was revealed that the mean values of the respondents on the 5 items ranged from 3.35 to 3.75 which are all greater than the cut-off point value of 2.50 on 4-point rating scale. This indicated that the respondents agreed that the identified 5 items in the table are ways through which the acquisition of skills in artificial intelligence influences the job performance of business education students. The cluster summary mean of 3.50 was substantially high while the standard deviation values of the 5 items ranged from 0.43 to 0.79 implied that the responses of the respondents are close to the mean and one another.

Hypotheses

Hypothesis One

H0₁: There is no significant difference in the mean ratings of the responses of Business Education Lecturers in FUOYE and Business Studies teachers on the types of skills in artificial intelligence to be acquired by business education students for effective job performance.

Table 4: Test of no Significant Difference in the Mean Ratings of Business Education Lecturers and Teachers on the Types of Skills in Artificial Intelligence to be Acquired by Business Education Students for Effective Job Performance

Variables	N	$\bar{x}$	SD	DF	Std. Error	t- Cal	t- Critical	Level of Sig.	Rmks
Bus. Edu Lecturers	10	3.59	0.50	60	0.040	1.06	1.96	0.05	NS
Bus. Studies Teachers	52	3.51	0.53						

Note: NS = Not Significant at 0.05.

The data presented on the t-test statistics in Table 4 above showed that the t-calculated (t-cal) value of 1.06 is less than the t-table (t-tab) value of 1.96 at 0.05 level of significance and 60 degree of freedom. This suggests that there is no significant ($p < 0.05$) difference between the mean ratings of the responses of Business Education Lecturers in FUOYE and Business Studies teachers on the types of skills in artificial intelligence to be acquired by business education students for effective job performance. Hence, the null hypothesis of no significant ($p < 0.05$) difference in the mean ratings of the responses of the lecturers and teachers was accepted on hypothesis one.

Hypothesis Two

H0₂: There is no significant difference in the mean ratings of the responses of Business Education Lecturers in FUOYE and Business Studies teachers on whether training and retraining of business education students yield to the acquisition of artificial intelligence for quality job performance.

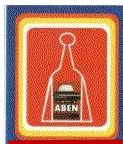


Table 5: Test of no Significant Difference in the Mean ratings of Business Education Lecturers and Teachers on Whether Training and Retraining of Business Education Students Yield to the Acquisition of Artificial Intelligence for Quality Job Performance

Variables	N	$\bar{X}$	SD	DF	Std. Error	t-Cal	t-Critical	Level of Sig.	Rmks
Bus. Edu Lecturers	10	3.70	0.68	60	0.060	2.09	1.96	0.05	S*
Bus. Studies Teachers	52	3.58	0.52						

Note: S* = Significant at 0.05.

From the data presented on the t-test statistics in Table 5, it was revealed that the t-calculated (t-cal) value of 2.09 is greater than the t-table (t-tab) value of 1.96 at 0.05 level of significance and 60 degree of freedom. This indicates that there is significant ($p < 0.05$) difference between the mean ratings of the responses of Business Education Lecturers in FUOYE and Business Studies Teachers on whether training and training of business education students yield to the acquisition of artificial intelligence for quality job performance. Therefore, the null hypothesis of no significant ($p < 0.05$) difference in the mean ratings of the responses of the lecturers and teachers was rejected on hypothesis two.

Hypothesis Three

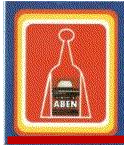
H0₃: There is no significant difference in the mean ratings of the responses of Business Education Lecturers in FUOYE and Business Studies teachers on how the acquisition of skills in artificial intelligence influences the job performance of business education students.

Table 6: Test of no Significant Difference in the Mean Ratings of Business Education lecturers and Teachers on how the Acquisition of Skills in Artificial Intelligence Influences the Job Performance of Business Education Students

Variables	N	$\bar{X}$	SD	DF	Std. Error	t-Cal	t-Critical	Level of Sig.	Rmks
Bus. Edu Lecturers	10	3.53	0.49	60	0.120	1.24	1.96	0.05	NS
Bus. Studies Teachers	52	3.38	0.55						

Note: NS = Not Significant at 0.05.

The data presented on the t-test statistics in Table 6 above showed that the t-calculated (t-cal) value of 1.24 is less than the t-table (t-tab) value of 1.96 at 0.05 level of significance and 60 degree of freedom. This implies that there is no significant ($p < 0.05$) difference between the mean ratings of the responses of Business Education Lecturers in FUOYE and Business Studies



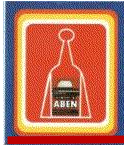
teachers on how the acquisition of skills in artificial intelligence influences the job performance of business education students. Consequently, the null hypothesis of no significant ($p < 0.05$) difference in the mean ratings of the responses of the lecturers and teachers was accepted on hypothesis three.

Discussion of Findings

The findings of this study on research question one identified 10 types of skills in artificial intelligence to be acquired by Business education students to include: facial recognition systems, voice or speech recognition systems, intelligent learning or teaching systems, prediction systems, data mining, virtual laboratories, image recognition, artificial intelligence chatbot, virtual personalized assistants and hearing and sensing technologies. This finding agreed with that of Ley et al., (2023) who found that the types of artificial intelligence skills include intelligent learning or teaching systems, learning analytics, facial recognition systems, voice or speech recognition systems, virtual laboratories, augmented reality, virtual reality, hearing and sensing technologies, edge computing, virtual personalised assistants and real-time analysis. The findings of this study equally corroborated that of Al-Zyoud (2020) and Han, Park and Lee (2022) that skills in artificial intelligence to be acquired for work in modern day society include: artificial Intelligence chatbot, image recognition, personalised learning approach, academic analytics, and adaptive learning method. Ouyang and Jiao (2021) identified three Artificial Intelligence in Education paradigms: "AI-direct, learner-as-recipient", where AI leads learning with a defined pathway for the learner, "AI-supported, learner-as-collaborator", where AI optimises interaction among learners, information, and technology, and "AI-empowered, learner-as-leader", where AI enhances learners' intelligence through a complex system.

The findings of this study on research question two identified 5 ways through which the training and training of business education students yield to the acquisition of artificial intelligence for quality job performance which include that: it makes business education students more effective in the workplace, improve their work performance, helps business education students become more efficient and effective, prepares business education students for higher responsibilities and improves their Information Technology and computer skills for quality job performance. In agreement with the findings of this study, Akaba and Osamuyi (2022) reported that the training according to is the development of specific skills and attitudes needed to perform a particular job or series of jobs to maximize the productivity of the individual and improve the overall organizational efficiency. Re-training on the other hand, according to Morandini, Fraboni, De Angelis, Puzzo, Giusino, and Pietrantonio, L. (2023), is an on-the-job training used by institutions to bring about development and improved competency in the teachers. This is essential especially with the frequent policy changes in education and also in the evolving new knowledge and technology-based society. Retraining business education lecturers can help to reduce mistakes and improve quality and innovations in the teaching profession.

The findings of this study on in respect to research question three identified 5 ways through which the acquisition of skills in artificial intelligence influence the job performance of business education students which include that: it guarantees quality output, enhances mass production, brings less fatigue, quick actualization of organizational goals and it increase the competencies of the employees. In conformity with the findings of this study, Zhang and Aslan (2021) found that Artificial Intelligence systems in education significantly enhance learners' involvement and job performance. Chiu et al. (2023) identified essential AI roles for learners: competency-based task assignments, learner-machine discussions, feedback, and adaptive digital environments. Zhang and Aslan (2021) added other AI facilitations, including engagement, enriched learning resources, and intellectual stimuli. Southworth et al. (2023)



highlight Artificial Intelligence Education's benefits, fostering technical skills, creativity, critical thinking, and problem-solving abilities for students. Hopcan, et al., (2022), artificial Intelligence Education personalises learning experiences and communication to cater to individual needs and abilities, enhancing efficiency (). Customised learning materials are tailored based on students' evaluations, addressing their strengths and weaknesses (Hopcan et al., 2022). Li and Wang (2023) propose using advanced technology to create a comfortable communication environment, fostering learner networks with increased information accessibility for future generations.

Agber (2021) investigated training and retraining as precursors to teachers' performance in secondary schools in Benue State, Nigeria and found that on-the-job training and retraining opportunities and off-the job training and retraining opportunities have significance. The study concluded that on-the-job training and retraining opportunities and off-the-job training and retraining opportunities have significant impact on teacher's job performance. Similarly, Zouhaier (2023) analyses the influence of AI on higher education, investigate its impact on the teaching and learning process, examine its effect on assessment and grading, and predict its influence on graduates' future careers and the results of this study demonstrate the crucial role of AI in the future of higher education. The findings highlight the effectiveness and efficiency of AI in equipping graduates with new skills for their future careers. They also emphasised the importance of considering the ethical implications of AI. The study reveals that higher education institutions needed to integrate AI more extensively in their programs to prepare graduates for the future workforce.

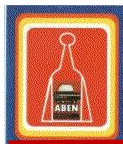
Conclusion

Acquisition of skills in artificial intelligence has become necessary considering the human functions it performs to relieve humans from the rigours of stress. This is because, Artificial Intelligence is complementary to human effort as scientists see it as the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. Recognizing the significance of artificial Intelligence skills in modern day work place, this study examined the training and retraining of business education students for skills acquisition in artificial intelligence for job performance in Ekiti State. Hence, the study identified 10 types of skills in artificial intelligence, 5 ways through which the training and training of business education students yield to the acquisition of artificial intelligence for quality job performance and 5 ways through which the acquisition of skills in artificial intelligence influence the job performance of business education students. The study therefore concluded that adoption of the identified 10 artificial intelligence skills for training and retraining of Business Education students will significantly increase their job performance in Ekiti State, Nigeria and the world at large.

Recommendations

From the data collected and analysed, the study recommended that:

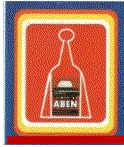
1. Artificial Intelligence (AI) should be extensively integrated into higher education curricula, and that institutions need to consider the ethical implications of AI in the development and implementation of their programmes.
2. The necessary instructional facilities to make teaching and learning of artificial intelligence through artificial intelligence should be adequately provided by the government and other relevant stakeholders in education management. This will help create conducive learning environment in acquisition of Artificial Intelligence skills.
3. Effort should be made by the school management and government agencies and parastatals to ensure periodic and continuous training and retaining of teachers, lecturers



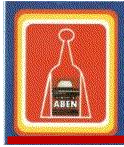
and instructors in Artificial Intelligence skills through workshops, and conferences among others.

References

- Agber, I J (2021). Training and retraining of teachers as a precursor to academic staff performance in secondary schools in Benue state. *Benue State University Journal of Educational Management*. 3(1).
- Akaba, j. & Osamuyi, A. B. (2022). The impact of training and retraining in improving manpower development among local government employees of Oredo local government council, Edo State. *Sapientia Global Journal of Arts, Humanities and Development Studies (SGOJAHDS)*, 5(3), 23 – 34.
- Al-Zyoud, H.M.M. (2020). The Role of Artificial Intelligence in Teacher Professional Development. *Universal Journal of Educational Research*, [e-journal] 8(11B), pp. 6263-6272.
- Ay, F. A., & Keleş, K. (2017). The Effect of Transactional and Transformational Leadership Styles on Intention to Leave and Job Performance. *Gumushane University Journal of Health Sciences*, 6(4), 193-203.
- Çakır, A., & Gözoğlu, Ö. F. (2019). The Effect of Perceived Institutional Reputation on Job Performance and Intention to Leave: A Study on Hospitality Businesses in Şanlıurfa. *Harran Üniversitesi İİBF Dergisi*, 3(4), 46-71.
- Chiu, T., Xia, Q., Zhou, X., Chai, C.S. and Cheng, M., (2023). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. *Computers and Education: Artificial Intelligence*, [e-journal] 4, article no. 100118. <https://doi.org/10.1016/j.caeai.2022.100118>.
- Das, S., Dey, A., Pal, A. and Roy, N., (2015). Applications of artificial intelligence in machine learning: review and prospect. *International Journal of Computer Applications*, [e-journal] 115(9), pp. 31-41. <https://doi.org/10.5120/20182-2402>.
- Edet, E., Okon, C., & Chukwurah, C. (2020). Technology-driven teaching skills' need of business education lecturers and content delivery in a globalised economy. *Journal of Education and Learning (EduLearn)*. 14(3), 393~401.
- Gülduran, Ç. A., & Perçin, N. Ş. (2020). The Effect of Big Five Personality Traits on Cyberloafing Behaviour and Job Performance: A Study in Hotel Businesses. *Duzce University Journal of Social Sciences Institute*, 10(1), 37-56.
- Han, J. W., Park, J. and Lee, H., (2022).. Analysis of the effect of an artificial intelligence chatbot educational program on non-face-to-face classes: a quasi-experimental study. *BMC Medical Education*, [e-journal] 22, article no. 830, pp. 1-10.
- Hopcan, S., Polat, E., Ozturk, M.E. and Ozturk, L., (2022). Artificial intelligence in special education: a systematic review. *Interactive Learning Environments*, [e-journal]. <https://doi.org/10.1080/10494820.2022.2067186>.
- Ley, T., Tammets, K., Pishtari, G., Chejara, P., Kasepalu, R., Khalil, M., Saar, M., Tuvi, I., Väljataga, T. and Wasson, B., (2023). Towards a partnership of teachers and intelligent learning technology: A systematic literature review of model-based learning analytics. *Journal of Computer Assisted Learning*, [e-journal] pp. 1397-1417.
- Morandini, S., Fraboni, F., De Angelis, M., Puzzo, G., Giusino, D., & Pietrantoni, L. (2023). The impact of artificial intelligence on workers' skills: Upskilling and reskilling in organisations. *Informing Science: The International Journal of an Emerging Transdiscipline*, 26, 39-68. <https://doi.org/10.28945/5078>



- Nkomo, N. N., & Abdi, M. U. (2023). Impacts of Training and Retraining Teachers in Primary and Post Primary Schools for Better Performance. *International Research Journal of Educational Research*, 14(3), 1-6.
- Oguejiofor, C. S., & Ezenwanne, C. R. (2020). Training and retraining programme as a strategy for improving the quality of business education lecturers in public tertiary institutions in anambra state *Global Journal of Education, Humanities and Management Sciences (GOJEHMS)*; 2(1), 144 – 153.
- Ouyang, F. and Jiao, P., (2021). Artificial intelligence in education: The three paradigms. *Computers and Education: Artificial Intelligence*, [e-journal] 2, article no. 100020, pp. 1-6.
- Southworth, J., Migliaccio, K., Glover, J., Glover, J., Reed, D., McCarty, C., Brendemuhl, J. and Thomas, A., (2023). Developing a model for AI Across the curriculum: Transforming the higher education landscape via innovation in AI literacy. *Computers and Education: Artificial Intelligence*, [e-journal] 4, article no. 100127, pp. 1-10.
- Udie, M. U. & Nwosu, O. B. (2023). Skills Required Of Business Education Graduates For Effective Job Performance In Modern Offices In Cross River State. *International Journal of Innovative Education Research* 11(2):183-192.
- Yıldız, S., Savcı, G., & Kapu, H. (2014). The Effect of Motivational Factors on Employees' Job Performance and Intention to Leave. *Celal Bayar Üniversitesi İ.İ.B.F Yönetimve Ekonomi Dergisi*, 21(1). <https://doi.org/10.18657/yecebu.75006>
- Zhang, K. and Aslan, A.B., (2021). AI technologies for education: Recent research and future directions. *Computers and Education: Artificial Intelligence*, 2, article no. 100025, pp. 1-11.
- Zilu, W., Enhui, B., & Min, L. (2024). An Evaluation of the Impact of Artificial Intelligence on university Students' Learning. *Journal of Innovation and Development*, 6(2), 22-25.
- Zouhaier, S. (2023). The Impact of Artificial Intelligence on Higher Education: An Empirical Study. *European Journal of Educational Sciences*, March 2023 edition, 10(1), 17-33.



BENEFIT OF ARTIFICIAL INTELLIGENCE AND ETHICAL IMPLICATIONS FOR BUSINESS EDUCATION PROGRAMME IN TERTIARY INSTITUTIONS IN DELTA STATE, NIGERIA

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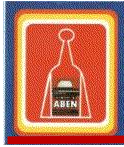
Abstract

The study explored the benefit of artificial intelligence and ethical implications for Business Education Programme in tertiary institutions in Delta State, Nigeria. Two research questions guided the study and two null hypotheses were formulated and tested. The study adopted the descriptive survey design. The population of the study consisted of two thousand six hundred and fifty (2,650) business education students registered for the 2021/2022 academic session from colleges of education and universities in Delta State. Simple random sampling technique was used to obtain a sample size of 350, comprising 150 college students and 200 university students. A 20 item statement questionnaire that was validated by three research experts was used for data collection. The reliability of the instrument was ensured using test re-test technique and data obtained were analyzed using Cronbach alpha statistics. The analysis yielded a reliability coefficient of 0.79 which was suitable for the study. Data collected from the research questions were analyzed using mean and standard deviation while the independent sample t-test was used to test the hypotheses at a significance level of 0.05. The findings of the study revealed that AI-empowered systems facilitate personalized-learning, enable adaptive learning and real-time feedbacks on learning progression. However, AI ethical concerns in education were identified to include but not limited to: data privacy and security, algorithmic bias, unfairness, among others. Based on the findings, the study recommends that AI-technology developers and regulatory bodies should ensure that viable data privacy policies are established to protect and safeguard personal information and that surveillance mechanism embedded in AI's predictive systems should be automated for prompt identification of learning patterns and areas of improvement, also that AI-algorithmic systems should be carefully designed for equitable access to data, avoid inequalities that could cause socio-economic disparities and educational gap.

Keywords: Artificial Intelligence, Personalized learning platforms, Adaptive learning Algorithms, Ethical Implications and Education

Introduction

Artificial intelligence has become significantly important in transforming various industries, shaping of individual lifestyle and work habit in today's world of work. In recent times the field of education has witnessed a rapid transformation, largely driven by advanced Artificial Intelligence (AI) technology. This technology has the potential to revolutionize every aspect of education ranging from personalized learning experiences to effective administrative system. The rapid update of AI technology and its continuous innovation and application in institutions has come with increased convenience providing innovative solutions and improved access to quality information. AI is remarkably a substantial technology that has recently tried to mop off the traditional pedagogical approach in academic and administrative processes with the introduction of machine learning systems designed to display very high level of human intelligence in an astonishing velocity. As noted by Cox and Mazumdar (2022), Artificial Intelligence is a collection of technologies with broad applicability in various fields of the human endeavor. AI deals with simulation of intelligence and behaviour in computers with capacity to mimic and virtually improve human conduct. According to Piano (2020), AI technology involves computers performing action or achieving desired result without human intervention. On a general note, especially as regards education sector, the emergence of Artificial Intelligence tools and its integration and application into learning situations has attracted significance with revolutionized teaching and learning, bringing about on the learning outcomes. AI-



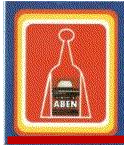
empowered learning tools involve machine learning system that uses algorithm to empower personalized and adaptive learning, facial recognitions among others.

Machine learning is concerned with the use of data and algorithms to perform tasks. Adewale and Akintola (2018) noted that Machine learning aims at building systems that make predictions based on data. It also involves drilling algorithms to identify learning styles and improve performance over time. These applications have expanded the digital possibilities in education by introducing new approaches and pedagogies in teaching-learning situations. Algorithms are rules designed to undertake a specific task or solve a particular problem. Algorithmic system provides a clear step-by-step strategy in achieving desired learning experience. According to Dignuim (2018), algorithmic systems are the core element of Artificial Intelligence, they consist of instructions that computers obey in finding solution to a problem. The algorithmic applications have featured prominently on various social media platforms and have contributed immensely to the overall improvement of education by providing timely solution to major challenges in education. The introduction and application of algorithmic systems in learning environment facilitate personalized-learning, enable adaptive learning and real-time feedbacks.

Personalized learning platforms are educational technologies that use AI tools to tailor learning experiences to individual learner's needs, performance and abilities. The platform influence AI- algorithms to analyze students' data and adapt instructional content, feedbacks and resource materials in optimizing learning outcomes. AI-Personalized learning platforms increase motivation and engagement of learners by aligning content with students' interest and learning pattern. This learning approach addresses specific gap in knowledge and adapt to varying learning needs. The personalized learning pattern supports diversity in learning patterns which accordingly result in instructional effectiveness. The platform leverages at advance AI technologies to adapt to learning environment of each learner. The adaptive learning platform powers AI to personalize educational experience. It uses algorithms to analyze students' learning styles and dynamically adjust content resources and at the same provides instant feedback to guide students in real-time. According to Bulger (2016), the transformative learning experiences through the personalized learning platforms, adapt to each learner's personal strengths, weaknesses, and preferences, providing a nurturing way to achieve superior learning outcomes. More importantly, these learning tools support and quicken responses to learners' questions, improving performance and other learning experiences. AI learning tools lessen the burden of both teachers and students through the automated learning assessment management systems that facilitate evaluation processes and facial recognition systems' insight into learners' behavior and other educational activities.

Education is a key to solving all life problems, It does not just prepare the individual for life but it is life itself. Education is dynamic process that emphasizes critical thinking, creativity and development of skills that allow individuals thrive in a complex society. Education involves discovery and talent development for capacity building. Education in its multifaceted nature aims at preparing individuals for active participation in the global world. According to Duckworth (2023), education is the systematic cultivation of intellectual and emotional resilience through a lifelong learning experience. The integrating of AI into the education system has fostered learning activities with transformative experiences. Adewale, & Akinola (2018) noted that AI-driven educational tools help to identify and nurture individual talents, provides innovative and learning opportunities that suits the learners' interest and strengths. The adaptive learning platforms allow learners to learn at their own pace, providing timely feedback to individual learners. The personalized learning tools are adaptive in nature that help in addressing individual learning styles by providing variety of instructional materials based on individual learning needs and progression. The learning platforms identify gaps in previous knowledge by accommodating learners' strength, weakness and providing adaptive support to students (Chu, Tu, & Yang 2022). Furthermore AI learning tools like the virtual classroom enhances collaborative learning and participation. These platforms are social learning outlets that facilitate interaction and ability to respond naturally with a conversational tone. Social networking learning platform allows for students-teachers connectivity and expands learning opportunities beyond the classroom. AI technological advancements has brought potential benefits to the education sector, although certain ethical issues have been identified to be associated with Artificial Intelligence integration in education

Ethical implication of Artificial intelligence in education extends beyond technical considerations but encompasses issues related to AI algorithmic biases. For instance, when algorithms are created, they collect a large set of data that are always accompanied by systemic biases that automatically transform into



algorithms biases. AI applications often require the collection, analysis and storage of large amounts of data. Given the volume of data generated, the greatest ethical concern is related to data privacy and security, fairness, transparency, accountability having greater impact on learning outcomes. The widespread collection and analysis of data by AI system, raises concerns about how that data is used, stored, and protected, particularly in protecting student data. According to Black, Bolsoven, and Daboise (2014), privacy violation occurs when individual information is access online without the owner's consent. AI systems that perpetuate bias and unfairness could result to educational disparities, thus creating gap and learning exclusion, especially among the disadvantaged learners. The amplification of AI systems has resulted in unfairness among learners and has broadened the possibility of less privileged learners having equal access to resources. Consequently, these wide range of ethical concerns in education that are not just limited to data privacy, unequal access, transparency and accountability could be tackled if the systems are carefully designed and monitored by AI technology developers and policy regulatory bodies in their established measures that enhance data privacy and security. Clearly Baker (2023) asserted that there is need for data protection regulations so as to safeguard against unauthorized access or misuse of students' personal information. Furthermore, algorithms and machine-learning model tracking systems need to be largely engaged in monitoring activities of users and determine their actions. Surveillance mechanism should also be embedded into AI's predictive systems to foresee students' outcomes, strengths, weaknesses and learning patterns. Mario and Ayala (2023) clearly noted that, a subtle technique is required to balance the benefits and ethical issues of artificial intelligence integration in education, essentially by applying principles of equity and fairness in AI learning platforms for optimal learning outcomes.

Statement of the Problem

One of the major aims of AI in education is to foster learning activities. With the transformative capacity of AI learning platforms, it presents opportunity for individualized learning experiences. The education sector is expected to fully explore the potentials in AI technologies through AI-driven learning activities. But observation reveals that the education sector especially some tertiary institutions seem not to have adequate access to AI- empowered learning platforms. Further observations also reveal that most learners especially the disadvantaged are deprived access to learning materials and timely feedback required in determining their learning progression. These setbacks could be attributed to the ethical concerns associated with the integration of AI technology in education. These ethical issues as identified in this study, include: data privacy and security, algorithm bias, unfairness, lack of transparency and accountability among others. The complexity of these hurdles in AI application in education if not contained may result in partial or non-accomplishment of learning objectives and consequently resulting in poor learning experiences, academic gap and unfruitful learning outcomes. In order to checkmate these learning anomalies, there is the need for a balanced approach in AI applications by ensuring an inclusive education system that is free of biases and inequalities if the maximum learning experience expected is to be attained. It is on this premises that the study examined the benefits of Artificial intelligence and ethical implications for business education programme in institutions especially in tertiary institutions in Delta State.

Research Questions

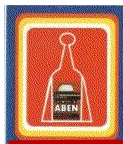
- 3 What are the benefits of AI integration in business education programme in tertiary institutions in Delta State?
- 4 What are the ethical implications of AI integration for business education programme in tertiary institutions in Delta State?

Hypotheses

Two null hypotheses were formulated and tested at alpha level of 0.05.

Ho1: There is no significant difference in the mean responses of business education students in colleges of education and universities on the benefits of AI integration in business education programme in tertiary institutions in Delta State.

Ho2: There is no significant difference in the mean responses of business education students in colleges of education and universities on the ethical implications of AI integration for business education programme in tertiary institutions in Delta State.



Method

The study adopted descriptive survey design. The researcher considered this design suitable for this study since it elicits information from respondents regarding the benefits and ethical implications of AI integration for business education programme in tertiary institutions in Delta State. Two research questions guided the study and two null hypotheses formulated and tested at alpha level of 0.05. The population of the study was made up of two thousand six hundred and fifty (2,650) business education students of the 2021/2022 academic session from colleges of education and universities where business education is offered in Delta State. Simple random sampling technique was employed to obtain a sample size 350, composed of 150 college students and 200 university students. A structured questionnaire with the title "Benefits and Ethical Implications of Artificial Intelligence in Business Education Programme in Nigerian Tertiary Institutions Questionnaire" (BEIAIBEPNTIQ) was used for the study. The instrument was made up of twenty (20) item statements and was graded on a four point rating scale of Strongly Agreed (4points), Agreed (3points), Disagreed (2points) and Strongly Disagreed (1point) which was validated by three research experts. The reliability of the instrument was determined using test-retest technique. Data obtained from the administrations were analyzed with Cronbach alpha statistics and it yielded a reliability coefficient of 0.79. The value was considered reliable and appropriate for the study. Data collected from respondents as regards the research questions were analyzed using Mean and Standard Deviation while Independent t-test was used to test the null hypotheses at a significance level of 0.05.

Decision rule for the research questions was based on an average mean score of 2.50 while the null hypotheses were based on t-critical value. If the t-calculated is less than the t-critical, the null hypothesis was accepted and if otherwise, rejected.

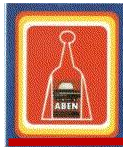
Results

Research Question 1: What are the benefits of AI integration in business education programme in tertiary institutions in Delta State?

Table 1: Mean and Standard Deviation of responses on the benefits of AI integration in business education programme in tertiary institutions in Delta State?

S/N	Item Statements	(x)	SD	Remark
1	I always utilize AI personalized learning platform	3.19	0.64	Agreed
2	Relevant resource materials are provided in the learning platforms based on learning needs	2.45	0.45	Disagreed
3	The adaptive learning platform fits into my learning preference	2.32	0.56	Disagreed
4	The learning platforms effectively identifies and address my learning strengths and weaknesses	3.65	0.54	Agreed
5	I am not satisfied with the feedbacks gotten from the AI learning platforms	2.28	0.55	Disagreed
6	I don't always access AI-generated recommendations for additional learning materials	2.23	0.43	Disagreed
7	I am motivated in my career due to the help of AI applications	3.45	0.45	Agreed
8	AI provides individualized performance progress	2.67	0.24	Agreed
9	I gets timely feedback from AI learning platforms	2.73	0.36	Agreed
10	Evaluating my learning progress is made easy through AI assessment platforms	2.65	0.38	Agreed
Grand Mean		2.76	0.46	Agreed

The analysis in research question one as shown in Table 1 indicates that the mean response of respondents ranged from 2.23 – 3.65. The result reveals that business education students in tertiary institutions in Delta State do access AI-empowered learning platforms. With an aggregate mean score of 2.76 above the criterion mean of 2.50, it implies that personalized and adaptive learning platforms are often utilized and enhances learning outcomes of business education programme in tertiary institutions in Delta State.



Research Question 2: What are the ethical implications of AI integration in business education programme in tertiary institutions in Delta State?

Table 2: Mean and Standard Deviation of responses on the ethical implications of AI integration in business education programme in tertiary institutions in Delta State

S/N	Item Statements	(x)	SD	Remark
11	I have limited access to AI learning resources due to digital divide	3.29	0.54	Agree
12	There is no transparency and accountability in AI learning platforms	2.25	0.56	Disagree
13	AI algorithms perpetuate unfairness in learning outcome	2.42	0.43	Disagree
14	I do have full access to AI- learning tools	3.35	0.55	Agree
15	I have never accessed AI learning platforms	2.27	0.64	Disagree
16	AI-algorithms prioritize security of data	2.63	0.47	Agreed
17	personally manage my privacy setting to control the use of data by others	2.17	0.78	Disagree
18	There are potential risks of data privacy and security in AI learning platforms	3.42	0.56	Agree
19	I don't share sensitive information online due to data insecurity	3.56	0.68	Agree
20	My school has some measures put in place to ensure AI-driven data privacy	2.23	0.57	Disagree
Grand Mean		2.76	0.58	Agree

The analysis in research question two as shown in Table 2 indicates that the mean responses ranged from 2.17 – 3.56. The result reveals that there are ethical challenges in AI integration in business education programme in tertiary institutions. With an aggregate mean score of 2.76 above the criterion mean of 2.50, this signifies that issues such as: data privacy and security, algorithm bias, unfairness among others are associated with AI integration in business education programme in tertiary institutions in Delta State.

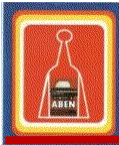
Test of Hypotheses

Ho1: There is no significant difference in the mean responses of business education students in colleges of education and universities on the benefits of AI integration in business education programme in tertiary institutions in Delta State.

Table 3: Summary of t-test analysis on the significant difference in the mean responses of business education students in colleges of education and universities on the benefits of AI integration in business education programme in tertiary institutions in Delta State

Institutions N X SD df t-cal t-critical Decision					
Colleges 1503.56 0.54 348 -28.08 1.96 Not Significant					
Universities 2003.450.49					

Data in Table 3 reveals a t-calculated value of -28.06 which is less than the t-critical value of 1.96 at alpha level of 0.05. The analysis depicts a null hypothesis of no significance. Therefore the null hypothesis which states that there is no significance difference in the mean responses of business education students in colleges of education and universities on the benefits of AI integration in business education programme in tertiary institutions in Delta State is retained. It therefore implies that the mean responses of business education students in colleges and universities do not significantly differ on the benefits of AI integration in business education programme in tertiary institutions in Delta State, Nigeria.



H02: There is no significant difference in the mean responses of business education students in colleges of education and universities on the ethical implication of AI integration in business education programme in tertiary institutions in Delta State.

Table4: Summary of t-test analysis on the significant difference in the mean responses of business education students in colleges of education and universities on the ethical implication of AI integration in business education programme in tertiary institutions in Delta State.

Institution	N	X	S	dft	-calt	-critical	Decision
Colleges	150	3.680	.72	273	-26.04	1.96	Not Significant
Universities	200	3.260	.56				

Table 4 analysis shows a t-calculated value of -26.04 which is less than the t-critical value of 1.96 at alpha level of 0.05. The result depicts a null hypothesis of no significance. Therefore the null hypothesis which states that there is no significant difference in the mean responses of business education students in colleges of education and universities on the ethical implication of AI integration in business education programme in tertiary institutions in Delta State is retained and accepted. The result implies that the mean responses of business education students in colleges of education and universities do not significantly differ on the ethical implications of AI integration in business education programme in tertiary institutions in Delta State, Nigeria.

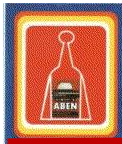
Discussion of Findings

The findings of the study were discussed in line with the research questions and the tested hypotheses. The result of research question one as shown in Table 1 reveals the mean and standard deviation of respondents on benefits of AI integration in business education study in tertiary institutions in Delta State. With an aggregate mean score of 2.76 above the criterion mean of 2.50, it implies that AI is beneficial in education through the personalized and adaptive learning platforms that enhance individualized learning experiences. This is in agreement with Loeck (2022) who affirm that the transformation of learning experiences through AI- personalized platforms has contributed greatly to the overall improvement in learning processes by identifying areas of improvement and profile timely solution.

The analysis in research question two as shown in Table 2 reveals that there are ethical implications associated with AI integration in learning. With an aggregate mean score of 2.76 above the criterion mean of 2.50, it signifies that the integration of AI technologies in education is associated with issues of data privacy, algorithmic bias and unfairness which are barriers to the learning experiences with AI learning platforms. According to Mario and Ayala (2023), the issue of unequal access to AI educational tools could cause socio-economic disparities, thus creating educational gaps especially among the disadvantaged learners.

The data analysis in Table 3 shows a t-calculated value of -28.06 which is less than the t-critical value of 1.96 at alpha level of 0.05. The result depicts a null hypothesis of no significance. Therefore the null hypothesis which states that there is no significance difference in the mean responses of business education students in colleges of education and universities on the benefits of AI integration in business education programme in tertiary institutions is retained. This implies that AI-empowered learning platforms are beneficial to business education students in tertiary institutions in Delta State.

The analysis in Table 4 reveals a t-calculated value of -26.04 which is less than the t-critical value of 1.96 at alpha level of 0.05. The result signifies a null hypothesis of no significance. It therefore depicts that the null hypothesis which states that there is no significant difference in the mean responses of business education students in colleges of education and universities on the ethical implication of AI integration in business education programme in tertiary institutions in Delta State is accepted. This suggests that ethical issues are associated in AI integration in business education study in tertiary institutions in Delta State. In corroboration with the above analysis, Black, Bolsoven, and Daboise (2014) affirm that AI-algorithms perpetuate bias and inequalities that lead to the exclusion of learners, especially if the systems are not carefully designed and monitored for equitable access.



Conclusion

Based on the findings, the researcher concluded that: AI-personalized and adaptive learning platforms are of utmost importance in education because these platforms adapt to individual learning capability, providing learning materials according to individual learning needs and subject areas. More importantly the AI-interactive learning tools, promote critical thinking and collaborative learning thus facilitating lifelong learning experiences. Algorithm bias and unequal access to data were revealed to be associated with AI integration in education. The most worrisome concerns were the issue of data privacy and security, lack of transparency among others

Recommendations

The following recommendations were made by the researcher based on the findings of the study;

- 1 AI technology developers and regulatory bodies should ensure that viable data privacy policy regulations are maintained to regularly protect and safeguard personal information.
- 2 Surveillance mechanism embedded in AI's predictive systems and AI- personalized platforms should be actively automated for prompt identification of learning patterns and areas of improvement and profile timely solution for the overall contribution and improvement in learning processes
- 3 AI-algorithmic systems should be carefully designed and monitored for equitable access to avoid inequalities that could cause socio-economic disparities, thus creating educational gaps that may lead to the exclusion of learners

References

- Adewale, A..A., & Akinola, T.O. (2018). Transforming Nigeria State University curriculum with artificial intelligence and machine learning integration: In Proceedings of the International Conference on Educational Technology (ICET), Lagos Nigeria
- Baker, M. (2023). Data protection day-key developments: Special Edition. *Update Of Key Data Protection and Privacy Developments and Trends across the Globe*. bakermckenzie.com
- Black, G., Bolsoven, G., & Duboise E. (2014). *A new policy paradox: Young people privacy on social network site*. Oxford Internet Institution.
- Borenstein, J., Howand, A. (2020). Emerging challenges in AI and the need for AI ethics education: AI Ethics 2020.1, 61-65, doi:10.1007/s43681-020-0002-9. (Cross (Ref)(Google Scholar).
- Bulger, M. (2016). Personalized learning, the conversation we're not having. *Data and Security Research Institution*.
- Chan, L., Chan, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*. 8, 75264-75278, <https://doi.org/10.1109/ACCESS.2020.2988510>
- Chu, H., Tu, Y., & Yang, K. (2022). Roles of research trends of artificial intelligence in higher education: A systematic review of the top 50 most-cited articles. *Australasia Journal of Educational Technology*. 38(3), 22-42, <https://doi.org/10.14742/ajet.7526>
- Cox, A. & Mazumdar, S. (2022). Defining artificial intelligence for librarian: *Journal of Librarianship and Information Science*. ISSN 0961-0006, <https://doi.org/10.1177/09610006221142029>
- Cristianini, N. (2016). Intelligence reinvented: New scientist, 23293097), 37-41, [https://doi.org/10.1016/so262-4079\(16\)31992-3S](https://doi.org/10.1016/so262-4079(16)31992-3S)
- Dignuin, V. (2018). *Ethics in artificial intelligence introduction to the special issue: <http://datasecurity.net/library/personalized-learning-theconversation-were-not-having>*.
- Mario, F., & Ayala, P. (2023). Artificial intelligence in education: exploring the potential benefits and risk: 593 *Digital Publisher CEIT*, 8(3), 892-899, <https://orcid.org/0000-0002-3344-8931>
- Piano, S.L. (2020) Ethical principles in machine learning and artificial intelligence: case from the field and possible ways forward: *Humanities Soc. Sci. Commun*. 2020: 7(9), 1-7. (Goggle Scholar)
- UNESCO. (2021). Principles for the ethical use of artificial intelligence in the United Nations' Systems: *HLCF Inter- Agency Working Group on Artificial Intelligence: UNESCO General conference, 41st session*



ADVANCING BUSINESS EDUCATION THROUGH THE INTEGRATION OF ARTIFICIAL INTELLIGENCE IN KOGI STATE

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Abstract

This paper focuses on advancing business education through the integration of Artificial Intelligence (AI) in Kogi State as a means of fostering innovation, improving teaching and learning outcomes, and aligning the programme with the needs of the modern place. Two purposes of the study, two research questions and two hypotheses were formulated to guide the study. The study was based on the Roger's theory of diffusion of innovation. A 4-point scale questionnaire titled: Questionnaire on the Advancing Business Education through the Integration of Artificial Intelligence (QABEIAI) was used for data collection. The instrument was tested for reliability using Cronbach Alpha and it yielded a reliability coefficient of 0.8. Two institutions in Kogi State were purposively sampled for the study which are; the Federal University Lokoja and Kogi State Polytechnic, Lokoja. The population comprised of the entire 16 business educators in the Departments of Business Education and of Office Technology and Management respectively. Mean and standard deviation were used to analyse the data and find answers to the research questions, while t-test was used to test the research hypotheses. The results of the research questions revealed amongst others the opportunities and challenges of integrating AI in business education curriculum; AI integration can personalize learning experiences in business education, AI technologies can enhance the accuracy of student assessments in business education while Lack of adequate infrastructure is a significant challenge to integrating AI in business education more so, AI's potential to replace traditional teaching roles creates uncertainty among educators. On the other hand, the hypotheses suggested that there is no significant difference in the mean ratings of business educators in polytechnic and university on the opportunities of integrating AI into business education curricula. Based on the findings, it was recommended amongst others that the Tertiary Education Trust Fund (TETFUND) should consider addressing the issue of technological infrastructure, including reliable internet access, modern computers, and AI software, in educational institutions and that Institutions should provide professional development programmes for educators focused on the effective use of AI in teaching and curriculum development.

(**Keywords:** Integrating Artificial Intelligence Business Education)

Introduction

The integration of Artificial Intelligence (AI) in various sectors has become a transformative force, fundamentally altering traditional approaches and practices. In recent years, Artificial Intelligence (AI) has emerged as both a revolutionary and transformative force in education, offering new possibilities for enhancing teaching, learning and research experiences, improving educational outcomes, and preparing students for the demands of a digitally-driven economy (Alam, 2021). Coursera (2024) defines Artificial intelligence as the theory and development of computer systems capable of performing tasks that historically required human intelligence, such as recognizing speech, making decisions and identifying patterns.



Business education is a programme of study that specializes in the acquisition and development of skills and competencies, attitudes, and attributes which are necessary for efficiency (Ojechi, 2015). It is a programme that plays a pivotal role in preparing individuals for the challenges and opportunities of the modern business world. In Nigeria, the business education curriculum has traditionally focused on providing students with knowledge in areas such as accounting, marketing, office technology and entrepreneurship. Effective business education must equip graduates with the skills and knowledge necessary to navigate a complex, technology-driven environment. However, the rapid pace of technological change and the increasing importance of digital literacy in the global economy have highlighted the need for a more innovative and forward-looking approach to curriculum development. Leveraging AI in business education could help address some of the systemic challenges in the education sector. For instance, AI-powered tools can enhance access to quality education by providing personalized learning experiences to students in remote or underserved areas. Additionally, AI can be used to develop more efficient educational management systems, improving resource allocation and reducing administrative burdens on educators. The rapid advancements in Artificial Intelligence (AI) are reshaping various programmes in education, creating a critical need for business education to adapt to these technological changes. However, many current business education curricula, particularly in developing countries, remain anchored in traditional methodologies that fail to incorporate AI-driven tools and knowledge. This disconnect between educational content and the skills demanded by the modern business environment would leave graduates underprepared for the challenges and opportunities presented by AI in the workplace.

In Nigeria, the gap is particularly pronounced as the integration of AI in education is still in its nascent stages. In spite of this, business education program is expected to take the lead on this technology driven terrain. The lack of a strategic framework for embedding AI into business education curricula exacerbates the issue, resulting in a misalignment between educational outcomes and industry needs. Consequently, business graduates in Nigeria may struggle to compete in the increasingly AI-driven global economy, limiting their employability and the country's overall economic growth. This study highlights the potential opportunities and challenges inherent in integrating AI in business education and proffers a strategic framework that should guide the process.

In Nigeria, the integration of AI into business education is both a challenge and an opportunity. However, Nigeria also presents significant opportunities for innovation in business education. The country's large and youthful population, coupled with a growing interest in entrepreneurship and digital innovation, creates a fertile ground for the development and implementation of AI-driven educational initiatives.

In business education, AI can enhance the learning process by providing students with interactive simulations, virtual business environments, and intelligent tutoring systems that adapt to individual learning styles and paces (Seldon & Abidoye, 2018). Integrating AI into business education curricula involves developing new content, pedagogical approaches, and assessment methods that reflect AI's impact on the business environment. Research indicates that AI can transform curriculum design by incorporating contemporary skills and knowledge areas (Murray, 2019). The role of Artificial Intelligence (AI) in business education in advanced countries has expanded rapidly, offering new opportunities for personalized learning, efficient resource management, and enhanced decision-making. AI technologies, such as machine learning, natural language processing, and predictive analytics, are being used to create adaptive learning environments that cater to individual student needs, predict learning outcomes, and provide real-time feedback (Kaplan & Haenlein, 2020; Rane, Choudhary & Rane, 2023).



AI tools such as intelligent tutoring systems, automated grading, and adaptive learning platforms have shown promise in improving learning outcomes by tailoring educational content to individual student needs (Luckin, Holmes, Griffiths, & Forcier, 2016). These technologies can provide real-time feedback, enabling students to learn at their own pace and allowing educators to focus on more complex instructional tasks.

Moreover, AI can help bridge the gap between education and industry by providing students with up-to-date knowledge and skills relevant to the current job market (West, 2018). For instance, AI can be used to analyze labor market trends and adjust curricula accordingly, ensuring that students are learning the most relevant and in-demand skills.

Lastly, AI introduces virtual tutors, which provide students with instant feedback and support. These AI-powered systems can adapt to individual learning needs, offering targeted assistance to help students to master complex concepts. Virtual tutors can analyze student responses and provide real-time feedback, ensuring that learners receive the support they need when they need it. This constant availability of personalized support helps students overcome challenges more effectively, fostering a more productive learning experience (OpenLearn, 2024). Despite the potential benefits of Integrating AI into business education curricula in Nigeria, there are a number of potential challenges. Generally, the country's education system faces numerous challenges, including inadequate infrastructure, limited access to digital resources, and a shortage of qualified educators. These challenges would no doubt hinder the adoption of AI and other advanced technologies in business education. One of the primary obstacles is the lack of infrastructure and resources. Many educational institutions in Nigeria struggle with basic issues such as inadequate funding, poor internet connectivity, and insufficient access to modern technology (Okebukola, 2015). These challenges make it difficult to implement AI-driven tools and platforms effectively.

Another significant challenge is the lack of trained educators who can effectively integrate AI into their teaching practices (Adedoyin & Soykan, 2020). Educators need to be not only familiar with AI technologies but also capable of designing and delivering AI-enhanced curricula. However, the current professional development opportunities for educators in Nigeria are limited, with few programs focusing on the use of AI in education (Omodan, 2020). Additionally, there are concerns about the ethical implications of AI in education, such as data privacy, bias in AI algorithms, and the potential for AI to exacerbate existing inequalities (Williamson & Eynon, 2020). These concerns need to be carefully considered when developing and implementing AI-driven educational initiatives. More so, potential barrier to effectively utilizing AI tools in business education is the lack of technical expertise among educators. Many teachers may struggle to adapt AI tools to their specific needs due to unfamiliarity with the technology. For instance, crafting effective prompts for generative AI tools often requires a deeper understanding of how to formulate questions in a way that elicits the desired responses. This process can necessitate knowledge of AI's underlying mechanisms, which may be outside the skill set of many educators. As a result, the potential benefits of AI could be underutilized without adequate support and training.

Cost is another challenge that educational institutions face when implementing AI solutions. The financial burden can be considerable, especially for institutions with limited budgets or funding sources. Although some AI providers have introduced credit systems to help manage usage and distribute costs among team members, the expenses associated with AI adoption remain a significant hurdle for many schools and universities. These financial constraints may prevent some institutions from fully embracing AI technology, limiting access to its potential benefits for both educators and students. The adoption of AI also raises a number



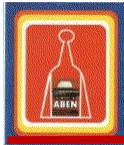
of ethical concerns that must be carefully considered. Privacy and data security are major issues, as AI often requires the collection and analysis of sensitive student information. Ensuring that this data is protected and used responsibly is critical to maintaining trust in AI systems. Additionally, the use of AI in education raises questions about academic integrity, as tools like generative AI can facilitate plagiarism or academic dishonesty. Another major challenge is the lack of expertise among educators. Many instructors may not have the necessary skills or knowledge to effectively teach AI-related content (Hsu, 2018). This gap necessitates professional development and training programs to equip educators with the required competencies (Wang, Wang, & Liu, 2019).

Finally, there is the challenge of fostering effective human-AI collaboration. The introduction of AI in business education may face resistance from educators who fear that AI could replace their roles, leading to job displacement. However, AI should not be viewed as a replacement for human creativity and expertise. Educators and learners bring unique perspectives, critical thinking, and innovative approaches that AI cannot replicate. AI should be seen as a tool to augment and enhance human capabilities, allowing educators to focus on higher-order teaching tasks while AI handles repetitive or administrative functions. By fostering a collaborative relationship between humans and AI, the educational process can be enriched rather than diminished (Nguyen, 2023). Given the potential challenges and opportunities of integrating AI into business education, there is a need for a strategic framework that should guide this process. Such a framework should address the specific needs and constraints of the Nigerian educational context while ensuring that the integration of AI enhances the quality and relevance of business education (Onyema, 2020).

As artificial intelligence (AI) becomes increasingly integrated into modern society, its role in transforming education is becoming evident. However, the successful integration of AI into business education programmes require careful attention to several key factors. These include the development of technological infrastructure, professional training for educators, the design of AI-enhanced curricula, addressing ethical considerations, and engaging stakeholders in the process. Each of these components plays a vital role in ensuring that AI is effectively and ethically used to improve education and better prepare students for the demands of the modern business environment.

One of the fundamental challenges facing educational institutions in the implementation of AI technologies is the lack of adequate technological infrastructure. For AI to be utilized effectively, institutions must have access to reliable internet, modern computing equipment, and the appropriate software tools that support AI applications. Many educational institutions, particularly in developing regions, face infrastructure gaps that hinder their ability to fully leverage AI.

The need for high-speed internet is essential, as many AI tools rely on cloud-based platforms that require constant connectivity. Additionally, outdated computer systems may not have the processing power necessary to run AI software efficiently. Investments in modern hardware and software are critical to ensuring that both educators and students can access and use AI technology to enhance learning. By addressing these ethical issues, institutions can create a framework that fosters trust in AI technologies while ensuring that their use in education aligns with broader societal values of fairness, equity, and inclusivity. Successfully integrating AI into business education requires the collaboration and input of all relevant stakeholders. These stakeholders include educators, students, policymakers, industry representatives, and technology developers. Engaging these groups in the development and implementation of AI-driven curricula ensures that the educational system is responsive to the needs of both learners and the broader economy.



Educators, as the primary implementers of AI technologies, must be involved in the design and decision-making process to ensure that the tools developed are practical and beneficial for teaching and learning. Students, as the end users, should also have a voice in how AI is used, as their feedback can help tailor AI tools to better meet their learning needs. Rogers Diffusion of Innovations Theory 2003 is relevant in the integration of AI in business education curriculum. Medlin (2001) asserted that Rogers' Diffusion of Innovations Theory is the most appropriate for investigating the integration of technology in higher education and educational environments. Rogers (2003) usually used the word "technology" and "innovation" as synonyms. He opined that, integration result from a decision of full use of an innovation as the best course of action available and rejection is a decision not to integrate a technology. According to Rogers (2003), uncertainty is an important obstacle to the adoption and integration of innovations. An innovation's consequences may create uncertainty. To reduce the uncertainty of adopting and integrating the innovation, individuals should be informed about its advantages (opportunities) and disadvantages (challenges) to make them aware of all its consequences.

The theory goes further to highlight uncertainty as an important obstacle to the adoption of an innovation, and suggests that for uncertainty to be reduced, individuals should be well informed about its advantages and disadvantages to make them aware of all its consequences. On the whole, the Rogers theory of diffusion of innovation helps to understand the desires and main behavior in the uptake and integration of technology at the higher institution.

Purpose of the Study

The following research questions guided the study

1. To identify the opportunities of integrating AI into business education curricula.
2. To identify the challenges of integrating AI into business education curricula.

Research Questions

1. What are the opportunities of integrating AI into business education curricula?
2. What are the challenges of integrating AI into business education curricula?

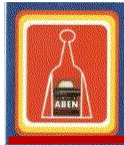
Hypotheses

Based on the purposes of the study and the research questions the following hypotheses were formulated and tested at 0.05 level of significance

1. There is no significant difference in the mean ratings of business educators in polytechnic and university on the opportunities of integrating AI into business education curricula
2. There is no significant difference in the mean ratings of business educators in polytechnic and university on the challenges of integrating AI into business education curricula

Methodology

Descriptive research design was adopted for the study. Two institutions in Kogi State were purposively sampled for the study and they are; the Federal University Lokoja (FUL) and Kogi State Polytechnic (KSP), Lokoja. The population comprised the entire 16 business educators in the Departments of Business Education and Office Technology and Management respectively. No sampling was carried out because the researcher found the population of the study to be manageable. The instrument of data collection was a structured questionnaire titled: Questionnaire on the Advancing Business Education through the Integration of Artificial Intelligence (QABEIAI). The instrument was structured on a four-point rating scale where 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Agree (A), and 4 = Strongly Agree (SA). The instrument has two sections: Section A focused on the bio-data questions while Section B focused on the research questions.



The instrument was validated by two experts in business education and one in measurement and evaluation from the Federal University Lokoja. The application of Cronbach Alpha reliability test on the returned data yielded coefficient values of 0.81 and 0.78 for clusters B1 and B2 respectively with an overall reliability co-efficient value of 0.8 for the two clusters. The researcher administered 16 copies of questionnaire to the respondents and all were completed and returned. Data collected from respondents were analyzed using mean, standard deviation and t-test. The mean value was used to answer the research question while the standard deviation was used to ascertain the homogeneity or otherwise of the respondents' ratings. In analyzing the mean, any item with mean score between 2.50 and 4.00 was deemed to be agreed while any item with mean score between 2.49 and 1.00 was deemed disagreed. For the hypotheses, t-test was used to test all the null hypotheses at 0.05 level of significance. Where the calculated t-value was less than the critical value of t, it meant that the variable had no significance. Where the calculated t-value was equal to or greater than the critical t-value, it meant that the variable had a significant effect on the respondents' mean rating and the hypotheses was rejected.

Results

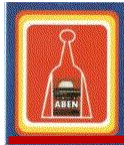
Research Question 1

What are the opportunities of integrating AI into business education curricula?

Table 1: mean ratings of business educators on the opportunities of integrating AI into Business Education curricula (N=16)

S/NO	ITEMS	X	SD	REMARKS
1	AI integration can personalize learning experiences in business education	3.86	0.87	Agree
2	AI can help in identifying individual student learning needs in business education	2.52	0.76	Agree
3	AI can facilitate the development of critical thinking skills in business education students	3.68	0.72	Agree
4	AI technologies can enhance the accuracy of student assessments in business education	3.84	0.81	Agree
5	The use of AI in business education can lead to more innovative teaching methods	3.88	0.76	Agree
6	AI can support the development of more relevant and up-to-date business education curricula	3.64	0.84	Agree
7	AI can contribute to more effective online learning experiences in business education	3.68	0.77	Agree
8	AI integration can help to better prepare business students for the workforce	3.88	0.80	Agree
9	AI can enable more flexible and adaptive learning pathways in business education	2.58	0.76	Agree
10	AI can assist in the continuous improvement of business education programs	3.87	0.72	Agree
11	AI can provide affordable access to high-quality educational content	3.76	0.74	Agree
Grand Mean		3.56		Agree

The result of research question 1 presented in table 1 showed that the grand mean of 3.56 was greater than the midpoint value of 2.50. This suggest that respondents agreed to the opportunities of integrating AI into Business Education curricula.



Research Question 2

What are the challenges of integrating AI into Business Education curricula?

Table 2: mean ratings of business educators on the challenges of integrating AI into Business Education curricula (N=16)

S/NO	ITEMS	X	SD	REMARKS
1	Lack of adequate infrastructure is a significant challenge to integrating AI in business education	3.48	0.74	Agree
2	There is a shortage of skilled educators proficient in AI within business education	3.21	0.72	Agree
3	Resistance to change among educators poses a challenge to AI integration in business education	3.45	0.81	Agree
4	AI's potential to replace traditional teaching roles creates uncertainty among educators	3.02	0.70	Agree
5	Ethical concerns regarding AI use are a challenge in business education	3.78	0.82	Agree
6	Students' lack of familiarity with AI technology is a barrier to its successful integration in business education	3.08	0.82	Agree
7	AI integration in business education requires significant curriculum redesign, which is challenging	3.22	0.79	Agree
8	The lack of relevant AI-related educational resources is a challenge for business education	3.54	0.80	Agree
9	The need for continuous AI-related training for educators is a challenge	3.35	0.77	Agree

Grand Mean

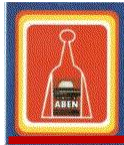
3.35 Agree

The result of research question 2 presented in table 2 showed that the grand mean of 3.35 was greater than the midpoint value of 2.50. This suggest that respondents agreed to the challenges of integrating AI into business education curricula.

Table 3: t-test analysis of respondents mean ratings of business educators on the opportunities of integrating AI into business education curricula.

Variable	N	SD	df	α	t-cal.	t-crit.	Decision
FUL Bus. Educ.	6	3.01	0.76				
			14	0.05	0.21	1.96	Not Significant
KSP Bus. Educ.	10	2.98	0.86				

Data in Table 3 shows that the calculated t-value of 0.21 at 14 degree of freedom at 0.05 level of significance is less than the critical value of 1.96. This indicates that there is no significant difference in the mean rating of Business Educators in the Polytechnic and Universities on the opportunities of integrating AI into business education curricula, hence the hypotheses is accepted.

**Table 4:** t-test analysis of respondents mean ratings of business educators on the challenges of integrating AI into business education curricula

Variable	N		SD	Df	A	t-cal.	t-crit.	Decision
FUL Bus. Educ.	6	3.00	0.76	14	0.05	0.43	1.96	Not Significant
KSP Bus. Educ.	10	3.18	0.79					

Data in Table 4 shows that the calculated t-value of 0.43 at 14 degree of freedom at 0.05 level of significance is less than the critical value of 1.96. This implies that there is no significant difference in the mean ratings of Business Educators in the Polytechnic and Universities on the challenges of integrating AI into business education curricula, hence the hypotheses is accepted.

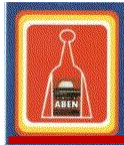
Discussion of Findings

The findings on Table 1; research question 1 revealed that the integration of artificial intelligence (AI) in business education can provide opportunities for personalize learning experiences, help in identifying individual student learning needs, facilitate the development of critical thinking skills, enhance the accuracy of student assessments, lead to more innovative teaching methods. The table also showed that integrating AI into the business education curriculum can support the development of more relevant and up-to-date business education curricula, contribute to more effective online learning experiences, help to better prepare business students for the workplace, enable more flexible and adaptive learning pathways, assist in the continuous improvement and provide affordable access to high-quality educational content.

These finding are in agreement with the views of Seldon and Abidoye (2018) who held that AI can significantly enhance the learning experience by providing personalized learning paths for students, automating routine tasks, and enabling more interactive and engaging educational content. Also the study is in agreement with Luckin, Holmes, Griffiths, & Forcier, (2016) who stated that the AI tools such as intelligent tutoring systems, automated grading, and adaptive learning platforms have shown the possibility in improving learning outcomes by tailoring educational contents to individual student needs. More so, Murray (2019) affirmed that AI can transform curriculum design by incorporating contemporary skills and knowledge areas. In line with the findings, West (2018) posited that AI can help bridge the gap between education and industry by providing students with up-to-date knowledge and skills relevant to the current job market.

Findings on Table 2; research question 2 showed that the following constitute challenges to the integration of AI in business education; Lack of adequate infrastructure, shortage of skilled educators proficient in AI within business education, resistance to change among educators fear of AI's potential to replace traditional teaching roles, ethical concerns regarding AI use, students' lack of familiarity with AI, requirement of significant curriculum redesign and the lack of relevant AI-related educational resources.

These findings are in consonance with Okebukola (2015) who revealed that many educational institutions in Nigeria struggle with basic issues such as inadequate funding, poor internet connectivity, and insufficient access to modern technology. Also Adedoyin & Soykan, (2020)



disclosed that another significant challenge is the lack of trained educators who can effectively integrate AI into their teaching practices.

Further findings reveal no significant difference in the mean ratings of business educators in the Polytechnic and University on the opportunities of integrating AI into business education curricula, hence the hypotheses is accepted. This shows that business educators in both Polytechnic and University are in agreement that the integration of AI in business education offers all the opportunities presented in Table 1. Further findings reveal no significant difference in the mean ratings of business educators in the Polytechnic and University on the challenges of integrating AI into business education curricula, hence the hypotheses is accepted. This shows that business educators in both Polytechnic and University are in agreement that the integration of AI in business education has all the challenges presented in Table 2.

Conclusion

Based on the findings of the study, the researcher concludes that the integration of AI into business education in Nigeria presents both challenges and opportunities. While there are significant obstacles to overcome, including inadequate infrastructure, lack of trained educators, and ethical concerns, the potential benefits of AI in enhancing the quality and relevance of business education are substantial. A strategic framework that addresses these challenges and leverages the strengths of AI can help transform business education in Nigeria, equipping students with the skills and knowledge they need to succeed in a rapidly evolving global economy.

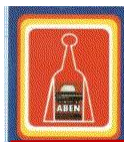
Recommendations

The following recommendations are made based on the findings of the study:

1. That the Tertiary Education Trust Fund (TETFUND) should consider addressing the issue of technological infrastructure, including reliable internet access, modern computers, and AI software, in educational institutions.
2. That Institutions should provide professional development programs for educators focused on the effective use of AI in teaching and curriculum development.
3. That the Nigerian Universities Commission (NUC), National Board for Technical Education (NBTE) and the National Commission for Colleges of Education (NCCE) in collaboration with the Association of Business Education (ABEN) should develop AI-enhanced curricula that are aligned with industry needs and provide students with the skills required in the modern business environment.
4. That all the concerned stakeholders should come together to address the issues surrounding ethical considerations by establishing guidelines to ensure the ethical use of AI in business education, including considerations of data privacy, bias, and accessibility.

References

- Abulibdeh, A., Zaidan, E. and Abulibdeh, R., (2024). Navigating the confluence of artificial intelligence and education for sustainable development in the era of industry 4.0: Challenges, opportunities, and ethical dimensions. *Journal of Cleaner Production*, p.140527.
- Adedoyin, O. B., & Soykan, E. (2020). COVID-19 pandemic and online learning: the challenges and opportunities. *Interactive Learning Environments*, 1-13.
<https://doi.org/10.1080/10494820.2020.1813180>
- Alam, A., (2021). Possibilities and apprehensions in the landscape of artificial intelligence in education. In 2021 International Conference on Computational Intelligence and Computing Applications (ICCICA) (pp. 1-8). IEEE.



- Chima, A. E. Onyebuchi, N. C & Idowu, S. A. (2024). Integrating AI in education: Opportunities, challenges, and ethical considerations *Magna Scientia Advanced Research and Reviews*, 2024, 10(02), 006-013
- Coursera (2024). What is artificial intelligence? <https://www.coursera.org/articles/what-is-artificial-intelligence>
- George, B. and Wooden, O., (2023). Managing the strategic transformation of higher education through artificial intelligence. *Administrative Sciences*, 13(9), p.196.
- Hsu, T. (2018). AI in education: An overview. *Journal of Educational Technology*, 35(2), 59-74.
- Kaplan, A., & Haenlein, M. (2020). Rulers of the world, unite! The challenges and opportunities of artificial intelligence. *Business Horizons*, 63(1), 37-50. <https://doi.org/10.1016/j.bushor.2019.09.003>
- Li, X. (2021). Emerging trends in business education: The role of AI. *Business Education Review*, 52(1), 112-127.
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence unleashed: An
- Medlin, B.D. (2001). The factors that may influence a faculty member's decision to adopt electronic technologies in instruction (Doctoral dissertation, Virginia Polytechnic Institute and State University, 2001). ProQuest Digital Dissertations. (UMI No. AAT 3095210).
- Murray, J. (2019). AI and curriculum development: A strategic approach. *Curriculum Perspectives*, 39(1), 34-47.
- Nguyen, N. (2023). Opportunities of AI in Education. Retrieved from: <https://feedbackfruits.com/blog/opportunities-and-challenges-of-ai-in-higher-education>
- Ojechi, H. O. (2015). Professionalism in business education: challenges and prospects. *Journal of vocational and technical education*, 9(1) 98-99
- Oluwatobi, S., & Ogunrinola, I. (2011). Government expenditure on human capital development: Implications for economic growth in Nigeria. *Journal of Sustainable Development*, 4(3), 72-80. <https://doi.org/10.5539/jsd.v>
- Okebukola, P. (2015). Bridging the digital divide in Africa: The Nigerian experience. *Open Learning: The Journal of Open, Distance and e-Learning*, 20(3), 254-257. <https://doi.org/10.1080/02680510500270158>
- Omodan, B. I. (2020). The vindication of decoloniality and reality of covid-19 as an emergence of unknown in rural university. *International journal of sociology of education* 8(4).1-26
- Onyema, E. M. (2020). Integration of emerging technologies in teaching and learning process in Nigeria: the challenges. *Central Asian journal of mathematical theory and computer sciences* 1(11).35-39
- Open Learning, (2024). Benefits of AI in Education. Retrieved from <https://blog.openlearning.com/ai-in-education>
- Rane, N., Choudhary, S. and Rane, J., (2023). Education 4.0 and 5.0: Integrating Artificial Intelligence (AI) for personalized and adaptive learning. Available at SSRN 4638365.
- Sajja, R., Sermet, Y., Cikmaz, M., Cwiertny, D. and Demir, I., (2023). Artificial Intelligence-Enabled Intelligent Assistant for Personalized and Adaptive Learning in Higher Education. arXiv preprint arXiv:2309.10892.
- Seldom, A. & Abidoye, O. (2018). The fourth education revolution. Legend press.
- Wang, Y., Wang, Y., & Liu, Y. (2019). Teacher training for AI integration in education: A global perspective. *Journal of Educational Technology & Society*, 22(2), 82-94.
- West, D. M. (2018). What is artificial intelligence brookings. Retrieved from: <https://www.brookings.edu/research/what-is-artificial-intelligence/>
- Rogers, E.M. (2003). Diffusion of innovations (5th ed.). 76-123 New York: Free Press

APPLICATION OF ARTIFICIAL INTELLIGENCE IN TEACHING BUSINESS EDUCATION COURSES IN RIVERS STATE TERTIARY INSTITUTIONS

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Abstract

Artificial Intelligence (AI) is rapidly enhancing teaching and learning process, and streamline administrative tasks globally. Therefore, this study determined application of artificial intelligence (AI) in teaching business education courses in River's state tertiary institutions. Two research questions guided the study and two null hypotheses were tested. Descriptive survey research design was adopted. From a population of 62 business education lecturers, a census survey sampling was employed. A four-point response options questionnaire was used for data collection, and it was validated by three experts. The reliability of the instrument was established using Cronbach's alpha which yielded coefficients of 0.81 and 0.80. Mean and Standard Deviation were used to answer the two research questions and measure the spread in respondents' opinions, while one-way analysis of variance (ANOVA) was used to test the two null hypotheses at 0.05 level of significance. Findings revealed that all the listed types of AI were highly needed for teaching business education courses, and that all the different types of AI stated for teaching business education courses were very highly beneficial. Based on the findings, it was concluded that if AI is included in the teaching of business education courses, it will transform the programme positively, lead to AI skills development and enable the learners to acquire the needed AI employability skills for the global workplace. Therefore, among other things, it was recommended that AI should be included in the business education curriculum through yearly internal curriculum review by lecturers in collaboration with their institutions and five years national review by all level of government. Also, lecturers should be trained and retrained on the application of AI for teaching business education courses in River's state tertiary institutions to enable them transfer the skills to learners.

Keywords: Artificial intelligence (AI), application of artificial intelligence, teaching business education courses.

Introduction

Artificial Intelligence (AI) is rapidly transforming various industries, including education. AI as an aspect of information and communication technology is being used in educational management to enhance teaching and learning process, improve student outcomes, and streamline administrative tasks. In recent years, AI has also made inroads into the education sector, particularly in educational management (Mekuri-Ndimele & Ukata, 2024; Igboke, 2023). AI can help improve the teaching and learning process, enhance teacher's performances, student outcomes, and automate administrative tasks. The application of AI in the teaching and learning is still in its early stages, moreover in Nigeria but it has already shown promising results (Gupta, 2020). AI in schools offers multiple possibilities for school administrators, teachers, and students.

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One example is ChatGPT, the latest version, GPT-4, is integrated into software such as Microsoft Office, Edge, and Bing, optimizing educational tasks (Forero-Corba, & Negre Bennasar, 2024). AI and Machine Learning (ML) have been oriented towards educational tasks (Zafari et al., 2021), which highlights the need to strengthen Teachers' Digital Competence (TDC).

AI technology in education is expected to grow significantly in the coming decades, presenting new opportunities and challenges (Surugiu, Grădinaru, & Surugiu, 2024; Khosravi, 2022). Researchers, policymakers, and practitioners are integrating Artificial Intelligence Education (AIE) to enhance teaching, personalised learning, assessments, and administrative services (Zhang and Aslan, 2021; Chiu et al., 2023). AI represents progress in education, offering benefits on multiple levels, and stimulates the evolution of teaching and learning through technologies like chatbots, Marvis Beacon Teaches Typing (MBTT), robots, automated assessment, digitised artefacts, and intelligent tutoring systems, despite occasional organisational challenges (Chiu et al., 2023).

AI is the theory and development of computer systems that are able to perform tasks requiring human intelligence, such as teaching, visual perception, speech recognition, decision-making, and translation between languages (Pattam, 2021). Artificial intelligence is the science of making machines that can think and act like humans. AI is an advanced part of information and communication technology (ICT) which adopts the application of hardware and software in imitating to demonstrate what human beings can do by those technologies.

The subsets of AI covered in this work are Machine Learning (ML) and Deep Learning (DL). This is because they are more related to the topic under study. Machine learning (ML) is a subset of artificial intelligence and it is a science of getting computers to learn and act as humans do, such accurate pronunciation of words by Google, Chatbot (Online Customer Support), and sentence rephrasing. The ML learns by acquiring data and creating rules for how to turn it into actionable information (Veletsianos, 2019). ML also reasons by focuses on choosing the right algorithm (procedure) to reach a desired outcome. ML as well do self-correction by continually fine-tuning algorithms (process) and ensure they provide the most accurate results possible (Pattam, 2021). Creativity is also an aspect of AI which uses neural networks, rules-based systems, statistical methods and other AI techniques to generate new images, new text, new music and new ideas. Deep Learning (DL) is a subset of machine learning. Deep Learning (DL) can perform far more complex tasks. Deep learning (DL) can process, interpret, and make use of far larger and more complex data sets. Deep learning mimics the working of our brains such as teaching keyboarding by Marvis Beacon Teaches Typing, Text to image such as to convert text into images, such as in the Google Translate app, I love my PDF etc. Machine learning has a simple "if this, then that" mechanism, whereas deep learning has "if this, then that, then what about (x)?" on repeat. In other words, machine learning can ask and answer one question, but it then requires human intervention (Pattam, 2021). Deep learning will ask and answer one question - based on that answer, ask another question, and answer it, and so on. Deep learning is the most advanced and sophisticated artificial intelligence technology. For example, it enables Google to give you a search result that is tailored specifically for your needs, not just something they think everyone may want to know about. Deep learning goes one step further by enabling Google to tell you what other people are searching for as well, which are applicable to business education teachers and learners during teaching, learning and research.

National Universities Commission (2022) posited that Business Education is a specialized profession designed to provide students with knowledge, skills and competence leading to employability and advancement in office occupations, pedagogical skills in teaching business subjects at different levels of educational system as well as self-employment or being



an employer of labour. As an aspect of Vocational Education and Training, Business Education is designed to fill the gap between knowledge and practice by exposing students to General Education as well as specialized areas in Accounting, Entrepreneurship, Marketing and Office Technology and Management (Ukata & Nmehielle, 2024a). Business Education contents are all encompassing programme in which courses contents are in the areas of Business Management, Business Administration, Office Information Management System, Office Technology and Management, (Information and Communication Technology or Information Management System, Purchase/Supply Education (Ukata & Nmehielle, 2024b). Others are Accountancy Education, Communication Skills, English Language, Distributive Education, Entrepreneurship Education, Management/Marketing, Education Psychology, Philosophy and Sociology of Education, Business Law, Research Methodology etc, which require the application of Artificial Intelligence (AI) (Ukata& Sila-Dikibo, 2020: Ukata, 2019). It is an education that theoretically and practically prepared the learners with the required skills needed at the global workplaces (Ukata, Adejola & Okoye, 2018). Business education programme is offered as a course in universities, colleges of education and as an option in the polytechnics. Accordingly, running his list, Lynch cites current areas AI is used in education which are applicable to business education programme to include but not limited to: Classroom/Behavior Management, Lesson Planning, Classroom Audio-Visual, Parent-Teacher Communication, Language Learning, Test Prep, Assessment, Learning Management Systems, Gamification for Enhanced Student Engagement, Staff Scheduling and Substitute Management, Professional Development, Transportation, Maintenance, Finance, Cybersecurity, Academic Fraud Detection, Safety and Security (Ukata&Agburuga, 2024a). Onlinedegrees, 2024; Smith,2021; Singh&Singh,2021).

AI is currently used in Plagiarism Detection (Turnitin, Eagle Scan), Academic Research, Online Teaching and Learning, Chatbots for Enrollment and Retention, Learning Management Systems, Transcription of Faculty Lectures, Enhanced Online Discussion Boards, Analyzing Student Success Metrics and Connected Campuses (Ukata&Agburuga, 2024b). Onlinedegrees, 2024; Smith,2022). According to Rose Luckin, a professor of learning-centred design at University College London, as quoted saying, "The real power of artificial intelligence for education is in the way that we can use it to process vast amounts of data about learners, about teachers, about teaching and learning interactions. Ultimately, AI can help teachers understand their students more accurately, more effectively (Ukata&Agburuga, 2024c). Onlinedegrees, 2024). Unfortunately, in the Core Curriculum and Minimum Academic Standard for Nigerian University System (CCMAS) published by the National Universities Commission in 2022 nothing was mentioned about AI in Business Education programme, and its application by business education teachers despite the abundant benefits in the teaching and learning process. These are issues of serious concern looking at the need of current global workplace and if Nigeria wants to produce graduates of high global standard.

Artificial Intelligence Education (AIE) builds upon previous learning theories, facilitating teacher adoption of educational tools and integrating best practices to enhance learning (Cope, Kalantzis, & Sears, 2021). AIE benefits teachers and the teaching process through tailored contents for individual learners, at-risk or gifted students, learning predictive models, personalised educational resources, improved classroom management, enhanced teaching across various subjects, academic progress facilitation, and qualified development in pedagogical skills, human behaviour, and interactions (Zhang & Aslan, 2021; Chiu et al., 2023). AI unlocks new research potential in universities and other tertiary institutions by expanding experimental and investigative activities, and disseminating study results. Teachers can focus on complex tasks as AI provides students support and answers (Southworth et al., 2023). Khosravi et al (2022) advocates



integrating explainable AI in education, prioritising human-centred design of educational tools, assessing AI implementation, and enhancing AIE systems for reliability and knowledge transfer support during teaching and learning (Ukata&Agburuga, 2024d).

AI system in education significantly enhance learners' involvement and performance (Zhang and Aslan, 2021). Chiu et al. (2023) identified essential AI roles for learners to include: competency-based task assignments, learner-machine discussions, feedback, and adaptive digital environments. Zhang and Aslan (2021) added other AI facilitations to include; engagement, enriched learning resources, and intellectual stimuli. Southworth et al. (2023) highlight AIE's benefits to be fostering technical skills, creativity, critical thinking, and problem - solving abilities for students. AIE personalises learning experiences and communication to cater for individual needs and abilities, enhancing efficiency (Hopcan et al., 2022; Southworth et al., 2023). AIE customised learning materials that are tailored based on students' evaluations, addressing their strengths and weaknesses (Ukata& Amini, 2025; Hopcan et al., 2022). Li and Wang (2023) proposes using advanced technology (AI) to create a comfortable communication environment, fostering learner networks with increased information accessibility for future generations. Adapting learning experiences sustains student progress and engagement in virtual environments, promoting skill development (Southworth et al., 2023). Interactivity and participation substantially increase among students and teachers. Khosravi et al. (2022) emphasise the significance of AI in various learning interfaces. For remote learners, AI offers a crucial advantage through simulation cases on complex life topics challenging to address in traditional settings (e.g., welfare system, losses, and violence). Ouyang and Jiao (2021) identified three AIE paradigms: "AI-direct, learner-as-recipient", where AI leads learning with a defined pathway for the learner, "AI-supported, learner-as- collaborator", where AI optimises interaction among learners, information, and technology, and "AI-empowered, learner-as-leader", where AI enhances learners' intelligence through a complex system which can be apply in teaching business education courses.

The following are some AIs that can be apply in teaching business education courses with Benefits:

Gentle, (2024) posited that the software Mavis Beacon Teaches Typing was first released in 1987 as a tool to train new computer and advanced users on keyboard skills (touch typing). Beacon was praised for helping make computer education more accessible and easier to people of colour, with modern day super fans going so far as to create deep fake footage of Barack Obama and Oprah Winfrey celebrating her influence.

The software (AI), Mavis Beacon Teaches Typing, whether you want to learn essential keyboarding skills or improve your overall typing efficiency, Mavis Beacon Teaches Typing Anniversary Edition will guide you on your road to success (Ukata&Mekuri-Ndimele, 2025). It gives you beginner ways and improves speed and accuracy with detailed assessments, customized lessons and skill-building games which are needed in different global workplace (Broderbund, 2024).

QuillBot paraphrasing tool (AI) is an online writing platform with a bunch of tools aimed at elevating and perfecting your writings. QuillBot (AI) paraphrases, summarizes, checks for grammar error and plagiarism, translate, outline, create citations and set researchers up for success in schools, workplaces and personal engagements (Ukata& Obinichi-Aaron, 2025; QuillBot, 2024). Onlinedegrees (2024) outlined some AI tools for teachers and learners in educational system to comprise Palitt which was built to help instructors to easily create "their own custom lecture series, syllabus or textbook for teaching and learning. Jill Watson is also an AI-enabled virtual teaching assistant introduced by the Georgia Institute of Technology in 2016 for

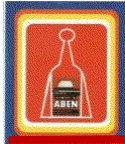


teaching and learning. Brainly is another wonderful social media site for classroom questions. Nuance is a great speech recognition software used by students and faculty; capable of transcribing up to 160 words per minute; especially very helpful for students who struggle with writing or have accessibility needs. Contents Technologies is another instructional design and contents application solutions fuelled by artificial intelligence with research engines to aid in teaching and learning.

Similarly, Smith (2021 & 2022) outlined several areas of applications of AI in teaching and learning with benefits as follows: 1. Personalized learning: Is an AI used to create customized learning paths for individual students, based on their strengths and weaknesses, learning styles, and interests. 2. Intelligent tutoring systems: Is an AI-powered tutoring system that provides real-time feedback to students, adapt to their individual learning needs, and track their progress. 3. Student performance prediction: Is an AI algorithm that analyses data on student performance, attendance, and other factors to predict which students may be at risk of falling behind and intervene early. 4. Automated grading: Is an AI that is used to grade multiple-choice and short-answer questions, freeing up teacher time for other tasks. 5. Learning analytics: Is an AI that helps educators in analyzing students' data to identify trends and patterns, evaluate the effectiveness of teaching methods, and make data-driven decisions. 6. Chatbots and virtual assistants: Are AI-powered chatbots and virtual assistants that provide students with instant answers to common questions, freeing up teachers and administrators to focus on more complex tasks. 7. Campus safety: Is an AI-powered surveillance system that detects unusual behavior and potential threats, alerting campus security personnel in real-time. 8. Recruitment and admissions: Is an AI that is used to analyze applicant data and identify candidates who are most likely to succeed in a given program. 9. Financial aid and student services: Is an AI that helps institutions to automate financial aid applications, identify students who may be eligible for scholarships or other forms of aid, and provide personalized support to students. 10. Curriculum development: Is an AI used to analyze trends in the job market and identify the skills and knowledge that students will need in the future, informing the development of new curricula and programs (Ukata, 2024; Southworth et al., 2023; Chiu et al., 2023 & Hopcan et al., 2022).

Zotero (AI) is an open-access, easy-to-use reference management tool that serves as your personal research assistant and helps you collect, organize, cite, and share your research sources. Zotero allows teachers and learners to: save references from library catalogues, research databases, and the web. It allows researchers to add PDFs, images, audio and video files, snapshots of web pages, and more, write annotations and attach them to citations and create bibliographies using most major citation styles (Ukata & Worgu, 2025; Libraries Central Michigan University, 2024).

The subjects for this study are male and female business education lecturers with different levels of educational attainment and years of teaching experience in Rivers state tertiary institutions. Mohammad et al, (2011) averred that how well lecturers demonstrate the knowledge of AI related teaching experience depend on their level of educational qualification, training and retraining, age and teaching experience. For example, lecturers with higher degrees such as (PhD and M.Sc. /M.Ed.) are expected to possess higher knowledge and skills with AI related teaching experience than those with HND/B.Sc./B.Ed (Ukata & Udeh, 2022; Ezenwafor & Ukata, 2022). Accordingly, Ukata and Okeke, (2023), Ukata and Nmiehelle, (2022) claimed that teaching experience and age are among the factors that influence lecturers' knowledge and skills with AI related teaching experience because younger and experienced lecturers are more likely to possess them higher than older and less experienced ones. Also, lecturers who have spent 10 years and above in teaching AI related courses are expected to possess higher knowledge and



skills to be able to identify the types of AI and their benefits to apply in teaching business education courses than those with less than 10 years teaching experience. Consequently, the study tested the influence of these respondents' variables of their level of educational attainment and years of teaching experience with AI related knowledge and skills in teaching business education courses in River's state tertiary institutions.

Artificial Intelligence (AI) as an aspect of information and communication technologies (ICTs) is rapidly transforming various industries, including education. AI is being used in educational management to enhance teaching and learning process, improve students' learning outcomes, and streamline administrative tasks in tertiary institutions. In recent years, AI in schools offers multiple possibilities for school administrators, teachers, and students. But despite its many available types and rich benefits in aiding teaching, learning and administrative tasks, nothing about AI was mentioned in the Core Curriculum and Minimum Academic Standard for Nigerian University System (CCMAS) of Business Education programme published by the National Universities Commission in 2022. Also, not much about AI have been noticed in the Nigeria educational system in general and its application in teaching business education courses in River's state tertiary institutions in particular. The researcher(s) is highly worried that AI have not been incorporated into the teaching of business education courses, and business education lecturers seem not to have given attention to the various types of AI available and their application in teaching and learning process. The reasons may be associated with not being specifically mentioned in the curriculum, lack of knowledge about the available types of AI and skills required for the application of AI in teaching business education courses. These are the justifications for the study, "application of artificial intelligence (AI) in teaching business education courses in River's state tertiary institutions. The study will reveal the necessity for including AI via yearly internal review process by lecturers, the types of AI that could be apply in teaching business education courses and their benefits in River's state tertiary institutions.

Methodology

The study adopted a descriptive survey research design. Population of the study was all the 57 business education lecturers from the four Rivers state tertiary institutions (two universities (Rivers State University (RSU) 21, Ignatius Ajuru University of Education (IAUE) 17), two polytechnics (Captain Elechi Amadi Polytechnic (CEAPOLY) 14, and Kensaro Wiwa Polytechnic (KENPOLY) 10) are the tertiary institutions own by Rivers state that offer business education programme as a course or as an option. Census survey was adopted to sample all the 61 business education lecturers because it is of manageable size. The instrument used for data collection was a self-designed four-point response options questionnaire titled "Application of AI in Teaching Business Education Courses (AAITBEC)". It contains two sections. Sections A and B. Each sections carries 15 items and were rated as very highly (4.50 - 500), highly (3.50 - 4.49), moderately (2.50 - 3.49), and lowly (1.50 - 2.49).

The questionnaire was subjected to face and contents validation by three experts from the Faculty of Education in Nnamdi Azikiwe University, Awka. The measure of internal consistency method was used to establish the reliability of the instrument. The instrument was administered to 15 lecturers from the University of Uyo who were not part of the population of the study. The Cronbach's alpha was applied to compute the reliability coefficient that yielded alpha values of 0.81 and 0.80. This high reliability coefficients show that the instrument was reliable for the study as recommended by Nworgu (2015) that a research instrument with a reliability index of 0.70 and above is reliable. The researcher(s) personally administered the copies of the questionnaire to the respondents in their schools with the help of three research assistants who



were adequately briefed on the modalities to follow. The researcher(s) first visited each of the tertiary institutions and sought consent from the relevant Heads of Department for the study. Thereafter, the researcher(s) and assistants visited each school and handed over the required number of copies of the instrument to the Heads of the Department to distribute to the business education lecturers for completion and, revisited after five working days to retrieve the completed copies. Fifty-two copies of the instrument were correctly filled, retrieved and used for data analysis. The arithmetic mean and standard deviation were used to answer the two research questions and ascertain how homogeneous or heterogeneous the respondents' opinions were relative to the questionnaire items and the aggregated mean. The one-way analysis variance (ANOVA) was used to test the null hypotheses at 0.05 level of significance. The ANOVA was used for the two null hypotheses because it measured one categorical independent variable with three levels of moderating variables ((PhD and M.Sc. /M.Ed., HND/B.Sc./B. Ed) (10 years and above, less than 10 years teaching experience). A null hypothesis was accepted where the calculated significant (Sig.) value, (p- value) was greater than or equal to ($\geq$) the alpha value of 0.05. Otherwise, the null hypothesis was rejected. The data analysis was carried out using Statistical Package for Social Sciences (SPSS) version 25.

Result Presentation, Analysis and Discussion

Research Question 1

What are the types of AI needed in the application of teaching business education courses in Rivers state tertiary institutions?

Table1: Respondents' mean ratings on the types of AI needed in the application of teaching business education courses N = 52

SN	Types of AI needed in teaching business education courses	$\bar{X}$	SD	Remarks
1	Marvis Beacon Teaches Typing	3.60	.88	Highly
2	ChatGPT and Chatbots	3.67	.92	Highly
3	Intelligent tutoring systems	3.75	.81	Highly
4	Text to image converter (I love my pdf)	3.76	.79	Highly
5	Turnitin, Eagle Scan	3.72	.85	Highly
6	AI-direct, learner-as-recipient	3.56	.84	Highly
7	AI-supported, learner-as- collaborator	3.60	.88	Highly
8	AI-empowered, learner-as-leader	3.67	.92	Highly
9	Quillbot Paraphrasing Tool	3.75	.81	Highly
10	Palitt	3.75	.81	Highly
11	Contents Technologies	3.76	.79	Highly
12	Personalized learning AI	3.72	.85	Highly
13	Intelligent tutoring systems	3.56	.84	Highly
14	Student performance prediction	3.60	.88	Highly
15	Zotero	3.67	.92	Highly
Aggregate Mean		3.67		Highly

Table 1 shows that all the 15 listed types of AI were highly needed in the application of teaching business education courses with mean scores that ranged from 3.56 to 3.76. However, the aggregate mean score was 3.67 which also shows that all the listed types of AI were highly needed for teaching business education courses. The standard deviations for the 15 listed items ranged within 0.78 to 0.92 which shows that respondents were homogeneous in their opinions



that all the listed types of AI were highly needed for teaching business education courses in River's state tertiary institutions.

Research Question 2

What are the benefits of the application of the different types of AI for teaching business education courses in River's state tertiary institutions?

Table2: Respondents' mean ratings on the benefits of the application of the different types of AI stated in teaching business education courses N = 52

SN	Benefits of the application of the types of AI stated in teaching business education courses	$\bar{X}$	SD	Remarks
16	Marvis Beacon Teaches Typing teaches keyboarding skills (touch typing)	4.50	.79	Very Highly
17	ChatGPT and Chatbots are online customers and learners support	4.52	.85	Very Highly
18	Intelligent tutoring systems provides feedback to students, adapt to their individual learning needs, and track their progress	4.51	.84	Very Highly
19	Text to image converter (I love my pdf) assist to convert documents of different forms into different format for use	4.51	.88	Very Highly
20	Turnitin is for anti-plagiarism detection and academic fraud	4.50	.92	Very Highly
21	AI-direct see the learner-as-recipient during teaching and learning	4.52	.81	Very Highly
22	AI-supported see the learner-as- collaborator during teaching and learning	4.51	.81	Very Highly
23	AI-empowered see the learner-as-leader in teaching and learning	4.54	.79	Very Highly
24	Quillbot paraphrasing tool assist to summarize sentences, checks grammar and plagiarism, translate and create citations	4.53	.85	Very Highly
25	Palitt assist instructors to easily create their own custom lecture series, syllabus or textbook.	4.52	.79	Very Highly
26	Contents Technologies assist in instructional design and contents creation	4.51	.85	Very Highly
27	Personalized learning AI is used to create customized learning paths for individual students	4.50	.84	Very Highly
28	Intelligent tutoring systems track learners progress and gives feedback	4.52	.88	Very Highly
29	Student performance prediction predicts which students may be at risk of falling behind and intervene early	4.52	.92	Very Highly
30	Zotero helps you to organize, cite, reference and share your research sources.	4.50	.81	Very Highly
Aggregate Mean		4.51		Very Highly

Table 2 shows that all the 15 different types of AI stated were very highly beneficial in the application of teaching business education courses with mean scores that ranged from 4.50 to 4.54. The aggregate mean score of 4.51 also shows that all the different types of AI stated for teaching business education courses were very highly beneficial. The standard deviations for the



15 listed items ranged within 0.79 to 0.92 which shows that respondents were homogeneous in their opinions that all the different types of AI were as well very highly beneficial in the application of teaching business education courses in Rivers state tertiary institutions.

Hypotheses Testing

HO₁: There is no significant difference in the mean rating of male and female business education lecturers on the types of AI needed in teaching business education courses in River's state tertiary institutions based on their educational attainment.

Table 3: ANOVA summary of business education lecturers on types of AI needed in the application of teaching business education courses based on educational attainment.

Sources of Variance	Sum of Squares	Df	Mean Square	F-cal.	Sig.	Decision
Between Groups	2.358	2	1.229	1.288	.383	Accept H ₀₁
Within Groups	54.357	50	.777			
Total	57.615	52				

Table 3 shows a calculated F-value of 1.28 with a significant (sig.) p-value of 0.38 which is greater than the alpha value of 0.05 ($0.38 > 0.05$) at degrees of freedom of 2 and 50. This means that there is no significant difference in the mean rating of male and female business education lecturers on the types of AI such as Marvis Beacon teaches typing, Quillbot, Zotero, Turnitin etc., needed in the teaching business education courses in Rivers state tertiary institutions based on their educational attainment.

HO₂: There is no significant difference in the mean rating of male and female business education lecturers on the benefits of application of the types of AI stated in teaching business education courses in River's state tertiary institutions based on their years of experience

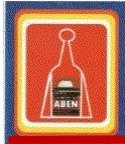
Table 4: ANOVA summary of business education lecturers on the benefits of application of the types of AI stated in teaching business education courses based on years of teaching experience.

Sources of Variance	Sum of Squares	Df	Mean Square	F-cal.	Sig.	Decision
Between Groups	1.741	2	.830	1.161	.362	Accept H ₀₂
Within Groups	48.959	50	.784			
Total	49.600	52				

Data on Table 4 show a calculated F-value of 1.16 with a significant (sig.) p-value of 0.36 which is greater than the alpha value of 0.05 ($0.36 > 0.05$) at degrees of 2 and 50. This means that there is no significant difference in the mean rating of male and female business education lecturers on benefits of application of the types of AI such as ChatGPT, personalise learning AI, Intelligent tutoring, text converter in teaching business education courses in River's state tertiary institutions based on their years of experience.

Discussion

Findings of the study shows that all the listed types of AI were highly needed in the application of teaching business education courses in River's state tertiary institutions. The finding agrees with Forero-Corba and Negre Bennasar, (2024) who augured that AI in schools offers multiple possibilities for school administrators, teachers, and students. One example is



ChatGPT, the latest version, GPT-4, which is usually integrated into software such as Microsoft Office, Edge, and Bing for optimizing educational tasks.

The findings also concur with Ouyang and Jiao (2021) as they identified three AIE paradigms to include: "AI-direct, learner-as-recipient", "AI-supported, learner-as-collaborator", and "AI-empowered, learner-as-leader" as other types of AI for teaching and learning. Furthermore, the findings see eye to eye with Gentle (2024) who identified Mavis Beacon Teaches Typing, QuillBot, (2024) that indicated Quillbot Paraphrasing Tool, and Onlinedegrees (2024) that outlined Palitt, Contents Technologies, Personalized learning among others as types of AI needed for teaching and learning business education courses. The fact that all the lecturers indicated that all the types of AI listed are highly needed for teaching business education courses is a serious call that they should be urgently included in the business education curriculum, and lecturers should do internal inclusion during teaching and learning while waiting for national curriculum review. The findings of the study as well shows that all the different types of AI stated in the application for teaching business education courses were very highly beneficial. Finding of the study harmonizes with the views of Veletsianos, (2019), Onlinedegrees, (2024), Smith, (2022), Zhang and Aslan, (2021); Chiu et al., (2023) who identified ChatGPT and Chatbot as online chat channel for students and customer supports, Turnitin for plagiarism academic fraud detection. Also, AI personalised educational resources, improved classroom management, enhanced teaching across various subjects, and create academic progress facilitation. The finding further agrees with the views of Broderbund, (2024), that Beacon Teaches Typing teach various class of learners keyboarding skills (touch typing), while Libraries Central Michigan University, (2024) noted that Zotero AI allows teachers and learners to organize their work, do citations, save references from library catalogues, research databases, and the web.

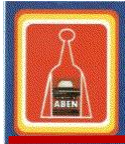
Findings of the study further shows that there is no significant difference in the views of the business education lecturers on the types of AI needed in teaching business education courses based on their educational attainment. This finding corresponds with the report of Mohammad et al., (2011) that how well lecturers demonstrate the knowledge of AI in teaching depend on their level of educational qualification, training and retraining. Additionally, finding of the study indicates that there is no significant difference in the views of the business education lecturers on benefits of application of the types of AI stated in teaching business education courses based on their teaching experience. The finding concurs too with the interpretations of Ukata and Okeke, (2023), Ukata and Nmiehelle, (2022) who claimed that teaching experience and age are among the factors that influence lecturers' knowledge and skills of AI related teaching experience because younger and experienced lecturers are more likely to possess them higher than older and less experienced ones in the River's state tertiary institutions.

Conclusion

Based on the findings that emanated from the discussions of the study, it was concluded that if AI is included in the teaching of business education courses, it will transform the programme positively, leading to AI skills development and enable the learners to acquire the needed employability skills for the global workplace. Finally, it was concluded that because the needed AI employability skills will be acquired by learners if included and taught to learners, it will assist to drastically reduce the high rate of un-employment among Business Education graduates in River's state in particular and Nigeria in general.

Recommendations

Based on the findings and conclusion of the study, the following recommendations were made:



1. AI should be included during the teaching of business education courses through yearly internal curriculum review by lecturers in collaboration with the authorities of their various institutions, and five years national review by federal government for teaching business education curriculum, since all the types listed are highly needed for teaching business education courses. Federal, states and local governments should provide enough funding for the procurement of AI equipment to enable lecturers and students have access to them for better teaching and learning experience. Heads of institutions running business education programme should fund the procurement of AI facilities via internally generated revenue.
2. Since whatever knowledge one acquires remains with the person, the business education lecturers should make personal sacrifices from their earnings and engage in AI trainings through online and offline short courses to enable them acquire a very highly AI knowledge and skills to teach business education courses as well as sustain and remain relevant in their areas of operations. Tertiary institutions running business education should send lecturers on AI specialise training to aid them in gaining the needed skills since the training may be expensive for lecturers to bear.
3. Since the level of educational attainment and years of experience play vital roles in identifying the types and benefits of AIs needed in the teaching of business education, business educators with the required academic qualifications and years of experiences should be employed by institutions running the programme. These will assist in the implementation of AI curriculum and transferring AI skills to learners to acquire the needed employability skills.

References

- Broderbund (2024). *Mavis Beacon teaches typing anniversary edition*. Retrieved from <https://www.broderbund.com/mavis-beacon-teaches-typing-anniversary-edition> on August 3rd, 2024.
- Chiu, T., Xia, Q., Zhou, X., Chai, C. S. & Cheng, M., (2023). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. *Computers and Education: Artificial Intelligence*, 4 (1). <https://doi.org/10.1016/j.caeai.2022.100118>.
- Cope, B., Kalantzis, M. & Sears, D., (2021). Artificial intelligence for education: Knowledge and its assessment in AI-enabled learning ecologies. *Educational Philosophy and Theory*, 53(12), 1229-1245. <https://doi.org/10.1080/00131857.2020.1728732>.
- Ezenwafor, J. I. & Ukata, P. F. (2022). ICTs instructional competencies possessed by lecturers for implementing OTM curriculum in public tertiary institutions in Rivers state. *NAU Journal of Technology & Vocational Education*, 7 (1), 73-81.
- Forero-Corba, W., & Negre Bennisar, F. (2024). Techniques and applications of machine learning and artificial intelligence in education: a systematic review. <https://doi.org/10.5944/ried.27.1.37491>
- Gentle, D. (2024). *Mavis Beacon, 'the world's greatest typing teacher,' does not want to be found by Oakland filmmakers*. Retrieved from <https://www.sfgate.com/sf-culture/article/mavis-beacon-teaches-typing-documentary-18635435.php> on August 3rd, 2024.
- Gupta, A. (2020). Artificial intelligence in education: A systematic literature review. *Education and Information Technologies*, 25(5), 4389-4418. doi: 10.1007/s10639-020-10287-3.
- Hopcan, S., Polat, E., Ozturk, M. E. & Ozturk, L. (2022). Artificial intelligence in special education: A systematic review. *Interactive Learning Environments*, 1 (1), 1-9. <https://doi.org/10.1080/10494820.2022.2067186>.



- Igbokwe, I. C. (2023). Application of artificial intelligence (AI) in educational management. *International Journal of Scientific and Research Publications*, 13 (3), 300-307.
- Khosravi, H., Shum, S. B., Chen, G., Conati, C., Tsai, Y. S., Kay, J., Knight, S., Martinez-Maldonado, R., Sadiq, S. & Gasevic, D. (2022). Explainable artificial intelligence in education. *Computers and Education: Artificial Intelligence*, 3(1) 1-22. <https://doi.org/10.1016/j.caeai.2022.100074>.
- Libraries Central Michigan University, (2024). *Zotero and how it works: Zotero? What is it?* Retrieved from [https://libguides.cmich.edu/Zotero#:~:text=Zotero%20\(pronounced%20%22zoh%2DTAIR,research%20databases%2C%20and%20the%20Web](https://libguides.cmich.edu/Zotero#:~:text=Zotero%20(pronounced%20%22zoh%2DTAIR,research%20databases%2C%20and%20the%20Web) on 3rd August, 2024.
- Mekuri-Ndimele, J. A. & Ukata, P. F. (2024). 18th International Conference of the Academic of Management of Nigeria. Held at Ignatius Ajuru University of Education, Rumuolumene, Port Harcourt, Rivers State, from 25th – 26th September, 2024. Application of Artificial Intelligence (AI) on Lecturers' Job Performances in Selected Rivers state Tertiary Institutions.
- National Universities Commission (2022). Core curriculum and minimum academic standard for Nigerian university system (CCMAS). A publication of the National Universities Commission, Abuja, Nigeria.
- Nworgu, B. G. (2015). *Educational research: Basic issues & methodology*. Enugu: University Trust Publishers.
- Online degrees, (2024). *43 examples of artificial intelligence in education*. Retrieved from <https://onlinedegrees.sandiego.edu/artificial-intelligence-education/> on the August 25th, 2024.
- Ouyang, F. & Jiao, P., (2021). Artificial intelligence in education: The three paradigms. *Computers and Education: Artificial Intelligence*, 2 (1), 1-6. <https://doi.org/10.1016/j.caeai.2021.100020>.
- Pattam, A. (2021). *Artificial intelligence, defined in simple terms*. Retrieved from <https://www.hcltech.com/blogs/artificial-intelligence-defined-simple-terms#:~:text=Artificial%20intelligence%20is%20the%20science,decisions%2C%20and%20judge%20like%20humans> on July 20th, 2024.
- QuillBot, (2024). *How does QuillBot work?* Retrieved from <https://quillbot.com/blog/quillbot-tools/how-does-quillbot-work/> on August 3, 2024.
- Singh, V., & Singh, A. (2021). Role of artificial intelligence in educational management. *Journal of Education and Practice*, 12(12), 78- 85.
- Smith, J. (2021). Application of AI in educational management. *International Journal of Educational Technology in Higher Education*, 18(1), 1-17. <https://doi.org/10.1186/s41239-021-00279-9>.
- Smith, J. (2022). Application of artificial intelligence in educational management. *Educational Technology Research and Development*, 70(2), 457-478. <https://doi.org/10.1007/s11423-022-09981-1>.
- Southworth, J., Migliaccio, K., Glover, J., Glover, J., Reed, D., McCarty, C., Brendemuhl, J. & Thomas, A. (2023). Developing a model for AI Across the curriculum: Transforming the higher education landscape via innovation in AI literacy. *Computers and Education: Artificial Intelligence*, 4 (1), 1-10. <https://doi.org/10.1016/j.caeai.2023.100127>.
- Surugiu, C., Grădinaru, C. & Surugiu, M. R. (2024). Artificial intelligence in business education: Benefits and tools. *Amfiteatru Economic*, 26 (65), 241-258.
- Ukata P. F., Nmehielle, E. L. (2024a). Office technology and management (OTM) curriculum development and review in Nigeria: Opportunities, challenges and trends in tertiary



- institutions in Rivers State. *NAU Journal of Technology and Vocational Education*, 9, (2), 43-55.
- Ukata P. F., Nmehielle, E. L. (2024b). Information and communication technology instructional competencies possessed by lecturers for implementing office management and technology curriculum in tertiary institutions in Rivers State. *Nigerian Journal of Business Education*, 11(2), 318-325
- Ukata, P. F. &Udeh, C. P. (2022).Utilization of new technologies by business education lecturers for teaching accounting courses in tertiary institutions in Rivers state. *International Journal of Innovative Information Systems & Technology Research*, 10(2), 29-38.
- Ukata, P. F. Silas-Dikibo, I. D. (2020). Extent of students' satisfaction with business experiences acquired through business education programme in Rivers state universities. *World Journal of Entrepreneurial Development Studies (WJEDS)*, 5 (2), 1 - 11.
- Ukata, P. F. &Agburuga, V. (2024a). 3rd International/36th Annual National Conference of Association of Business Educators of Nigeria (ABEN) Held at Abuja at Chinua Achebe International Conference Centre, Mamman Vatsa Writers Village, Mpape, Abuja from 9th -11th October, 2024. Application of Artificial Intelligence (AI) in Teaching Business Education Courses in Rivers State Tertiary Institutions.
- Ukata, P. F. &Agburuga, V. (2024b). 3rd International/36th Annual National Conference of Association of Business Educators of Nigeria (ABEN) Held at Abuja at Chinua Achebe International Conference Centre, Mamman Vatsa Writers Village, Mpape, Abuja from 9th - 11thOctober, 2024. Challenges Lecturers Faced and Solutions to the Application of Artificial Intelligence (AI) in Teaching Business Education Courses in Rivers State Tertiary Institutions.
- Ukata, P. F. &Agburuga, V. (2024c). 11th Annual Conference 2024 of Colleges of Education Academic Staff Union (COEASU), tagged: Integrating Emerging Technologies in Teacher Education for Global Competitiveness. Held at College of Education Afana Nsit, from 19th March – 22ndMarch, 2024. Application of Modern Instructional Technologies by Business Education Lecturers for Teaching Accounting Courses in Tertiary Institutions in Rivers State.
- Ukata, P. F. &Agburuga, V. (2024d). Application of Modern Instructional Technologies by Business Education Lecturers for Teaching Accounting Courses in Tertiary Institutions in Rivers State. *British Journal of Contemporary Education (BJCE)*, 4 (1).
- Ukata, P. F. & Amini, M. C. (2025). Exploring the power of artificial intelligence (AI) for improving the teaching of Business Education courses in government tertiary institutions in Rivers State. *Research Journal of Mass Communication and Information Technology*, 11 (1), 73-89.
- Ukata, P. F. & Mekuri-Ndimele, J. A. (2025). Teaching students artificial intelligence tools required for digital entrepreneurship to acquire decent employments in selected Rivers State Tertiary Institutions, 2 (3), 1-8.
- Ukata, P. F. & Nmiehelle, E. L. (2022). Utilization of multimedia technologies by lecturers for instructional delivery of OTM courses in tertiary institutions in Rivers State. *Journal of Management & Environmental Studies*, 1 (2), 275-287.



- Ukata, P. F. & Obinichi-Aaron, E. O. (2025). Teaching artificial intelligence tools required of undergraduates for communication and digital entrepreneurship in public tertiary institutions in Rivers State. *GRS Journal of Multidisciplinary Research and Studies*, 2 (4), 21-27.
- Ukata, P. F. & Okeke, V. N. (2023). Survey of corruption and falling standard of education in tertiary institutions in Rivers and Anambra states with impact on Nigeria. *International Journal of Current Educational Studies*, 2 (1), 62-76.
- Ukata, P. F. & Worgu, S. (2025). Teaching learners artificial intelligence tools for effective and efficient digital entrepreneurship in public tertiary institutions in Rivers State. *World Journal of Innovation and Modern Technology*, 9 (1), 142-155.
- Ukata, P. F. (2019). *Business education students' learning experiences and programme satisfaction*. Germany: Lap Lambert Academic Publishing.
- Ukata, P. F. (2024). International Council for Education, Research and Training Conference Book of Abstract, 20th December, 2024, held at the M.D.S.D. College Ambala City Haryana India. Exploring the power of artificial intelligence for improving the teaching of business education courses in government tertiary institutions in Rivers State
- Ukata, P. F., Adejola, B. C. & Okoye, A. J. C (2018). Business education students learning experience and programme satisfaction in Rivers state university. *World Journal of Innovation and Modern Technology*, 2 (1), 9-34.
- Veletsianos, G. (2019). A case study of machine learning in education: Shifting ontologies. *Educational Researcher*, 48(7), 397-405.
- Zafari, M., Sadeghi-Niaraki, A., Choi, S. M., & Esmaeily, A. (2021). A practical model for the evaluation of high school student performance based on machine learning. *Applied Sciences (Switzerland)*, 11(23). <https://doi.org/10.3390/app112311534>.
- Zhang, K. & Aslan, A. B. (2021). AI technologies for education: Recent research and future directions. *Computers and Education: Artificial Intelligence*, 2 (1), 1-11. <https://doi.org/10.1016/j.caeai.2021.100025>.



TRENDS, OPPORTUNITIES AND CHALLENGES OF OFFICE ADMINISTRATION IN THE ERA OF AUTOMATION AND ARTIFICIAL INTELLIGENCE

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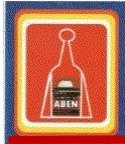
Abstract

The advent of artificial intelligent has meant that a number of hitherto cast-iron realities have had to be reconceived, and a lot of processes reconfigured, with great implications for production, training and development, and procedures. In the field office administration and management, the transformation that artificial intelligence-driven automation is engendering has been profound. This paper discusses the trends, opportunities and challenges of office administration and management in the era of automation and artificial intelligence. It posits that the world stands at the threshold of great transformations in the field of office administration. The paper discusses the concept of office administration, requisite competencies and personality qualities of the contemporary officer, evolution of the office from the invention of the typewriter to the development of the internet and submits that artificial intelligence, which is already driving great transformations in all realms of human endeavour, is poised to radically innovate the office beyond mankind's current comprehension. The paper identifies artificial intelligence system integration, robotic process automation, augmented reality and virtual reality, Internet of things, collaborative cloud tools, blockchain and personalized learning as AI-enabled tools driving the ongoing revolution in office administration and management. This revolution promises fundamental transformation in processes, with significant implications for productivity, efficiency and employee engagement. Automation however also constitutes significant challenge in the areas of asset security and privacy, job loss and the need for continuous financial deployment to catch up with endless changes. The paper also provides the panacea to these challenges: continuous training for reskilling and upskilling. The Nigerian government is also advised to put in place infrastructures and policies to encourage the deployment of AI in government and industry.

Key words: Office administration, Automation, Artificial Intelligence.

Introduction

The world stands today at the threshold of new possibilities and hitherto unimaginable opportunities. The advent of information technology has engendered new realities in all aspects of human life. Information technology has impacted commerce, health, education, aviation, research and management, among several other realms. No aspect of human life has managed to evade the pervasive encroachment of information technology. Information technology has fundamentally transformed management practice. It has changed the traditional office of the 1960s and 1970s far beyond recognition especially in the developed world. Forty years ago, clairvoyants were predicting the paperless office. Now with millions of workers reporting for duty



from their sitting room desks, the reality of the virtual office is here; and the revolution has only just started.

Information technology has led to the replacement of the typewriter with the computer, shorthand with voice transcription software, duplication machines with high speed photocopiers, postal letters with emails. Desktop publishing has replaced the hitherto arduous task of duplicating. As a result, the discipline hitherto known as Secretarial Studies, is now, called Office Technology and Management. The beautiful, pliant, smiling secretary is being rapidly replaced by the IT savvy youth, who is much more comfortable in the computational realms than in stenography (whatever is left of it). Those, however, are preliminaries. The acceleration of the digital revolution accentuated by the reality of artificial intelligence is promising far more complex and comprehensive transformations at short notice. This demands of office educators to stand on their toes in order to catch up with the breathless pace of development.

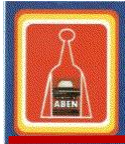
This paper describes the new trends, promises and challenges of automation and artificial intelligence in office management, so that office administrators can help them keep abreast of developments and to anticipate future possibilities.

Office Administration: Concept and Practice

The term "office" is universally understood to refer to a place where clerical work is undertaken; a place where all kinds of paperwork - files, records, briefs, letters, correspondence - is managed. In the words of Mills and Standingford (1986), the office is a place where all forms of clerical work are done to coordinate and control the affairs of the whole organization. The office is the administrative nerve centre of the organization (Agboola, 2016). Its main purpose is to provide communication service and safeguard records and assets. It is also the primary meeting point of organizational functionaries (Ademiluyi, 2021). In other words, it is the place where the control mechanisms for an organization are located, where records are initiated for communication, control and effective management of the operations.

In the opinion of Roche (2014), given the reality of the information age and the increasing dominance of information technology, it may be erroneous to think of the office as a specific place. It may be safer to assume that an office exists wherever certain kinds of work are performed. It is preferable to regard the term Office as denoting a function or related set of functions rather than a specific place. When regarded as a function, an office can plan, organise, coordinate, standardise and supervise paperwork, irrespective of person or place. But if viewed as a certain place only, the paper work done outside the boundaries of that place called the Office would not be under its control. Many executives do official work at home, in cars, trains, aircrafts and other automobiles. According to Leffingwell and Robinson (2008:7) "the essential feature of the office is the work itself, not who does it or where it is done." It may, in summary, therefore, be said that an "office" refers to the functions performed by a certain set of persons rather than the place, where clerical work is done. It similarly refers to the act of collecting, processing, storing and distributing information, all of which constitute the functions of an office.

If the office is beyond the physical setting, it goes without saying that office management transcends the management of the four-dimensional office structure. Office management is the technique of planning, organizing, directing, controlling, and staffing office activities for the purpose of achieving organizational objectives of accomplishing effective and efficient office work (Agboola, 2016). Office administration refers to a set of practices that ensure smooth administrative and financial functioning of office work and the workplace. It refers to the daily functions completed within an office or in respect of office tasks. It may involve communication with clients and team members by phone, email, maintaining an organized filing and record system, planning events and meetings, creating schedules, monitoring finance, booking



appointments and other tasks applicable to the individual office. It is focused on creating an organized and efficient workplace and work process (Libby, 2017). Office administrators are responsible for the day to day functioning of the office. They ensure that the workplace runs smoothly. They act as the office leader and liaise with senior management to ensure goals are met and work is completed in timely manner (Trios College, 2022)

The duties and responsibilities of an office manager may vary depending on the organization (Pillai & Bagavathiu, 2018). Such tasks may include but are not limited to assisting with scheduling meetings, making travel arrangements for business trips, performing accounting tasks, planning and organizing events, keeping an inventory of office supplies, conducting research and creating reports on various situations, conducting or supervising clerical works, managing office and organisational communications including text messaging, preserving and managing documents physically and electronically.

The office manager is the coordinator of the work system. An office manager plays the lead role for planning, organization, and controlling the clerical aspects of the organization, including the preparation, communication, coordination and storage of data to support production and other important operations of an industrial establishment. Often he also engages in marketing. His tasks are to monitor the work processes and to evaluate the outcome.

The office manager also has the following glossary of functions to perform: Budget development and implementation; purchasing; printing; records management; forms management; payroll; facilities management; space management; risk management; grants administration; information technology and telecommunications; management of health and safety in the company office; assisting senior managers in identifying health and safety needs in their departments; responsibility for the day to day running of the office; liaising with senior managers to ensure that staffers in the division have appropriate information technology equipment, and planning, consulting and managing office moves for the division and other units within the department (Steve, 2017).

Broadly speaking, Administrative Office Manager either at the board, executive or department level, engages in a common set of functions to meet the organization's goals. These functions were described by Henri Fayol as "the 5 elements of administration". The common sets of functions include: planning, organizing, staffing, directing and controlling

Competencies and Personality Qualities of the Office Manager

Considering the variegated nature of his functions, an office manager is expected to demonstrate many competencies and personality endowments. Some of the competencies/skills he or she is expected to possess are problem solving skills and decision-making abilities, integrity, assertiveness, flexibility, accuracy and psychic durability.

The office administrator is also expected to demonstrate adequate problem-solving skills if he is to be able to solve the different problems that land on his desk on a daily basis. Even if the office manager cannot solve the problem on his own, he must know where to go to address the problem.

An office manager should also be personable in nature. Since he is an individual required to deal with others, inside and outside of the office environment, it is pertinent for an office manager to be a good conversationalist. He must be at ease while conversing with others as this will enable him to get the job done in the most efficient way possible.

Good mathematical skills are positive requisites for the office manager as he will be working with numbers on a frequent basis. Not only does he have to perform payroll duties, he may also need to perform accounting tasks as well. An administrative Office Manager with good mathematical skills will be able to accomplish the task swiftly and efficiently..



An office manager should also have good multitasking skills. Frequently an office manager will be pulled in different directions so it is important for him to know how to do multiple things at one time.

One final requisite of the office administrator is leadership skill. He should be comfortable with filling a lead position and be able to resolve all problems which come his way. By being a natural leader, the office manager will be able to complete his daily duties in a timely and efficient manner.

Other relevant competencies include: Listening openly and non-judgmentally, expressing disagreement tactfully and sensitively, summarising input, listening without interrupting, using correct grammar, spelling and punctuation. The office administrator should also have strong interpersonal skills, enthusiastic attitude, ability to work in a team, time management and effective communication skills, strong organisational skills and an ability to maintain a high level of accuracy in preparing documents.

Evolution of the office: The Office Yesterday and Today

Several decades ago, a typical business office presented a gloomy picture. Housed in one or two small rooms, it was poorly lit and ill-ventilated. There was a small volume of paperwork, which was handled by a few clerks manually and without the aid of mechanical and labour-saving devices. However, the introduction of commercial typewriter in 1870 and the invention of the telephone in 1880 were among the early developments of the late 19th Century which culminated in the evolution of the modern office. The introduction of increasingly more complex devices set office management on a road to sophistication which endures till today. The process accelerated with the introduction of electric typewriter, (1920), duplicators, dictaphones and intercoms (1930), calculators, computers and photocopiers (1950), word processing equipment (1964), computerized telephone networks, (1980), personal computers, microprocessing equipment, electronic mail, fax machines, modems, pagers, cellular phones and internet systems (1990), internet telephony, internet banking and internet trading (2000) among others. Until the introduction of personal computer and office internet systems, the office was a tough place headed by a secretary or administrator who juggled stenographic, communication and office management tasks: a difficult task, sometimes best-manned by difficult men and impossible women.

Office activities have undergone vast changes in the last five or six decades. A Modern Office is well-planned, well-laid out and well-organised. The scope of office activities has widened tremendously following spectacular developments in science and technology, industrialisation, transport and communication. These developments have led to expansion in the scale of production and business activities, to greater governmental and legislative interference and control, and the consequent enlargement of the volume of office work. A greater and wider use of machines has resulted in greater saving of time and labour. The internet has eased communications with great implications for office activities and management.

While the much anticipated expectations of a paperless office have not been fully realized, there is, undoubtedly, a tremendous decrease in the use of paper for office communication, given the quantum of messages being churned out, thanks to the internet and the email. The idea of the virtual office is now being swiftly realized, especially in developed countries, accentuated by the Covid-19 Pandemic and its aftershocks. Many people now work from home, with great implications for office administration and management. Most corporate meetings now take place on line; decision points are no longer in the conference rooms, but on internet-enabled platforms. Many sophisticated facilities and equipment are now at the beck and call of office workers and their managers thanks to office automation. Now, the advent of artificial



intelligence is threatening to create a stampede in the pace of office revolution.

Office Automation and Artificial Intelligence

Automation involves using various equipment and control systems in productive or management processes. The term, Office Automation is used to describe the different types of computer systems and software used to collect digitally, store, manipulate transfer and utilize office information to implement office tasks and assignments. An automated system simplifies daily office tasks by providing email software, document management tools and scheduling apps that help with communication and organization.

There are two types of office automation, back office and front office automation. Back office automation describes automated processes for finance, human resource management and IT among others while front office automation refers to automated processes for sales, marketing, customer relations management, and other front office activities. Automation promotes efficiency, productivity, cost-savings, customer and employee satisfaction (Ganesh, 2020). It also minimizes paper-based processes. Automation and artificial intelligence are like Siamese twins; they support and promote each other.

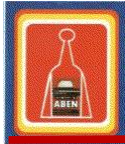
Artificial intelligence refers to the operations of computer systems that try to model and apply the intelligence of human mind. It is a domain of computer science which deals with the development of intelligent computer system. Bellman (1978) describes artificial intelligence as the automation of activities that we associate with human thinking such as decision making and problem solving. Kurzweil (1990) describes artificial intelligence as creating machines that performs functions that require intelligence when performed by human beings. It is concerned with intelligent behavior in artifacts (Nilsson, 1998).

AI has been used to develop many state of the art machines, facilities and processes. These include facial recognition apps, voice assistant apps, robotics, social media search engines, among others. Artificial intelligence is the ultimate tool of automation. The development of AI-powered robotics implies that routine office works can now be handed out to robots, leaving executives free to concentrate on decision making and problem solving.

There is a global consensus that while AI can accelerate progress in all areas of human imagination and endeavor, it may ultimately be a dangerous tool and a potential Nemesis of the human race. Autonomous cars, drones and pilotless planes are AI-enabled developments which in addition to AI medical innovations, promise to astronomically expand the possibilities of the homo sapiens. Robonauts are being developed by NASA (National Aeronautics and Space Administration) to drive the exploration of the outer space. Some scientists are predicting that by the dawn of the next century there would be a merger of the human race with AI-powered machines, so that mankind would be half man and half machine. The implication is that mortality may become a rarity, immortality a reality, since there would always be a machine to replace the heart, the lungs, the brain, the liver: any organ that goes wrong (Marsden, 2018). A human being and his system may have computer backups, forever annulling the saying that life has no duplicate.

This prospect is so realistic that it already has a name: Singularity. According to Prabkhar (2017). Singularity refers to a hypothetical point in time when the development of artificial general intelligence becomes so advanced that it will irreversibly change human civilisation. This would mark the dawn of mankind's inseparability from machines.

In 2018, researchers in University of Seattle, USA, created a network, named BrainNet, which allowed three people to communicate by thoughts alone, using electrodes attached to their brains. According to Marsden (2018), this raised the possibility of future brain to brain interfaces



that enable cooperative problem solving by human beings. In February, 2024, a man implanted with computer chips by Neuralink was able to control a computer mouse by his thoughts alone. Elon Musk's firm Neuralink, is developing a product for anyone who wants to have superhuman cognition. "Your phone is already a part of you. You are already a cyborg." Musk foresees the merging of artificial intelligence as an "inevitable and sensible option. If you cannot beat it, join it."

This promise of AI-driven limitless possibilities is fraught with titanic challenges. What if mankind's creation become self-aware and it turns against us? What if a hostile power unleashes an army of indestructible robots against its enemies?? Well, that is far into the future, and for now, it has nothing to do with office administration,

Technology-Powered Trends in Office Administration

Given the established realities and future potentials of artificial intelligence in human affairs, it is evident that office administration would not be left out of its influence. The automation revolution has liberated office administrators from the tedium of repetitive tasks like data entry and shorthand note taking which are now entrusted to artificial intelligence. This affords the office administrator the time to focus on creativity and innovative thinking. Cloud technology has similarly opened hitherto unimaginable space for document storage and management. For generations, file management, especially storage and retrieval, was a major challenge especially for big organisations. Today, localized data storage in form of physical file cabinets have been replaced by the limitless expanse of clouds, which enable seamless storage retrieval and all the year round accessibility, irrespective of location (Steve, 2017).

Technology has similarly engendered fluid information sharing, coordination communication through android telephones, social media platforms, and video conferencing apps. New and more efficient data analytical tools also enable administrators to forecast future trends, needs and to take actions based on the predictions emanating from the analytical tools. According to Mukherjee (2023), mobile apps facilitate instant communication, coordination and control, ensuring that administrators remain in command even while on the move. Finally, advancement in cyber security architecture helps to protect the organisation's cyber assets "from the ever-evolving landscape of digital threats, p.5."

Trends in Office Administration

Office administration is technologically enhanced by the following systems and capabilities:

Artificial Intelligence Systems Integration

Artificial Intelligence Systems Integration seeks to make individual software components interoperable with other components in order to create larger, broader and more efficient AI systems Baun, (2022). This is achieved through message routing or communication protocols that the software components use to communicate with each other. often through a middleware blackboard system.

Integrated artificial intelligence capabilities help to augment human capabilities and frees office administrators to face the most important tasks. AIAs can assist customer queries, sales and marketing analysis, work-time management, income analysis, budget planning and expenditure analysis, among others. Resultantly, the busy executive's should no longer be consumed by such mundane assignments.

Robotic Process Automation

Robotic Process Automation is the software that makes it easy to build, deploy and manage software robots that emulate human actions interacting with digital systems and software. This enables repetitive, rule-based tasks to be executed promptly and efficiently. Robotic Process Automation can assist the office administrator with data transfers, onboarding payroll process,



customer complaints, processing orders on ecommerce, data entry, file management, report generation, credit card application, and call centre operation Baun, (2022). This enables the busy executive to focus on tasks that demand critical thinking, man management skills, and emotional intelligence.

Augmented Reality and Virtual Reality

In the aftermath of the COVID-19 Pandemic crisis, the need and demand for augmented and virtual reality systems skyrocketed. Schools, offices and businesses had to operate virtually, for fear of the consequences of viral contamination. Augmented reality is an interactive experience which combines real world with computer generated contents (Mukherjee, 2023). The content can span multiple sensory modalities including visual, auditory and somatosensory modes

Virtual reality is the use of computer modeling and simulation that enables a person to interact with an artificial three-dimensional visual or other sensory environment. Meetings can now be held with partners across the globe. A man can present a paper in Moscow, and one hour later attend a seminar in Rio de Janeiro, all the while without leaving his home in Lagos, Nigeria. Skype, Zoom, Google Classroom, WhatsApp, have comprehensively enabled the busy executive to economise his time without significant deficit in efficiency. VR and AR have facilitated interaction, collaboration and have promoted cross cultural interactions and experience sharing.

Internet of Things

Internet of Things (IoT) refers to the collective network of connected devices and the technology that facilitates communication between devices and the cloud as well as between the devices themselves. Smart TVs, smart watches, autonomous cars, personal medical devices, heating and cooling systems, trackers are examples of IoT-enabled products which can be very useful to the administrator (Mukherjee, 2023). The devices can transfer data to one another without human intervention. The purpose is to create self-reporting devices that can communicate with each other in real time. In the office, smart office buildings can adjust lighting and temperature based on occupancy; smart doors can open at the approach of cleared client or staffer. This can enhance operational efficiency and reduce waste. It can boost productivity and promote job satisfaction.

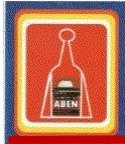
Collaborative Cloud Tools

Employees use cloud based collaboration tools and platforms to share, edit and work together on a project. Cloud collaboration enables employees to work together on documents and other types of data which are stored off premises and outside of the organisation's physical location. This enhances teamwork irrespective of the employees' different locations. Cloud collaboration tools include, Asana, Microsoft 365, Google Workplace, Microsoft Workplace, Dropbox, Google Drive, among others. They enable real time collaboration, document sharing, and communication across physical locations and time differences. This enhances collaboration, efficiency, sense of importance, unity and common purposes among members.

Blockchain for Enhanced Security

Blockchain technology is a decentralized, distributed ledger that stores the record of ownership of digital assets. Any data stored on blockchain cannot be modified, making it a guarantor of cybersecurity, ideal for payment, healthcare management and cybersecurity. The major elements of blockchain are, distribution, encryption, immutability, tokensation, and transparency.

Since security of assets are always a major concern of the administrator, especially those in highly sensitive government agencies and businesses, blockchain security would put the



administrator's mind at rest, allowing him to concentrate on other important assignments.-

Personalized Learning

Given this avalanche of technology- related issues, an administrator should, finally concern himself with the issue of personalized learning. Personalized-learning, whether in or outside the class room, focuses on tailoring learning experiences to suit the interests and needs of the worker (Prabkhar, 2017).

In a high-technology environment, workers interests and needs are bound to be widely varied. Personalised Instruction would be useful for orientation, induction, training, and lifelong learning. Personalised Instruction would structure learning time, type and process to the needs of the worker, saving expenses and time. It would be ideal in a highly technological environment where new knowledge, skills and attitudes have to be continually acquired.

Office Administration and the Promise of a New World

These technological new horizons promise positive viral impact on office administration. Thanks to technology, remote work and job flexibility are now realities, with great implications for workplace, communication, management, collaboration, training and development, resource management and corporate finances. The new technological implements have also brought the issue of employee well-being in a technological environment to the front burner of management discourse, with ecological and ergonomics concerns coming into prominence.

In the most sophisticated offices today, thanks to technology, decisions and actions are now data-driven with improved productivity and efficiency. Analytical tools transform raw data into actionable insights. Tools like Business Intelligence and Predictive Analytics help to identify future trends and potential outcomes enabling organisations to preempt challenges and optimise opportunities. The new technological environment has also highlighted the importance employee well-being, emphasizing the imperative of building healthy minds for healthy workplaces, whether physical or virtual. Forward-looking organisations now prioritise employee wellbeing, using implements like flexible work hours, training and other motivation techniques to build the competency and confidence of their workmen even as they prepare for the intriguing future of work.

Office automation, particularly machine learning, natural language processing and robotic process automation have facilitated office administration by automating routine tasks, streamlining processes and enabling data-driven decision making. IT-driven tools like automatic scheduling systems, virtual assistants and chatbots are rapidly becoming indispensable instruments of the modern office environment with positive implications for integration, collaboration, communication, customer relations, and management activities.

Artificial intelligence continues to revolutionize the workplace. Due to its capacity to power systems that can swiftly and perfectly analyze large volumes of data, reducing the time required for such mundane tasks. AI-powered document-management systems, can organize and categorise documents efficiently, making information retrieval faster and relatively fool-proof. AI-enabled scheduling tools can make meeting schedules based on availability and members' preferences. Furthermore, AI-supported chatbots can automatically respond to customers' queries and staffers' enquiries in real time, with great implications for organisational economy, efficiency and personnel well-being.

In the long term, the promise is that scientists will continue to develop ever-improving and revolutionary software to automate mundane and not-so-mundane tasks which will free up valuable time for office leaders to focus more on strategic activities like man-management, problem-solving and decision making, with enhanced creativity and innovation as corporate benefits.



Ongoing advancements in robotics will ultimately introduce large numbers of robotic personnel into factory floors and similar workplaces, from the office to military units. This will create, positively and negatively, completely new frontiers for the administrator to address.

AI is projected to contribute 15.7 trillion dollars to global economy by 2030. It is expected to increase business productivity by forty per cent (BlueTree, 2024). The impact of all these on office administration will be very profound, challenging office administrators, like everyone in government and industry – indeed, everyone – to gird their loins.

Challenges of Automation and AI on Office Administration

The major challenge that automation and AI poses is the fear of job displacement among office administrators. There is the fear that as automative technologies advance, administrative tasks may become fully automated, to the detriment of human labour demand. The panacea to this challenge, however is for the administrator to reskill and upskill in order to remain relevant.

There is also the challenge of data security and privacy. The use of AI to collect and analyse large volumes of data raise the risk of data breaches and privacy violations. To address this, office administrators need to be aware of the risks and implement robust security protocols to safeguard important security information.

Office administrators also face the challenge of meeting new skills needs. Since they can no longer be satisfied with performing routine tasks but are also expected to contribute to problem solving, decision making and process improvement initiative, they have to develop skills in areas such as data analytics, project management and communication to effectively navigate the changing landscape of 21st century office management.

Conclusion

Artificial intelligence has transformed organizational operations by automating tasks, analyzing data and enhancing decision making. From automating repetitive processes and optimizing supply chains to predicting maintenance needs and offering personalized customer experiences, AI has continued to significantly boost operational efficiency. It has helped to identify new business opportunities, pin-point potential operational inhibitions, come up with effective ways to personalize outreach, and anticipate challenges based on data. AI has engendered increased productivity, efficiency, quality and innovation. It has similarly created new opportunities, employment and markets. While there are challenges associated with automation and artificial intelligence in office administrations, these challenges can be met by reskilling and upskilling the office administrator and upgrading equipment, facilities and processes. By embracing and optimizing automation and artificial intelligence, and equipping employees with the necessary facilities and skills, office administrators can continually enhance their productivity and effectiveness in the age of automation and artificial intelligence.

Recommendations

The following recommendations are proffered to encourage public and private organisations to take advantage of the offerings of artificial intelligence for office management:

1. Office administrators should continually keep abreast of development in the area of the application of artificial intelligence for automating office functions. This will enhance productivity, efficiency and confer competitive advantages on organisations.
2. Corporate leaders should provide state of the art facilities and software for their offices. Offices should also be designed to follow current ergonomics and ecological standards which are compatible with the deployment of artificial intelligence technology.



3. The Nigerian government should put in place mechanisms, facilities and policies which can accelerate development and optimal deployment of artificial intelligence for the Nigerian situation. AI may provide the silver bullet for addressing the challenge of technological and economic challenges in Nigeria.
4. Government, industry and learning institutions, particularly, business schools, should actively promote training and learning in all aspects of artificial intelligence. The public should be sensitized to the reality of artificial intelligence and prepare them for the implications, especially in respect of office and economic management.

References

- Ademiluyi, L. F. (2021). Digital secretarial practice and office management. New Deal Publications Ltd.
- Baun, H. (2022) An Introduction to artificial intelligence.
<https://us.docworkspace.com/d/sIDbG57w82ZLEsay>
- Bellman, R. (1978). An introduction to artificial intelligence: Can computers think? Boyd and Fraser Publishing Company.
- Bluetree, (2024). AI industry growth statistics: Exploring key metrics driving the growth of AI.
<https://bluetree.digita/ai-industry-growth-metrics/>
- Fayol, H. (1949). General and industrial management. Kindle.
- Ganesh, S. (2020). Introduction to office management. [https://accountslearning.com/office management](https://accountslearning.com/office-management).
- Harold .K & O'Donnel, (1964). Principles of management. An Analysis of management functions, 3rd ed. McGraw Hill.
- Kurzweil, R. (1990). The age of intelligent machines. Kurzweil Foundation.
- Leffingwell, W.H. & Robinson, E.M. (1950). Textbook of Office Management. McGraw Hill.
- Libbey, C. O, (2017). Components of office management. <https://www.academia.edu/4781360/>
- Marsden, R, (2018, October 15). <https://www.thenationalnews/art-culture/comment>
- Mills, M, & Standingford, S. (1986). The Modern Office Management. Institute of Purchasing and Supply.
- Mukherjee, S. (2023). Office administration trends: embracing the future of workplace efficiency.
[linkedln.com/pulse/office-admin-trends-embracing-future-of-workplace-efficiency-smnath-mukerjee-8qdcg-?utm_source=share](https://www.linkedin.com/pulse/office-admin-trends-embracing-future-of-workplace-efficiency-smnath-mukerjee-8qdcg/?utm_source=share)
- Nilsson, N. J. (1998). Artificial intelligence: A new synthesis. Morgan Kaufmann Publishers Inc.
- Pillai, R S. N. & Bagavathi A. (2018). Modern office management. hand and Company. 3
- Prabkhar, A. (2017) The merging of man and machine is happening now.
<https://www.wired.com/story/darpa.arati>. Prabkhar.
- Russel, S.J & Norvig, P. (2012). Artificial Intelligence : A Modern Approach. Pearson
- Steve M. 2017, Small business Network, Inc. [http://www.askjim.biz /answers/use-of- job-description 1475.php](http://www.askjim.biz/answers/use-of-job-description-1475.php).
- TRIOS College (2022). <https://trios.com/blog/w/whkiat-is-office-administration/>
- What are the benefits of office automation? Fast Tracking the Digital Transformation (2022).
[Https://www.impactmybiiz.com/blog/advantage-of-automation3](https://www.impactmybiiz.com/blog/advantage-of-automation3)



ENHANCING BUSINESS EDUCATION PROGRAMME IN TERTIARY INSTITUTIONS IN EBONYI STATE FOR EFFECTIVE SKILL ACQUISITION THROUGH ARTIFICIAL INTELLIGENCE

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Abstract

The study ascertained the ways business education programme in tertiary institutions in Ebonyi State could be enhanced for effective skill acquisition through Artificial Intelligence. These institutions are Alex Ekwueme Federal University, Ndufu-Alike; Ebonyi State University, Abakaliki, and College of Education, Ikwo. Three purposes were raised from which three research questions and two null hypotheses tested at 0.05 level of significance were formulated to guide the study. In carrying out this investigation, a census survey design was used. The population comprised 45 business education lecturers in the three tertiary institutions in Ebonyi State, Nigeria. This population represents the entire target population for this reason, a census was conducted. A four-point scale structured questionnaire entitled „Enhancing Business Education through Artificial Intelligence (EBEDA)“ was used to collect data. The reliability coefficient of the instrument was determined to be 0.85 using test-retest method. The data collected were analysed using mean statistics and standard deviation to answer the research questions and t-test for the hypotheses. The result showed that business educators in tertiary institutions in Ebonyi State agreed that business education as a programme could leverage on the provision of Artificial Intelligence for effective skill acquisition. AI tools enhance students’ engagement and motivation; help to customize learning paths to cater for individual needs; give real-time feedback for targeted improvement and give access to a range of educational resources tailored to students’ interest and these are all basic to effective skill acquisition. Based on the findings of the study, it was concluded that for business education programme to inculcate into its recipients „life skill“ for economic success as targeted, it is vital that Artificial intelligence tools be engaged in the teaching and learning processes. Therefore, the study recommended among others, that business educators should open up to this paradigm shift in teaching and learning and embrace the personalized learning inherent in Artificial Intelligence tools for educational improvement.

Keywords: Artificial Intelligence, Business Education, Effective, Enhancement, Skill Acquisition,

Introduction

In a rapid improving setting of business education, the integration of artificial Intelligence (AI) presents promising opportunities for its goal achievement. It is amazing to note the potential transformative impact AI can have on basic education, skill development and business innovation which are all components of business education. Business education, being a skill-based programme shaped to offer opportunity to our teeming youths to acquire practical and applied skills can leverage on the tools, experiences, and activities offered in AI to achieve effective skill acquisition. Enhancing business education programme with digital tools is essential considering the view of Salami and Kehinde (2023) that skill acquisition is very paramount for effective job performance. It also implies that for a business education student to be relevant in the



contemporary society he must be empowered with relevant skills to operate in the business world or teaching profession.

Business education as a programme of study is relatively new in Nigeria. In the opinion of Ibrahim (2022), it prepares individuals to be productive in the economy as employees or self-employed persons by equipping them with practical skills required to enter into the labour force and be productive in the economy. It is an entrepreneurship-based programme which equips students with relevant skills, knowledge and attitude required in the business world. According to Udo in Ariwodo and Emeasoba (2023), business education is a comprehensive activity-based occupational education programme that is concerned with the acquisition of practical skills, work habits, competences, and knowledge, requisite to succeed in any chosen business occupation. Edokpolor and Egbri in Ariwodo and Emeasoba (2023) postulated that the actual goals of business education are to: prepare students for specific career in office occupations; equip students with the requisite skills for job creation and entrepreneurship and expose students with knowledge about business, including a good blend of computer technology, which incorporates information and communication technology. Business education offers recipients who wish to pursue a career the opportunity to develop skills, abilities and understanding that will enable them to enter, perform and progress in teaching and business occupations.

The course content of business education if effectively implemented should enable its recipients acquire managerial, communication, human relations, technological, manipulative and technical skills. Skill acquisition is a process through which one gains mastery of a particular vocation or the basics of a task with the sole purpose of rendering services for financial freedom (Ariwodo&Emeasoba, 2023). In the views of Amesi (2017), it is a deliberate, systematic and sustainable effort which leads to capacity that makes a person to effectively and efficiently carry out complex activities or job functions involving cognitive, technical, and interpersonal dispositions. Skill is acquired through learning and constant practice.

Effective implementation of the curricular of business education as a skill-based programme cannot be achieved without correct teaching staff, appropriate instructional methods/strategies, application of right tools and correct environment. Therefore, the digital era calls for incorporation of new technologies as they emerge in order to inculcate new skills and upgrade existing ones. This is because new technologies give people opportunity to access, manage, integrate and evaluate huge amount of information real-time and accurately. One of such devices that advancement in technology has offered in the recent times is the Artificial Intelligence software/tools.

The global e-learning platform has undergone a profound transformation, marking a departure from traditional methods to embrace innovative approaches. At the heart of this educational revolution lies the concept of personalized learning, a paradigm shifts that tailor educational experiences to the unique needs of individual learners. This departure from the one-size-fits-all model is driven by recognition that students possess distinct learning styles, paces, and preferences.

Facilitating this transformative shift is the integration of Artificial Intelligence (AI) into traditional educational frameworks. AI, with its capacity for data processing and pattern recognition, emerges as a powerful catalyst in creating adaptive and personalized learning experiences. It revolutionizes how educators assess, engage, and respond to the diverse needs of students. Integrating AI into the learning process of business education will cater for individual student needs. In the opinion of Pichai (2019) AI offers personalized learning which recognizes and adapts to the diverse ways in which students learn, thereby fostering increased engagement, deeper understanding, and more meaningful educational outcomes. As students navigate their

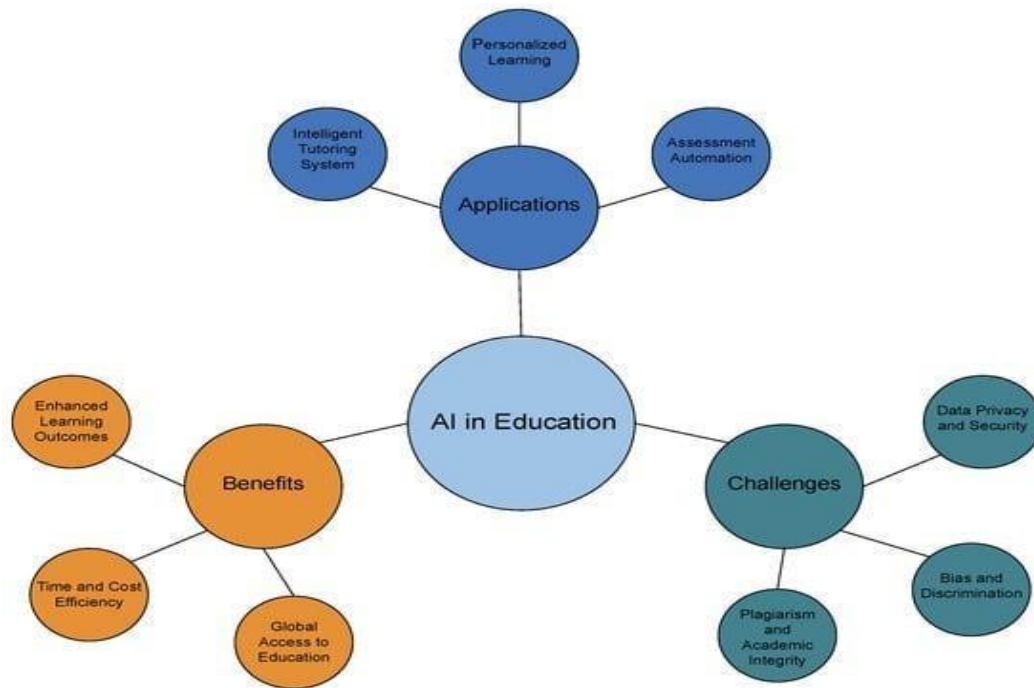


educational journeys, tailored experiences enhance their strengths, address their weaknesses, and empower them to thrive in a personalized learning environment thereby making for effective skill acquisition.

Artificial Intelligence or AI, according to Fishel (2023) refers to the simulation of human intelligence by software-coded heuristics. Artificial Intelligence is a rapidly evolving technology that tries to simulate human intelligence using machines, enabling them to perform a wide range of tasks, from simple to complex. The ideal characteristic of artificial intelligence is its ability to rationalize and take actions that have the best chance of achieving a specific goal. The goals of artificial intelligence include computer-enhanced learning, reasoning, and perception.

AI is continuously evolving to benefit many different industries. Its applications are endless and with varying levels of sophistication. It is being tested and used in the healthcare industry for suggesting drug dosages, identifying treatments, and for aiding in surgical procedures in the operating room. In the view of Kamalov, Calonge and Gurrib (2023) artificial intelligence, in the educational context, refers to the application of machine learning algorithms and data analytics to enhance various aspects of the learning process. It encompasses a range of applications, from intelligent tutoring systems and personalized learning platforms to smart content creation and automated grading systems. AI automates tasks and acts as a catalyst for personalized and adaptive learning experiences. Machine learning algorithms in AI analyse vast datasets to identify patterns in student behaviour, learning styles, and comprehension levels.

Prasad (2023) avers that AI addresses the challenges inherent to lifelong learning and skill development by delivering a dynamic and customizable educational framework. It can play a pivotal role particularly in the context of the rapidly evolving job market and the need for continuous up-skilling. AI-driven learning platforms can help individuals identify skill gaps, access relevant learning resources, and track their progress. One of the key aspects of AI is the potential to harness massive datasets to identify emerging trends, skill gaps, and workforce requirements. The extracted information can be used to design and deliver education and training programs that align with the evolving demands of the global economy. By intelligently identifying and addressing individual skill gaps, AI systems can facilitate efficient up-skilling and re-skilling, enabling individuals to adapt more effectively to shifting job markets and technological advancements (Prasad, 2020). Applications of AI in education are broadly in the areas of intelligent tutoring; personalized learning; and assessment automation. This application has several benefits and challenges as well.



Multifaceted impact of AI in education.

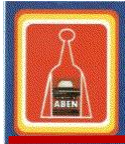
Source: <https://www.mdpi.com/2071-1050/15/16/12451>

However, the invaluable opportunity offered by AI will enable business educators especially to modify their teaching methods; implementing strategies that will address the unique needs of each student in skill acquisition. AI facilitates early identification of learning difficulties and provides timely interventions, ensuring a proactive approach to educational support (Zia, 2023).

The facilities offered by AI are timely interventions in solidifying skill acquisition inherent in business education in order that learners will build capacity for effectiveness and efficiency in carrying out jobs related to the discipline. Udo (2015) asserts that effective acquisition of skills will enable recipients of business education to make positive impact in the world of work in order to boost sustainable national development in Nigeria. Emeasoba, Egbo and Akudolu, (2023) also agreed that effective skill acquisition will aid in repositioning of the Nigerian economy. Therefore, business educators should leverage on the innovations of AI for effective skill acquisition. AI saves time, sparks ideas and offer new angles to skill acquisition (Rebelo, 2024).

Statement of the Problem

Effective skill acquisition is achieved when the learning and practice makes one perform better, meet task-target, and able to contribute to societal growth and development. This however is a far cry from the reality in business education considering that its products are among the unemployed teeming youths causing nuisance in the society, bereft of skills and abilities to be employable or self-employed. This persisting problem could be as a result of students' disengagement. Students' disengagement and disinterest affects learning negatively. To enhance students' learning which is expected to improve skills- acquisition inherent in business education, AI-powered personalized learning as a student-centric approach that



addresses the issue of student disengagement in education could be involved. By tailoring learning experiences to individual needs, interests, and pace, AI offers adaptive content, interactive experiences, and data analysis to optimize learning outcomes.

Purpose of the Study

The major purpose of the study was to find out ways business education could be enhanced for effective skill acquisition through the instrument of Artificial intelligence. Specifically, the paper ascertained:

1. Ways AI-powered tools could enhance business education for effective skill acquisition.
2. Ways personalized learning offered in AI could enhance business education for effective skill acquisition.
3. How analysis of vast amount of data in AI could enhance business education for effective skill acquisition.

Research Questions

The following research questions guided the study:

1. In what ways could AI-powered tools enhance business education for effective skill acquisition?
2. In what ways could personalized learning offered in AI enhance business education for effective skill acquisition?
3. How could analysis of data in AI enhance business education for effective skill acquisition?

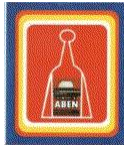
Hypotheses

These null hypotheses were tested at 0.05 level of significance:

- Ho₁: Male and female business educators do not differ significantly in their mean responses on the ways AI-powered tools facilitate experiential learning for effective skill acquisition in business education.
- Ho₂: There is no significant difference in the mean responses of business educators on the enhancement of business education for effective skill acquisition through Artificial Intelligence tools

Method

The study adopted census survey research design. This design was considered appropriate because the study sought the opinions of business education lecturers on the ways business education could be enhanced for effective skill acquisition through Artificial Intelligence. The population of the study consisted of 45 lecturers in business education departments of tertiary institutions in Ebonyi State that are offering business education. These institutions are Alex Ekwueme Federal University, Ndufu-Alike, Ebonyi State University, Abakaliki, and College of Education, Ikwo. A census was conducted because, the small population size of 45 represents the entire target population. The researcher developed a four-point scale structured questionnaire entitled ‘_Enhancing Business Education through Artificial Intelligence (EBEDAI)’ for collection of data. The response categories were strongly Agreed, Agreed, Disagreed and Strongly Disagreed. Part ‘_A’ contained information on demographic data while part ‘_B’ contained information relating to research questions. The questionnaire was subjected to face and contents validity by a business educator and two lecturers in Computer Engineering and Computer Science of Akanulbiam Federal Polytechnic Unwana. The questionnaire had an overall reliability index of 0.86 using Test-retest reliability method and this was established through a Pearson Product-Moment Correlation Coefficient (Pearson’s r).



Forty-five copies of the questionnaire were administered through personal contact by the researcher with the help of three research assistants. The 45 copies were returned and used for the analysis. Data collected were analysed using mean, standard deviation and t-test statistics. The analyses were done with statistical package for social sciences (SPSS). Mean and standard deviation were used to answer the research questions. A cut-off of 2.5 was used as a base line score for accepting or rejecting of each of the items of the questionnaire. Statistical t-test was used to test the null hypothesis. The null hypothesis of no significant difference was rejected where the calculated t-value was equal to or greater than the table t-test value for a given degree of freedom at P=0.05 level of significance. The null hypothesis of no significant difference was upheld where the calculated t-value was less than the table t-value of 0.05 level of significance.

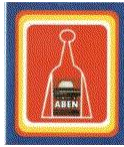
Results

Research Question 1

In what ways could AI-powered tools enhance business education for effective skill acquisition?

Table 1: Mean responses and standard deviation of Business Educators on the ways AI tools enhance business education for effective skill acquisition. N=45

S/N	Variables		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
1	Use of Natural Language Processing(NLP) enhances business education for principles of specific skill	Equal variances assumed	0.008	0.931	0.379	42	0.707	0.09091	0.24011	-0.39366	.57548
		Equal variances not assumed			0.379	41.930	0.707	0.09091	0.24011	-0.39368	.57550
2	Student modelling tools enhances business education by tracking students' skill acquisition progress	Equal variances assumed	0.176	0.677	-0.251	42	0.803	-0.04545	0.18100	-0.41074	.31983
		Equal variances not assumed			-0.251	41.936	0.803	-0.04545	0.18100	-0.41075	.31984
3	Meaningful dialogue in NLP enhances business education for effective acquisition of communication skills	Equal variances assumed	0.339	0.564	0.431	43	0.669	0.10277	0.23860	-0.37841	.58394
		Equal variances not assumed			0.432	42.320	0.668	0.10277	0.23767	-0.37676	.58229
4	Teacher-student collaboration tools offered in AI enhance business education for effective skill acquisition by providing real time feedback	Equal variances assumed	0.417	0.522	1.237	42	0.223	0.27122	0.21928	-0.17131	.71376
		Equal variances not assumed			1.235	41.315	0.224	0.27122	0.21965	-0.17227	.71471
5	Intelligence Tutoring System (ITS) enhances business education by customizing teaching methods for effective manipulative skill	Equal variances assumed	2.094	0.155	0.955	43	0.345	0.19368	0.20282	-0.21535	.60270
		Equal variances not			0.964	37.287	0.341	0.19368	0.20083	-0.21314	.60049

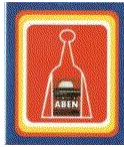


	acquisition	assumed										
6	Voice-activated Technology in AI enhances business education for effective skill acquisition by improving teacher-student collaboration.	Equal variances assumed	0.391	0.535	0.414	42	0.681	0.11180	0.26992	-0.43292	.65652	
		Equal variances not assumed			0.412	39.924	0.683	0.11180	0.27163	-0.43722	.66082	
7	Student modelling tool tracks students' behavior	Equal variances assumed	0.004	0.951	-1.315	42	0.196	-0.30849	0.23466	-0.78205	.16507	
		Equal variances not assumed			-1.310	40.941	0.197	-0.30849	0.23540	-0.78391	.16693	
8	Virtual tutors, text to image generation, video generation platforms, and others can be used to supplement traditional business education techniques to align with evolving demands of the global economy.	Equal variances assumed	0.549	0.463	1.080	43	0.286	0.19170	0.17749	-0.16624	.54963	
		Equal variances not assumed			1.087	40.721	0.283	0.19170	0.17636	-0.16454	.54794	
9	AI tools handle the limitations of traditional one-size-fits-all approaches to ICT skills acquisition in business education.	Equal variances assumed	0.998	0.323	-0.882	43	0.383	-0.21146	0.23982	-0.69510	.27218	
		Equal variances not assumed			-0.875	37.066	0.387	-0.21146	0.24178	-0.70132	.27840	
10	AI tools offer automated grading system.	Equal variances assumed	0.529	0.471	-0.059	42	0.953	-0.01449	0.24593	-0.51079	.48181	
		Equal variances not assumed			-0.059	41.603	0.953	-0.01449	0.24377	-0.50658	.47759	

Source: Authors' computation using SPSS version 25, 2024

Data in Table 1 above revealed that items 1, 2, 3, 4, 6, and 7 has a sig value .500 or 50% and above which shows how well artificial intelligence tools contribute to effective skill acquisition. The variables with less than .500 or 50% shows that the variables under review contribute less or nothing and may not be required, like items 5, 8, 9 and 10. Therefore, Intelligence tutoring system (ITS) enhances business education by customizing teaching methods for effective manipulative skill acquisition with sig. value of .155 or 15%, Ai tools handle the limitations of traditional one-size- fit-all approaches to ICT skills acquisition in business education with sig. value of .32 or 32%,Virtual tutors, text to image generation, video generation platforms, and others can be used to supplement traditional business education techniques to align with evolving demands of the global economy with .46 or 46% and Ai tools offer automated grading system with .47 or 47%,shows how well the independent variables explain the dependent variables.

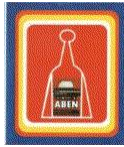
Research Question 2



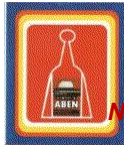
In what ways could personalized learning offered in AI enhance business education for effective skill acquisition?

Table 2: Mean responses and standard deviation on the ways personalized learning offered in AI could enhance business education for effective skill acquisition. N=45

S/N	Variables		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
1	AI driven learning platforms help individuals identify skill gap	Equal variances assumed	0.101	0.753	0.821	43	0.416	0.14822	0.18050	-0.21579	0.51223
		Equal variances not assumed			0.827	40.270	0.413	0.14822	0.17926	-0.21400	0.51044
2	Personalized learning facilitates up-skilling and re-skilling	Equal variances assumed	0.183	0.671	-1.279	42	0.208	-0.22727	0.17771	-0.58591	0.13137
		Equal variances not assumed			-1.279	39.126	0.208	-0.22727	0.17771	-0.58670	0.13215
3	Personalized learning facilitate re-skilling	Equal variances assumed	0.293	0.592	-0.832	41	0.410	-0.21739	0.26115	-0.74480	0.31002
		Equal variances not assumed			-0.824	37.943	0.415	-0.21739	0.26382	-0.75149	0.31671
4	Personalized learning addresses unique needs of each student in skill acquisition.	Equal variances assumed	1.462	0.234	-1.313	40	0.197	-0.23810	0.18133	-0.60457	0.12838
		Equal variances not assumed			-1.313	37.555	0.197	-0.23810	0.18133	-0.60532	0.12913
5	Personalized learning fosters increased engagement of students for effective skill acquisition	Equal variances assumed	0.018	0.895	-0.581	43	0.564	-0.11462	0.19734	-0.51261	0.28336
		Equal variances not assumed			-0.581	42.949	0.564	-0.11462	0.19729	-0.51252	0.28327
6	It addresses students' weaknesses	Equal variances assumed	2.370	0.132	0.288	39	0.775	0.06459	0.22459	-0.38968	0.51886
		Equal variances not assumed			0.293	38.521	0.771	0.06459	0.22029	-0.38115	0.51034
7	Personalized learning offers tailored experiences which enhance students'	Equal variances assumed	1.545	0.221	-1.651	43	0.106	-0.38538	0.23336	-0.85599	0.08524
		Equal variances not assumed			-1.635	35.150	0.111	-0.38538	0.23566	-0.86371	0.09296



	strengths and address their weaknesses										
8	As an adaptive and student-centric pedagogical approach, personalized learning enhances business education for effective managerial skills acquisition	Equal variances assumed	0.304	0.584	-0.690	43	0.494	-0.16403	0.23780	-0.64360	0.31554
		Equal variances not assumed			-0.687	40.881	0.496	-0.16403	0.23879	-0.64632	0.31826
9	Personalized learning allows students to progress at a rate that aligns with their understanding.	Equal variances assumed	1.030	0.316	0.056	43	0.956	0.01383	0.24760	-0.48550	0.51317
		Equal variances not assumed			0.056	38.738	0.956	0.01383	0.24923	-0.49039	0.51806
10	By addressing individual strengths, business educators create an environment that nurtures a student's passion and aptitude through personalized learning	Equal variances assumed	0.011	0.917	0.090	43	0.929	0.01779	0.19717	-0.37984	0.41541
		Equal variances not assumed			0.090	42.845	0.929	0.01779	0.19723	-0.38001	0.41559
11	Customization of learning in personalized learning AI enhances business education for effective skill acquisition by cultivating love for learning in students	Equal variances assumed	0.399	0.531	-0.941	43	0.352	-0.20751	0.22053	-0.65226	0.23724
		Equal variances not assumed			-0.944	42.629	0.351	-0.20751	0.21984	-0.65097	0.23596
12	AI give access to a wide range of educational resources tailored to student interests.	Equal variances assumed	2.174	0.148	0.513	43	0.611	0.10474	0.20433	-0.30734	0.51682
		Equal variances not assumed			0.516	41.196	0.609	0.10474	0.20316	-0.30549	0.51497



Source: Authors' computation using SPSS version 25, 2024

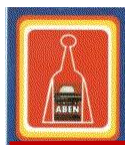
Data in Table 2 above revealed that items 4,6,7,9, and 12 are below the sig value of .500 or 50% and therefore are not necessarily required to enhance business education for effective skill acquisition While items 1, 2, 3, 5, 8, 10 and 11 with sig value of .500 or 50% and above are required and highly required to enhance business education for effective skill acquisition.

Research Question 3

How could analysis of data in AI enhance business education for effective skill acquisition?

Table 3: Mean responses and standard deviation on the ways data analysis in AI enhance business education for effective skill acquisition. N=45

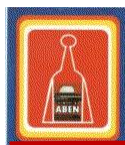
S/N	Variables		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
1	AI's capacity for data processing enhances business education by revolutionizing the way business educators assess students.	Equal variances assumed	4.087	0.049	-0.139	43	0.890	-0.02964	0.21326	- 0.40044 0.45973
		Equal variances not assumed			-0.141	34.094	0.889	-0.02964	0.21061	- 0.39833 0.45761
2	Unlike the traditional approach, AI accommodate the diverse needs of students through its vast data processing capacity.	Equal variances assumed	0.783	0.381	0.910	43	0.368	0.19368	0.21277	- 0.62277 0.23542
		Equal variances not assumed			0.916	40.389	0.365	0.19368	0.21134	- 0.62067 0.23332
3	Business education platforms leverages AI to comprehend students' individual learning style.	Equal variances assumed	0.000	1.000	0.592	42	0.557	0.09091	0.15366	- 0.40102 0.21920
		Equal variances not assumed			0.592	42.000	0.557	0.09091	0.15366	- 0.40102 0.21920
4	It facilitates students' collaboration by promoting teamwork/team effectiveness.	Equal variances assumed	0.108	0.744	0.289	41	0.774	0.06494	0.22466	- 0.51865 0.38878
		Equal variances not assumed			0.290	40.538	0.773	0.06494	0.22384	- 0.51714 0.38727



5	It gives room to periodic personalized assessments.	Equal variances assumed	3.919	0.054	1.634	43	0.110	0.33202	0.20318	-	0.74177
		Equal variances not assumed			1.652	36.252	0.107	0.33202	0.20101	-	0.73959
6	It facilitates immediate feedback.	Equal variances assumed	6.019	0.018	1.837	43	0.073	0.33399	0.18185	-	0.70074
		Equal variances not assumed			1.853	38.519	0.072	0.33399	0.18028	-	0.69878
7	It helps in progress tracking.	Equal variances assumed	0.135	0.715	0.398	42	0.693	0.09091	0.22835	-	0.55174
		Equal variances not assumed			0.398	41.847	0.693	0.09091	0.22835	-	0.55179
8	It enables adaptive learning.	Equal variances assumed	0.162	0.689	0.082	43	0.935	0.01779	0.21714	-	0.45568
		Equal variances not assumed			0.082	42.439	0.935	0.01779	0.21635	-	0.45426
9	It harnesses massive datasets to identify emerging trends.	Equal variances assumed	0.072	0.790	0.266	43	0.791	0.05929	0.22261	-	0.50822
		Equal variances not assumed			0.266	41.915	0.792	0.05929	0.22320	-	0.50974
10	It supplies data that help to provide timely intervention to students' skill acquisition difficulty.	Equal variances assumed	0.254	0.617	-1.574	42	0.123	-0.33954	0.21575	-	0.09587
		Equal variances not assumed			-1.550	35.753	0.130	-0.33954	0.21910	-	0.10491
11	It ensures a proactive approach to skill acquisition support.	Equal variances assumed	1.133	0.293	0.467	43	0.643	0.09881	0.21169	-	0.52573
		Equal variances not assumed			0.469	41.910	0.642	0.09881	0.21070	-	0.52406

Source: Authors' computation using SPSS version 25, 2024

Data in Table 3 above revealed that items 1, 2 3 5, 6, and 11 are below the sig value of .500 or 50% and therefore are not necessarily required to enhance business education for effective skill acquisition While items 4, 7, 8, 9, and 10 with sig value of .500 or 50% and above are required and highly required to enhance business education for effective skill acquisition.



Hypotheses

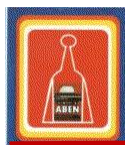
Ho₁: Male and female business educators do not differ significantly in their mean responses on the ways AI-powered tools facilitate experiential learning for effective skill acquisition in business education.

Table 4: Summary of t-test analysis of the mean responses of male and female business educators on the ways AI-powered tools facilitate experiential learning for effective skill acquisition in business education.

S/N		Gender of respondents	N	Mean	Std. Deviation	Std. Error Mean
1	Use of Natural Language Processing(NLP) enhances business education for principles of specific skill	Male	22	3.3182	.77989	.16627
		Female	22	3.2273	.81251	.17323
2	Student modeling tools enhances business education by tracking students' skill acquisition progress	Male	22	3.1818	.58849	.12547
		Female	22	3.2273	.61193	.13046
3	Meaningful dialogue in NLP enhances business education for effective acquisition of communication skills	Male	22	3.3636	.72673	.15494
		Female	23	3.2609	.86431	.18022
4	Teacher-student collaboration tools offered in AI enhance business education for effective skill acquisition by providing real time feedback	Male	21	3.6190	.74001	.16148
		Female	23	3.3478	.71406	.14889
5	Intelligence Tutoring System (ITS) enhances business education by customizing teaching methods for effective manipulative skill acquisition	Male	22	3.4545	.50965	.10866
		Female	23	3.2609	.81002	.16890
6	Voice-activated Technology in AI enhances business education for effective skill acquisition by improving teacher- student collaboration.	Male	21	3.2857	.95618	.20866
		Female	23	3.1739	.83406	.17391
7	Student modeling tool tracks students' behavior	Male	21	2.9524	.80475	.17561
		Female	23	3.2609	.75181	.15676
8	Virtual tutors, text to image generation, video generation platforms, and others can be used to supplement traditional business education techniques to align with evolving demands of the global economy.	Male	22	3.4091	.50324	.10729
		Female	23	3.2174	.67126	.13997
9	AI tools handle the limitations of traditional one-size-fits-all approaches to ICT skills acquisition in business education.	Male	22	3.1364	.94089	.20060
		Female	23	3.3478	.64728	.13497
10	AI tools offer automated grading system.	Male	21	3.3333	.73030	.15936
		Female	23	3.3478	.88465	.18446

Source: SPSS output version 25, 2024.

Given the decision criteria to accept Ho if the Calculated t- value > Critical value (2.50). Table above shows the calculated t- value for the group statistics with an average value of 3.00 for all the variables in the group statistics for male and female. We accept the null hypothesis (Ho) and conclude that Male and female business educators do not differ in their mean responses on the ways Ai-powered tool facilitate experiential learning for effective skill acquisition in business education in tertiary institutions in Ebonyi State that are offering business education in whatever capacity.



Ho₂: There is no significant difference in the mean responses of business educators on the enhancement of business education for effective skill acquisition through Artificial Intelligence tools

Table 5: Summary of t-test analysis of the mean responses of business educators on the ways AI-powered tools facilitate experiential learning for effective skill acquisition in business education.

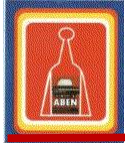
S/ N	Gender of respondents		N	Mean	Std. Deviation	Std. Error Mean
1	Male	AI's capacity for data processing enhances business education by revolutionizing the way business educators assess students,	22	3.3182	0.47673	0.10164
	Female		23	3.3478	0.88465	0.18446
2	Male	Unlike the traditional approach, AI accommodate the diverse needs of students through its vast data processing capacity.	22	3.4545	0.59580	0.12703
	Female		23	3.2609	0.81002	0.16890
3	Male	Business education platforms leverages AI to comprehend students' individual learning style.	22	3.5455	0.50965	0.10866
	Female		22	3.4545	0.50965	0.10866
4	Male	It facilitates students' collaboration by promoting teamwork/team effectiveness.	21	3.4286	0.67612	0.14754
	Female		22	3.3636	0.78954	0.16833
5	Male	It gives room to periodic personalized assessments.	22	3.6364	0.49237	0.10497
	Female		23	3.3043	0.82212	0.17142
6	Male	It facilitates immediate feedback.	22	3.6818	0.47673	0.10164
	Female		23	3.3478	0.71406	0.14889
7	Male	It helps in progress tracking.	22	3.4091	0.73414	0.15652
	Female		22	3.3182	0.77989	0.16627
8	Male	It enables adaptive learning.	22	3.4091	0.66613	0.14202
	Female		23	3.3913	0.78272	0.16321
9	Male	It harnesses massive datasets to identify emerging trends.	22	3.3636	0.78954	0.16833
	Female		23	3.3043	0.70290	0.14657
10	Male	It supplies data that help to provide timely intervention to students' skill acquisition difficulty.	21	3.0952	0.83095	0.18133
	Female		23	3.4348	0.58977	0.12298
11	Male	It ensures a proactive approach to skill acquisition support.	22	3.2727	0.63109	0.13455
	Female		23	3.1739	0.77765	0.16215

Source: SPSS output version 25, 2024.

Given the decision criteria to accept Ho if the Calculated t- value > Critical value (2.50). Table above shows the calculated t- value for the group statistics with an average value of 3.00 for all the variables in the group statistics. We accept the null hypothesis (Ho) and conclude that there is no significant difference in the mean responses of business educators on the enhancement of business education for effective skill acquisition through Artificial Intelligence tool to facilitate experiential learning for effective skill acquisition in business education in tertiary institutions in Ebonyi State that are offering business education in whatever capacity.

Discussion of Findings

The result of the study shows that AI is a transformative device that could be used to enhance business education programme for effective skill acquisition. Business educators agreed that Natural Language (NLP) tools, modelling tools, teacher-students' collaboration tools,



and voice-activated technology are transformative tools that could enhance business education programme for effective skill acquisition. This finding corroborates the conclusion of Kamalov, Calonge and Gurrib (2023) that AI has quickly established itself as a transformative force in a wide range of industries including education. They further asserted that integration of AI in educational systems is altering the ways in which students learn, teachers educate and institutions function. However, business educators are of the opinion that intelligence tutoring system (ITS) in AI is not necessary for enhancement of business education for effective skill acquisition. This stand is not surprising as there have been contentions on its ability to encourage cheating which is in congruent with the opinion of Prasad (2023) that in as much as ITS delivers intelligent tutoring, it is also a tool for academic dishonesty.

Business educators also agreed that personalized learning offered in AI could be a veritable tool for harvesting effective skill acquisition by students as it boosts identification of skills gap, facilitates re-skilling and up-skilling, fosters increased engagement of students and addresses individual strengths. This finding resonates Lake (2019) view that AI has the potential to positively impact skill acquisition in higher education. He puts it succinctly that adaptive learning systems driven by AI may analyse students' performances, strengths and shortcomings in order to offer tailored learning courses. Mauri (2019) is also in agreement with the findings as he avers that the personalized nature of adaptive learning ensures that students receive tailored content and support, addressing their unique learning needs which, contributes to a more dynamic and effective skill acquisition.

The results also revealed that business educators agreed that AI's capability in analyzing vast amount of data could enhance business education for effective skill acquisition as it enables comprehension of students' individual learning styles; facilitates students' collaboration and helps in progress tracking of students' skills acquisition progress. The finding is in line with the opinion of Meehirr (2023) that AI algorithms' ability to analyze students' data, recognize patterns and suggest personalized content and resources optimize their learning experiences in skill acquisition. In the same vein, Kamalov, Calonge and Gurrib (2023) recognize that AI's potential to analyze massive volumes of data created by students during skill acquisition process reveal patterns and trends that might assist instructors in identifying areas where students require additional support or resources for effective skill acquisition.

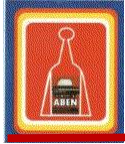
The t-test result for hypotheses revealed that business educators, in their gender and group did not differ significantly in their mean opinion on the ways AI could enhance business education programme for effective skill acquisition. This could be explained by the finding of Naoley (2023) that AI has the power to help improve learning experience by including gamification features such as incentives, challenges and competition. Moreover, engaging and individualized learning environments that increase motivation and active engagement by adapting these components to individual students can be developed.

Conclusion

The impact of AI-powered adaptive learning is profound, redefining the educational landscape for both students and educators. Students not only experience increased engagement but also benefit from higher retention rates and markedly improved academic performance from AI tools. Ultimately, the best way forward is to incorporate AI into the educational system and leverage its capabilities to deliver better learning outcomes for the students. Rather than stopping or preventing the advancement of new AI technology in education, it will be more beneficial, on balance, to integrate it into the curriculum.

Recommendations

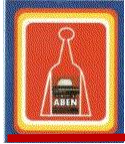
The following recommendations were advanced based on the findings of the study:



1. Business educators should open up to this paradigm shift in teaching and learning and embrace the personalized learning inherent in Artificial Intelligence tools for educational improvement.
2. Curriculum planners should review business education curriculum to include basic AI skills to enable students acquire digital skills for use of AI software.
3. The management of institutions offering business education should see the need to procure and install gadgets and software that are necessary for the use of AI in the teaching and learning process.

References

- Amesi, J. (2017). Quality assurance in Business Education programme and skill acquisition among Business Education students in tertiary institutions in Rivers State. *Nigerian Journal of Business Education*, 4(1), 35-44.
- Apture, S., Kalkoti, F., Sardar, A., Ahsan, M. & Tare, R. (2023). Personalized Artificial Intelligence enhanced learning platform. *International Research Journal of Modernization in Engineering Technology and Science*. DOI: <https://www.doi.org/10.56726/IRJMETS47868>
- Ariwodo, F. O. & Emeasoba, N. C. (2023). Skills acquisition as correlate to decent work in digital era among business education students in tertiary institutions in Akwa Ibom State. *Nigerian Journal of Business Education*, 10 (1), 95-104.
- Emeasoba, N. C., Egbo, N., O. Akudolu, C. A. (2023). Funding business education programme in South East Universities for promoting skills acquisition. *Nigerian Journal of Business Education*, 10 (1), 84-94.
- Fishel, D. (2023). What is Artificial Intelligence? <https://elearningindustry.com/elearning-authors-Articles>
- Ibrahim, S. (2022). Business education, entrepreneurship and skills acquisition in digital era. *Nigerian Journal of Business Education*, 10(1), 1-8.
- Kamalov, F., Calonge, D. S., & Gurrib, I. (2023). New era of Artificial Intelligence in education: Towards a sustainable multifaceted revolution. <https://www.mdpi.com/2071-1050/15/16/12451>
- Lake, K. (2019). What is personalized learning? <https://elearningindustry.com/elearning-authors/kelly-lake>
- Mauri, J. (2019). Personalized learning through Artificial Intelligence. <https://elearningindustry.com/elearning-authors/jacop-mauri>
- Meehirr, K. (2023). Artificial Intelligence for personalized learning. <https://elearningindustry.com/elearning-authors/trusec-ai>
- Naoley, S. (2023). Artificial Intelligence in e-learning for personalized experience. <https://elearningindustry.com/elearning-authors/ujwao-tiwari>
- Pichai, S. (2019). Artificial Intelligence will have a more profound impact on humanity than fire, electricity and the internet. <https://elearningindustry.com/elearning-authors/pichai-s>
- Prasad, R. K. (2023). The remarkable role of Artificial Intelligence in personalized learning. <https://elearningindustry.com/elearning-authors/rk-prasad>
- Salami, O. L. & Kehinde, M. O. (2023). Skill acquisition in business education programme: A predictor for effective job performance of business education graduates in the digital era. *Nigerian Journal of Business Education*, 10 (2), 74-83.
- Udo, M. P. (2015). Techniques for improving practical skill acquisition in vocational business education (VBE) for sustainable development in Nigeria. *European Journal of Research and Reflection in Educational Sciences*, 3 (1), 27-34.
- Zia, T. (2023). Transforming education: AI-powered personalized learning revolution. <https://www.techopedia.com/transforming-education-ai-powered-personalized-learning-revolution>



ESPOUSING ARTIFICIAL INTELLIGENCE-POWERED BUSINESS EDUCATION PLATFORM: CULTURING, NURTURING AND EXPANDING

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Abstract

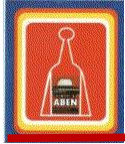
This study on “espousing artificial intelligence-powered business education platform: Cultivating, nurturing and expanding” investigate artificial intelligence (AI) as a panacea for overcoming the limitations of traditional learning methods. The objective of the study was to ascertain how we can cultivate, nurture and expand artificial intelligence-powered business education platform through the suggested dimension which are adaptive learning, intelligent content delivery and data-driven insights. The study adopted diffusion of innovations theory to further discuss espousing artificial intelligence-powered business education platform: cultivating, nurturing and expanding; from the empirical literature reviewed; it shows that no researcher have specifically mentioned adaptive learning with how it interacts with cultivating and intelligent content delivery with how it interacts with nurturing and data-driven insights with how it interacts with expanding. The study concludes by highlighting that as AI continues to evolve, its potential to reshape and enhance business education will only grow, making it imperative for educational institutions and platforms. The study recommended amongst other that educational institutions should implement adaptive learning systems that customize learning experiences based on individual student needs and progress.

Keywords: Artificial Intelligence, Adaptive Learning, Intelligent Content Delivery Data-Driven Insights Cultivating, Nurturing, Expanding.

Introduction

The integration of artificial intelligence (AI) into business education is transforming how educational content is delivered, consumed, and applied. In a time when technological advancements drive innovation across various sectors, business education platforms are increasingly adopting AI-powered solutions to meet the evolving needs of learners, educators, and the corporate world. This paper explores the significant impact of AI-powered business education platforms, focusing on their role in cultivating, nurturing, and expanding the capabilities of students and professionals in the business domain. Business education has undergone substantial changes over the past few decades, moving from traditional classroom settings to more dynamic, technology-enhanced learning environments. Initially, education in business heavily relied on lectures, case studies, and textbooks, with limited interaction between students and instructors. However, the advent of digital technologies introduced online learning platforms, allowing students to access educational content remotely and at their own pace. These platforms laid the groundwork for more personalized and interactive learning experiences, setting the stage for the integration of AI (Saborío-Taylor & Rojas-Ramírez, 2024).

The integration of artificial intelligence (AI) into business education is indeed a transformative step, offering personalized learning experiences, data-driven insights, and adaptive content delivery. AI-powered platforms can analyze vast amounts of data, including



students' learning patterns, preferences, and performance metrics, to tailor educational experiences to meet individual needs. This personalized approach not only enhances the learning experience but also increases student engagement and retention, leading to better educational outcomes. One of the primary objectives of business education is to cultivate business acumen among students and professionals. AI-powered platforms play a pivotal role in enhancing educational experiences by providing learners with access to real-time data, market trends, and business analytics.

These platforms leverage AI-driven analytics to facilitate agile decision-making, enabling students to extract actionable insights from vast datasets, which is crucial for simulating real-world business scenarios (Althati et al., 2024). Furthermore, AI-powered business intelligence has been shown to improve resource allocation and strategy development in education, allowing for more personalized learning experiences (Ponnuviji et al., 2024). For instance, AI-driven simulations can mimic stock market behavior, enabling students to practice trading strategies and understand the impact of economic variables on financial markets. Moreover, AI-powered platforms facilitate the development of critical thinking and problem-solving skills. By analyzing students' responses to various business challenges, AI can provide instant feedback, highlight areas for improvement, and suggest alternative approaches. Wu (2024) posit that AI-powered business intelligence significantly enhances educational methodologies, fostering personalized learning experiences that align with current professional demands.

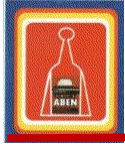
AI can help individuals and organizations identify strengths, weaknesses, and areas for development. AI-powered business education platforms hold significant promise for democratizing access to quality education globally. Traditional business schools often encounter barriers such as geographical limitations, high costs, and resource scarcity, which restrict access for many aspiring students. AI technologies, including personalized learning algorithms and adaptive assessment tools, can tailor educational experiences to individual needs, thereby enhancing engagement and motivation among diverse learners (Cota-Rivera et al., 2024). Furthermore, AI can help mitigate educational inequalities by addressing learning disparities and overcoming language barriers.

Statement of the Problem

The integration of artificial intelligence (AI) into business education is fundamentally reshaping the delivery, consumption and application of educational content. AI-powered business intelligence has been shown to improve resource allocation and strategy development in education, allowing for more personalized learning experiences (Ponnuviji et al., 2024). Despite the significant potential of AI-powered platforms to cultivate, nurture, and expand learners' capabilities, there remains a gap in understanding how these technologies specifically interact with adaptive learning, intelligent content delivery and data-driven insights in fostering business acumen. Existing studies highlight the transformative impact of AI on educational methodologies, yet they do not fully explore how AI-driven systems can be effectively leveraged to enhance personalized learning experiences, promote lifelong learning and democratize access to quality education. This research aims to address this gap by investigating the role of AI in optimizing business education and identifying the challenges and opportunities associated with its implementation.

Purpose of the Study:

The purpose of the study was to examine artificial intelligence-powered business education platforms as a panacea for overcoming the limitations of traditional learning methods. The specific objectives of the study include the following:



1. To ascertain the relationship between adaptive learning and cultivating as a panacea for overcoming the limitations of traditional learning methods.
2. To determine the relationship between intelligent content delivery and nurturing as a panacea for overcoming the limitations of traditional learning methods.
3. To ascertain the relationship between data-driven insights and expanding as a panacea for overcoming the limitations of traditional learning methods.

Literature Review

Artificial Intelligence

Artificial Intelligence (AI) has emerged as a transformative force across various domains, fundamentally altering how we interact with technology and approach complex problems.

The roots of AI can be traced back to the mid-20th century when pioneering researchers like Alan Turing and John McCarthy began exploring the concept of machines simulating human intelligence (McCarthy et al., 2006). AI encompasses a range of technologies that enable machines to perform tasks that typically require human cognitive processes, such as learning, reasoning, problem-solving, and decision-making (Nilsson, 2010). AI broadly refers to the development of computer systems capable of performing tasks that would normally require human cognitive abilities. These tasks include understanding natural language, recognizing patterns, making decisions, and adapting to new situations (Russell & Norvig, 2016). AI technologies are categorized into various types, including machine learning, where systems learn from data to improve performance over time (Bishop, 2006);

The integration of AI into business education platforms represents a significant advancement in how educational content is delivered, managed, and personalized. Traditional business education methods often involve standardized curricula and one-size-fits-all teaching approaches, which can be less effective in addressing the diverse learning needs of students. AI-powered platforms offer innovative solutions to these challenges by leveraging data and advanced algorithms to create more dynamic and responsive learning environments (Luckin et al., 2016).

One of the key benefits of AI in business education is its ability to provide personalized learning experiences. AI systems can analyze individual student performance data, learning styles, and preferences to tailor educational content and teaching methods accordingly. This personalization helps ensure that students receive instruction and resources that are most relevant to their needs, potentially improving engagement and outcomes (Woolf, 2010).

For instance, AI can recommend specific courses or materials based on a student's progress, interests, and career goals, facilitating a more customized learning journey (Popenici & Kerr, 2017).

Furthermore, AI enhances the efficiency of educational administration through automation. Tasks such as grading, scheduling, and student assessments can be streamlined with AI-driven tools, allowing educators to focus more on interactive teaching and mentoring (Bayne, 2015). AI-powered chat-bots and virtual assistants can handle routine inquiries and provide timely support to students, reducing the administrative burden on faculty and improving the overall learning experience (Chen et al., 2020).

Conceptual Framework

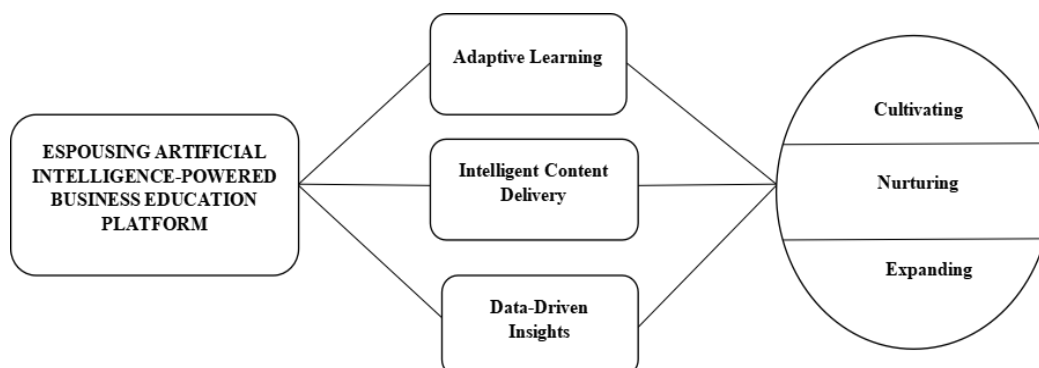


Fig 1.1. Conceptual framework showing the relationship in Espousing Artificial Intelligence-powered business education platform: Cultivating, nurturing and expanding

Source: Nwaonumah, Sagbara& Obi (2024)

Dimension of Espousing Artificial Intelligence

Adaptive Learning

Adaptive learning emerged as a revolutionary approach in education, driven by the need to cater diverse learning styles and paces among students. Traditionally, education has followed a one-size-fits-all model, where all students are expected to progress through the same material at the same pace, regardless of their individual abilities, needs or interests.

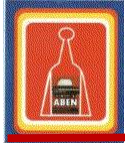
This approach often leaves some students behind while others may not be sufficiently challenged (Pane et al., 2014). In response to these challenges, adaptive learning has been developed as a more personalized method of instruction.

Adaptive learning is an educational method that uses technology to tailor learning experiences to individual students. It involves continuously assessing a student's performance and making real-time adjustments to the educational content, pace, and style of instruction to better suit their learning needs (Brusilovsky & Millán, 2007). By leveraging data on a student's progress, strengths, and weaknesses, adaptive learning systems can provide a customized educational experience that promotes more effective learning outcomes (Walkington, 2013).

Artificial intelligence (AI) plays a central role in enabling adaptive learning, especially within AI-powered business education platforms. This data-driven approach allows the platform to dynamically adjust the learning path for each student, offering personalized recommendations, resources, and feedback (Johnson et al., 2015). In business education, where the complexity of subjects like finance, marketing, and management can vary greatly among students, adaptive learning ensures that each learner receives the appropriate level of challenge and support (Pachler et al., 2010). AI-powered adaptive learning platforms can simulate real-world business scenarios tailored to a student's current level of understanding, allowing them to apply theoretical knowledge in practical contexts. This not only enhances learning efficiency but also prepares students for real-world business challenges by providing them with experiences that are directly relevant to their future careers (Heffernan & Koedinger, 2012).

Intelligent Content

Intelligent content has become a pivotal concept in modern education, particularly with the increasing integration of digital technologies. Traditionally, educational content has been static,



consisting of textbooks, lecture notes, and other resources that remain unchanged regardless of the student's needs or context. While this approach served its purpose in traditional classroom settings, the rapid advancement of technology has highlighted its limitations (Nikolov, 2007). As education increasingly moves online, there is a growing need for content that is more dynamic, responsive, and adaptable to the diverse needs of learners. This is where intelligent content comes into play. Intelligent content refers to educational materials that are designed to be adaptable, reusable, and easily discoverable, often through the use of AI and other advanced technologies.

Unlike traditional content, intelligent content is structured in a way that allows it to be easily manipulated, personalized, and delivered across various platforms (Mayer, 2009). In the context of AI-powered business education platforms, intelligent content plays a crucial role in enhancing the learning process. These platforms use AI to analyze student data and preferences, enabling them to deliver content that is tailored to individual learning paths (Baker & Siemens, 2014). AI can also enhance intelligent content by integrating multimedia elements such as interactive simulations, videos, and quizzes, making learning more engaging and interactive (Clark & Mayer, 2016).

Data Driven Insights

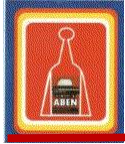
Data-driven insights have become a cornerstone of decision-making across various sectors, including education, due to the exponential growth of digital data. In traditional educational settings, decisions regarding curriculum design, student support, and teaching strategies were often based on intuition, experience, or limited data sets (Mandinach, 2012). However, with the rise of digital technologies and the ability to collect vast amounts of data on student behavior, performance, and engagement, educational institutions now have the opportunity to make more informed, evidence-based decisions (Picciano, 2012). This shift towards data-driven insights is transforming education on delivered and optimized.

Data-driven insights refer to conclusions and actionable information derived from the analysis of large sets of data. These insights are obtained by examining patterns, correlations, and trends within the data, which can then be used to make informed decisions - Baker & Inventado, (2014). In the context of education, data-driven insights enable educators and administrators to understand how students learn, identify areas where they may struggle, and develop strategies to enhance educational outcomes - Siemens & Long, (2011). By leveraging these insights, institutions can move away from a one-size-fits-all approach and towards more personalized, effective educational practices - U.S. Department of Education, (2013).

Artificial intelligence (AI) plays a critical role in generating data-driven insights, especially within AI-powered business education platforms. Moreover, data-driven insights allow for the continuous improvement of business education programs. By regularly analyzing student data, AI systems can provide feedback on which teaching methods, course materials, or learning activities are most effective Greller & Drachsler, - (2012). This enables educators to refine their approaches, ensuring that the content remains relevant and the delivery methods are aligned with student needs - Baker, (2016). Artificial intelligence (AI) leads to more engaged learning, higher retention rates and ultimately, better academic performance - Berg & Simon, (2013).

Measures of Business Education Platform Cultivating

Cultivating AI involves the deliberate and ongoing process of developing and refining AI technologies to ensure they reach their full potential in serving society. Just as cultivating talent in education requires consistent effort, mentorship, and structured learning, cultivating AI demands



a strategic approach to guide its growth, address challenges, and maximize its benefits Bostrom & Yudkowsky, (2014). With AI becoming an integral part of various sectors, including education, the way we cultivate AI must evolve to ensure that it not only advances technologically but also aligns with ethical standards and societal needs - Müller, (2020).

In AI-powered business education platforms, cultivating AI extends beyond mere technological advancements. It includes fostering an environment where AI is used to support critical thinking, creativity, and ethical decision-making O'Neil, (2016). By cultivating AI to prioritize these aspects, educational platforms can prepare students to navigate the complexities of modern business environments with confidence and competence - West, (2018). As AI continues to shape the future of education and industry, the need to cultivate it with intention and care will only grow, making it an essential component of modern education and professional development.

Nurturing

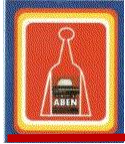
Nurturing artificial intelligence (AI) involves the continuous development, refinement, and ethical guidance of AI technologies to ensure they reach their full potential in serving humanity. As AI becomes an increasingly integral part of various industries, including education, the concept of nurturing AI is crucial to harnessing its capabilities in a way that benefits society while mitigating risks - Russell, (2019). Unlike traditional technological advancements, AI has the unique ability to learn, adapt, and evolve, making its nurturing a dynamic and ongoing process that requires careful oversight, ethical considerations, and a commitment to continuous improvement - Floridi, (2014). Nurturing AI refers to the process of guiding the development and application of AI systems to ensure they are not only effective and efficient but also aligned with ethical standards and societal values. This involves not just the technical aspects of AI, such as improving algorithms and data processing capabilities, but also the broader implications of AI use, including its impact on employment, privacy, and decision-making - Bostrom & Yudkowsky, (2014). As AI systems become more sophisticated, nurturing AI requires a collaborative effort between technologists, ethicists, policymakers, and educators to ensure that these systems are developed responsibly and are used in ways that enhance human well-being - Müller, (2020).

In the context of AI-powered business education platforms, nurturing AI is essential for creating learning environments that are both innovative and ethically sound. These platforms rely on AI to personalize learning experiences, provide real-time feedback, and adapt to the needs of individual students (Luckin, 2017). Nurturing AI in this setting involves ensuring that the AI systems are continually refined to better understand and meet the diverse needs of learners. This includes improving the AI's ability to deliver content that is not only relevant and accurate but also engaging and accessible to all students, regardless of their background or learning style (Holmes et al., 2019). Moreover, nurturing AI within educational platforms extends to the ethical considerations of how AI interacts with students.

This continuous nurturing ensures that AI remains relevant and effective in the ever-changing landscape of business education, adapting to new challenges and opportunities as they arise. Overall, nurturing AI is a critical process that ensures the responsible and effective development of AI technologies, particularly in the realm of education. By focusing on both the technical and ethical aspects of AI, we can create AI-powered business education platforms that not only enhance learning but also promote fairness, inclusivity, and transparency (West, 2018).

Expanding

Expanding, in the context of technological and educational advancements, refers to the process of broadening the scope, influence, and application of innovations to reach a wider audience and achieve greater impact. Historically, expansion in education has meant increasing access to learning resources, scaling educational programs, and disseminating knowledge to more diverse



and global populations (Altbach et al., 2009). In the era of artificial intelligence (AI), expanding takes on a new dimension as AI technologies enable unprecedented growth in how education is delivered, personalized, and integrated into various aspects of business and professional development (Luckin et al., 2016).

With AI playing an essential role in modern education, expanding its reach and capabilities is crucial for ensuring better and more inclusive learning experiences. Expanding AI involves extending its applications, capabilities, and influence across different sectors and communities. This process includes not only improving the technology itself but also making it accessible and relevant to a broader audience (Schwab, 2017). In the context of AI-powered business education platforms, expanding AI means enhancing the platform's ability to cater diverse learners, integrating AI-driven tools into more aspects of the educational process, and scaling the platform to reach more students globally.

This expansion also involves incorporating AI-driven insights and tools into more aspects of the educational process, from curriculum development to student assessment, to create a more holistic and impactful learning environment (Zawacki-Richter et al., 2019). By expanding AI's role in business education platforms, institutions can offer more comprehensive and up-to-date learning experiences that reflect the latest industry trends and technologies. This ensures that students are not only learning the basics but are also gaining the advanced skills and knowledge needed to excel in a rapidly changing business landscape (West, 2018).

By focusing on expanding AI in education, we can create a learning environment that is not only more accessible but also more responsive to the needs of today's learners, preparing them for success in an AI-driven world (Holmes et al., 2019).

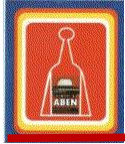
Relationship between Artificial Intelligence-Powered Business Education platform and Cultivating, Nurturing and Expanding

The relationship between artificial intelligence (AI)-powered business education platforms and the processes of cultivating, nurturing, and expanding is deeply interconnected and synergistic. These platforms, by their very nature, are designed to cultivate talent by offering personalized learning experiences that adapt to the unique needs of each student (Heffernan & Heffernan, 2014).

Through AI, these platforms continuously nurture students' growth by providing real-time feedback, targeted resources, and tailored learning paths that help individuals refine their skills and knowledge (Pane et al., 2015). This nurturing process ensures that students are not only acquiring information but are also developing critical thinking, creativity, and problem-solving abilities essential for success in a dynamic business environment (Zawacki-Richter et al., 2019). Moreover, AI-powered platforms inherently support the expansion of educational opportunities by making high-quality, personalized learning accessible to a broader audience (Holmes et al., 2019). As these platforms evolve, they expand their reach and capabilities, allowing more students from diverse backgrounds to benefit from advanced business education (Luckin et al., 2016). The expansion also enhances the platform's ability to adapt to new educational demands, ensuring that students are equipped with the latest knowledge and skills relevant to the changing business landscape (Brynjolfsson & McAfee, 2014).

Theoretical Review

This work is supported by the Diffusion of Innovations Theory, introduced by Everett Rogers in 1962, the theory states crucial framework for understanding how new technologies, such as artificial intelligence (AI) in business education platforms, are adopted and integrated into various sectors. Rogers' theory explores the process through which innovations spread within a social



system, addressing the factors that influence the rate and extent of adoption among individuals and organizations. This theory is particularly relevant to the topic of AI-powered business education platforms as it provides insights on how these technologies are introduced, accepted, and utilized in educational settings. By applying this theory, one can analyze how AI platforms are integrated into educational institutions, the perceptions of educators and learners regarding these platforms, and the factors that drive their widespread acceptance. For example, it helps to understand why some institutions may rapidly embrace

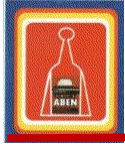
AI technologies while others may be slower to adopt them and what strategies can be employed to accelerate this process. The relevance of Diffusion of Innovations Theory lies in its ability to explain the mechanisms behind the adoption and integration of AI-powered business education platforms. It provides a framework for examining these platforms as adopted and the challenges faced by those who are slower to adopt. The theory highlights the factors influencing adoption, such as the perceived benefits of AI in enhancing learning experiences, the ease of integration into existing systems and the support available for users. Understanding these factors can guide the development and implementation strategies for AI-powered platforms. By gaining insights into the diffusion process, educational institutions can develop more effective strategies to expand the use of AI technologies, ensuring that the benefits of personalized and adaptive learning are realized across a broader audience. The Diffusion of Innovations Theory provides a comprehensive framework for analyzing the adoption and integration of AI-powered business education platforms.

Empirical Review

Wang et al. (2023) explored the transformative impact of new-generation information technologies, such as big data, blockchain, and artificial intelligence, on both economic society and higher education. The study focuses on the evolving landscape of trade economy talent training in the context of the digital and intelligent era, driven by the rise of dual circulation strategies that have fostered new business models like new retail and new foreign trade. As the demand for skilled professionals in intellectual trade and economic fields continues to grow, the authors identify significant gaps in the current talent training approaches that are not adequately preparing students to meet the complex demands of this evolving landscape.

The core contribution of Wang et al.'s work lies in their proposed "Three Integration" talent training model, which they argue is essential for addressing the structural talent shortages in the trade economy sector. This model emphasizes the integration of three key dimensions: discipline integration, industry-education integration, and cultural integration. The authors suggest that integrating these dimensions is crucial to developing well-rounded professionals equipped with the necessary skills and knowledge to thrive in a digital and intellectual economy. Their research underscores the importance of aligning educational practices with the needs of the industry, fostering closer collaborations between academic institutions and businesses, and promoting a culture that supports continuous learning and innovation. Empirically, Wang et al.'s study contributes to the ongoing discourse on the need for educational reform in the context of rapidly advancing technology. By providing a detailed analysis of the challenges and proposing a comprehensive model for talent development, the study offers a pragmatic approach to bridging the gap between the current state of trade economy education and the emerging needs of the digital economy. Their findings have significant implications for regional economic development, suggesting that by adopting the **Three Integration** model, educational institutions can better prepare students to meet the demands of the modern workforce, ultimately contributing to more robust and sustainable economic growth.

Ponnuviji et al. (2024) investigate the transformative role



of Artificial Intelligence-powered business intelligence (AI-BI) in the domains of education and finance. The study highlights the inadequacies of traditional data analysis methods in addressing the complexities of these modern sectors, where the demands for efficiency, precision, and adaptability have increased. By integrating AI into business intelligence frameworks, the authors argue that both educational and financial institutions can achieve superior outcomes in resource allocation, strategy development, and operational efficiency. In the financial sector, the study provides empirical evidence of AI-BI's impact on improving risk management and generating deeper strategic investment insights. Through case studies and interviews with industrial professionals, the authors demonstrate how AI enhances the ability to predict market trends, assess risks and make informed investment decisions.

Conclusion

The integration of artificial intelligence (AI) into business education platforms marks a transformative shift on how educational content is delivered, personalized and expanded. This research highlights the critical roles that adaptive learning, intelligent content, and data-driven insights play in enhancing business education. By addressing the gaps identified in existing studies, this study revealed how these AI components can improve the business educational system, support ongoing professional development and access to quality education.

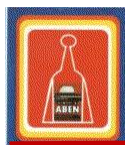
Adaptive learning technologies offer personalized learning experiences that cater to individual needs, thereby fostering a more engaging and effective educational environment. Intelligent content delivery ensures that learners receive the most relevant and current information, promoting continuous learning and up-to-date industry knowledge. Data-driven insights enable platforms to address skills gaps, monitor learner progress, and optimize educational strategies, contributing to a more inclusive and equitable education system.

The findings underscore the importance of embracing AI's capabilities to bridge the divide between traditional educational methods and the evolving needs of today's learners. By integrating these advanced technologies, business education platforms can better prepare students and professionals for the complexities of the modern business landscape. As AI continues to evolve, its potential to reshape and enhance business education will only grow, making it imperative for educational institutions and platforms to adapt and leverage these innovations to ensure that all learners have the tools and opportunities they need to succeed.

Suggestions

Based on the research findings, several key suggestions were made to optimize the integration and utilization of AI-powered business education platforms:

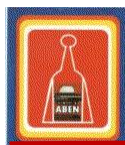
- Educational institutions should implement adaptive learning systems that customize learning experiences based on individual student needs and progress. This involves investing in AI tools that analyze student performance, learning styles, and preferences to deliver personalized content and feedback.
- Business education platforms should focus on leveraging intelligent content delivery systems to provide up-to-date and relevant information. This includes incorporating AI-driven content and real-time updates that reflect the latest industry trends and best practices.
- Educators should receive training and support to effectively utilize AI-powered tools and integrate them into their teaching practices.
- AI-powered platforms should focus on creating scalable and cost-effective solutions that reach underserved regions. This includes developing online learning modules, providing



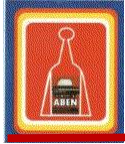
affordable access to educational resources and fostering global collaboration among students, educators and industry professionals.

References

- Baker, R. S. (2016). Stupid tutoring systems, intelligent humans. *International Journal of Artificial Intelligence in Education*, 26(2), 600-614.
- Berg, A., & Simon, H. (2013). The learning analytics cycle: Closing the loop effectively. *Journal of Learning Analytics*, 1(1), 89-107.
- Bishop, C. M. (2006). Pattern recognition and machine learning. Springer.
- Bostrom, N., & Yudkowsky, E. (2014). The ethics of artificial intelligence. In K. Frankish & W. M. Ramsey (Eds.), *The Cambridge Handbook of Artificial Intelligence* (pp. 316-334). Cambridge University Press.
- Brusilovsky, P., & Millán, E. (2007). User models for adaptive hypermedia and adaptive educational systems. *The adaptive web*, 54(2), 3-53.
- Brynjolfsson, E., & McAfee, A. (2014). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. W. W. Norton & Company.
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*, 8, 75264-75278.
- Clark, R. C., & Mayer, R. E. (2016). *Learning from multimedia: Principles from the science of learning*. Pearson.
- Floridi, L. (2014). *The Fourth Revolution: How the Infosphere is Reshaping Human Reality*. Oxford University Press.
- Goh, L. H., Lim, T. L., & Poh, S. Y. (2022). AI in business education: Enhancing learning through simulations. *Journal of Business Education*, 35(2), 213-229.
- Greller, W., & Drachsler, H. (2012). Translating learning into numbers: A generic framework for learning analytics. *Educational Technology & Society*, 15(3), 42-57.
- Heffernan, N. T., & Koedinger, K. R. (2012). The future of intelligent tutoring systems: Adaptive and adaptable learning. *AI Magazine*, 33(1), 45-46.
- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*. Center for Curriculum Redesign.
- Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2014). *NMC Horizon Report: 2014 Higher Education Edition*. The New Media Consortium.
- Luckin, R. (2017). *Enhancing Learning and Teaching with Technology: What the Research Says*. UCL Institute of Education Press.
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence Unleashed: An Argument for AI in Education*. Pearson.
- Mandinach, E. B. (2012). A perfect time for data use: Using data-driven decision making to inform practice. *Educational Psychologist*, 47(2), 71-85.
- Mayer, R. E. (2009). *Multimedia learning* (2nd ed.). Cambridge University Press.
- McCarthy, J., Minsky, M., Rochester, N., & Shannon, C. (2006). A proposal for the Dartmouth Summer Research Project on Artificial Intelligence. *AI Magazine*, 27(4), 12-14.
- Müller, V. C. (2020). *Ethics of Artificial Intelligence and Robotics*. Routledge.
- Nikolov, R. (2007). Building a common digital education space. *International Journal of Information Technology & Knowledge Management*, 1(2), 123-130.
- Nilsson, N. J. (2010). *The quest for artificial intelligence*. Cambridge University Press.
- O'Neil, C. (2016). *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*. Crown Publishing Group.



- Pachler, N., Bachmair, B., & Cook, J. (2010). *Mobile learning: Structures, agency, practices*. Springer Science & Business Media.
- Pane, J. F., Griffin, B. A., McCaffrey, D. F., & Karam, R. (2014). Effectiveness of cognitive tutor algebra I at scale. *Educational Evaluation and Policy Analysis*, 36(2), 127-144.
- Picciano, A. G. (2012). The evolution of big data and learning analytics in American higher education. *Journal of Asynchronous Learning Networks*, 16(3), 9-20.
- Ponnuviji, N. P., Murugan, P., Esakkiammal, S., Kumar, S., Vishal, K. S., & Meenakshi, S. (2024, March). AI-Powered Business Intelligence for Transforming Finance and Education. In *2024 2nd International Conference on Disruptive Technologies (ICDT)* (pp. 1287-1291). IEEE.
- Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning*, 12(1), 1-13.
- Russell, S. (2019). *Human Compatible: Artificial Intelligence and the Problem of Control*. Viking.
- Siemens, G., & Baker, R. S. (2012). Learning analytics and educational data mining: Towards communication and collaboration. *Proceedings of the 2nd International Conference on Learning Analytics and Knowledge*, 252-254.
- U.S. Department of Education (2013). *Enhancing teaching and learning through educational data mining and learning analytics: An issue brief*. Office of Educational Technology.
- Walkington, C. (2013). Using adaptive learning technologies to personalize instruction to student interests: The impact of relevant contexts on performance and learning outcomes. *Journal of Educational Psychology*, 105(4), 932.
- Wang, F., Zhao, D., Shi, A., & Liu, S. (2023) Digital Intelligence Empowerment: a Study on the Three Integration|| Talent Training Model of Trade Economy.
- West, D. M. (2018). *The Future of Work: Robots, AI, and Automation*. Brookings Institution Press.
- Woolf, B. P. (2010). *Building intelligent interactive tutors: Student-centered strategies for revolutionizing e-learning*. Morgan Kaufmann.
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education-where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), 1-27



BUSINESS EDUCATORS' AWARENESS AND READINESS TO USE ARTIFICIAL INTELLIGENCE IN INSTRUCTIONAL DELIVERY IN KWARA STATE COLLEGES OF EDUCATION

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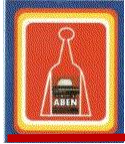
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Abstract

The study investigated the awareness and readiness levels of business educators to use artificial intelligence in instructional delivery in Kwara State Colleges of Education. The study adopted a descriptive research survey design. The total population for the study comprised 32 business educators/ lecturers in business education departments in Kwara State colleges of education. The population was sizeable and was therefore used for the study. Two research questions were answered. A researcher-designed questionnaire titled "Business Educators' Awareness and Readiness to Use Artificial Intelligence in Instructional Delivery Questionnaire (BEARUAIIDQ)" was used for data collection. The instrument had two sections for the problems of the study. Cronbach Alpha reliability test was used to determine the psychometric properties of the instrument which yielded 0.75. Data on research questions were analyzed using mean and standard deviation. Findings revealed that business educators were not aware of artificial intelligence tools (Mean = 2.27; SD = 0.778) but they were ready to use them in instructional delivery (Mean = 3.08; SD = 0.800). Based on the findings of the study, it was concluded that business educators were not aware of many artificial intelligence tools that could assist them in achieving behavioural objectives of their lessons. However, with the education created by this study particularly, through the interactions between the researchers and the business educators who were the respondents, there was high level of readiness among them to use artificial intelligence in instructional delivery. It was thereafter recommended that sensitization activities and trainings in form of workshops and seminars should be conducted for business educators in Kwara State Colleges of Education tailored towards creating awareness about artificial intelligence tools and their educational significance when adopted in instructional delivery. Also, government and other relevant stakeholders in education such as Association of Business Educators of Nigeria (ABEN) and school administrators should equip Kwara State Colleges of Education and other institutions with adequate computer hardware, software and internet facilities that would enable business educators and students to have unrestricted access to artificial intelligence tools which they can use in teaching and learning.

Keywords: Artificial Intelligence, Awareness, Readiness, Business Educators, Instructional Delivery.



Introduction

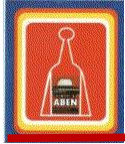
Today, "education" as an act is encapsulating which requires technologies to bring the abstract to concrete, ease the teaching and learning process and achieve the set behavioural objectives at the beginning of the lesson. Therefore, methods of learning are constantly evolving and undergoing numerous changes due to new technologies. We are all intimated with the traditional ways of learning where education is imparted within the walls of classrooms to a group of students with no technologies. This moved to where simple technologies were used in teaching and learning such as overhead projectors, tape recorder and others. Internet and digital technology trended slowly and surely taking the place of classrooms. This advancement eradicated the problem of many students to a teacher because technologies are there to assist the work of the teachers. The usage of Artificial intelligence is growing at an unprecedented rate and it is rapidly changing the aspects of human life including education (Xue & Wang, 2022a). According to Mircea (2023), the modern education system has been able to facilitate avenues for students and teachers to participate in technology-based learning. These avenues are free from any kind of limitations of time, space or number of students. As a result, the popularity of online learning is increasing day by day. The benefits of these various avenues range from flexibility, lower costs, timely, accurate responses to wide range of content.

In recent decades, Artificial Intelligence (AI) has become increasingly used in driving education. It has encouraged focused learning, exciting learning experiences, goal accomplishment, simplicity in teaching and learning. Thus, artificial intelligence refers to the development of systems, machines and technologies that can simulate intelligent human behavior, such as learning, reasoning, and problem-solving (Mircea, 2023). AI has been designed to use algorithms and complex mathematical models to enable machines to learn and improve their performance autonomously and the fundamental purpose of AI is to enable machines to exhibit traits specific to human intelligence. Artificial intelligence (AI) is the ability of machines or computers to think and act as humans do, represents the efforts towards computerized systems to imitate the human mind, actions and behavior (Wartman & Combs, 2018). It can therefore be expressed as the skillful imitation of human behaviour or mind by tools or programs designed to do these (Mohammed & Watson, 2019).

Artificial Intelligence (AI) is also a field of computer science concerned with the development of computer systems capable of performing tasks that normally require human intelligence and understanding. According to one of the founders of AI, McCarthy (2007) in Riki and Marlina (2023) defined Artificial Intelligence as the science and engineering that deals with creating intelligent machines especially intelligent computer programs. It is conceived as machines that can perform the tasks that humans carry out through their thinking (Dörfler, 2022).

Specifically, students make use of AI to learn at their own pace - create tutorials and interactive virtual assistants, systems that can answer students' questions, provide additional explanations and guide students in real-time through the learning process. Therefore, through tutorials and virtual assistance students can benefit from additional support and learn at an individualized pace receiving real-time guidance to support the learning process (Mahendra 2023). Just as students make use of it for easing learning, teachers also employ it to deliver instructions, give assignments/ home works, solve difficult questions and so on. Therefore, when AI is applied effectively in teaching business subjects, it will increase students' assimilation and make learning more attractive to learners.

Business educators are those teachers specialized in teaching business subjects at all levels of education. Business subjects include Accounts, Marketing, Commerce & E-commerce, Business Mathematics & Statistics, Economics, Computer and so on. These educators could also



make use of various artificial intelligence tools to teach their various subjects. The AI that could be used include Machine Vision (MS), Expert System (ES), Natural Language Processing (NLP), Machine Learning (ML), Deep Learning (DP) and Robotics. At this juncture, it should be known that for business educators to adopt technologies in their classes, they must be aware of it and be ready to use them.

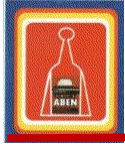
Awareness can be regarded as the state of being informed about the existence of an innovation or technology. It can also be described as the state of consciousness of a thing and it can to a large extent determine whether an individual will accept or reject such thing (Falode et al., 2018). For instance, Edumadze et al. (2014) stated that failure of lecturers (business educators inclusive) to use e-learning tools to low level of awareness and proficiency in usage. For lecturers to use artificial intelligence for instructional delivery in institutions of higher learning in Kwara State, there is need for them to be aware of it, know its' features, benefits and procedures for usage. The adoption of artificial intelligence by business educators does not only depend on their level of awareness as they may be aware but not ready to use it for instructional delivery.

Readiness refers to the state and/ or condition of an individuals that makes it possible for them to engage profitably in a given activity (Falode et al., 2018). It is also regarded as the preparation and anticipation for a task. Borotis and Poulymenakou (2008) explained readiness as the mental or physical preparedness of teachers and students for electronic teaching and learning. Schreurs et al. (2008) stated that, for any category of technologies to be adopted in teaching and learning process, stakeholders' readiness must be ensured. This was corroborated by Falode et al. (2016) that, technologies meant for distance and other forms of learning require mental, physical and financial readiness on the part of the users before success can be recorded. Thus, this study was carried out to investigate business educators' awareness and readiness to use artificial intelligence in instructional delivery in Kwara State colleges of education.

Statement of the Problem

Artificial intelligence has taken over spaces of traditional methods of teaching through improvement in teaching and learning process. Both students and teachers use AI in their educational endeavor. For any technology to be used whether in the companies, industries or offices, awareness about such technology must be created so that those that will use it for their work will know of it and be ready to use it when it is time. This is analogous to business educators adopting AI tools in instructional delivery. These tools include among others: Plagiarism Detection, Exam Integrity, Chatbots, Enhanced Online Discussion Board, Learning Management Systems, Jill Watson, Brainly, Nuance, Palitt and so on. When these are used in instructional delivery, teaching will be easy and simple, learning will be more attractive, interest will aroused, effects of noise to physical classes are defeated and so on

According to the study by Edumadze et al. (2014), the awareness and perception of lecturers in using e-learning tools for teaching were assessed and it was revealed that 75.8% of the respondents were aware of the existence of Learning Management Systems since they had heard of the term LMSs. However, only 2% of the respondents specifically mentioned the various types of LMS in existence out of 75.8%. The low awareness of specific LMSs was therefore attributed to lack of experience in using the technologies in instructional delivery. It was also found from the same study that 95.3% of the respondents indicated willingness and readiness towards the adoption of LMSs in teaching and learning process. Therefore, instructional significance of artificial intelligence is enormous. If adopted in teaching business subjects, teaching becomes easier, business lecturers become more efficient and learners' performance would be greatly improved. Despite the benefits of these tools, there is insufficient literature



revealing the success or otherwise of their utilization by business educators in Kwara State colleges of education. Could it be because business educators are not aware or probably they are not ready to use it in instructional delivery? Hence, the need for this study.

Research Questions

The following research questions guided the study:

1. What is the business educators' awareness level about artificial intelligence tools in Kwara State colleges of education?
2. To what extent are business educators ready to use artificial intelligence in instructional delivery in Kwara State colleges of education?

Methodology

Descriptive survey design was adopted for this study. The descriptive survey design was preferred because it largely focuses on vital facts, beliefs, opinions, demographic information, attitudes, motives and behaviours of respondents giving responses to the research instrument (Osinbajo et al., 2014). The population of this study consisted of 32 Business Educators in Kwara State colleges of education, Ilorin. Due to the fact that the population is sizeable, the total population was used in the study.

A questionnaire titled 'Business Educators' Awareness and Readiness to Use Artificial Intelligence in Instructional Delivery Questionnaire (BEARUAIIDQ)' designed by the researcher was used to collect data from the respondents. To ensure the face and content validities of the questionnaire, the researcher submitted the draft of it to two (2) experts in the Department of Business Education – one was Senior Lecturer and the other was a Chief Lecturer. Items in the questionnaire were reviewed to ascertain that the statements in the instrument actually covered the contents that they were expected to measure. The experts' constructive criticisms and suggestions were incorporated to improve and prepare the final version of the instrument. The Cronbach Alpha Method was used to determine the reliability of the instrument. To determine the internal consistency of the question items of the questionnaire, the instrument was administered to six lecturers in Kwara State colleges of education. The Alpha reliability test yielded correlation coefficient of 0.75.

Data collected to answer research questions was analyzed using mean and standard deviation. The decision rule for the research questions was that any question item with a mean of 2.50 and above was rated 'Agreed' while question items with a mean of 2.49 and below was rated 'Disagreed'.

Results and Interpretation

Research Questions One: What is the business educators' awareness level about artificial intelligence tools in Kwara State colleges of education?

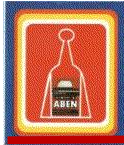


Table 1

Mean and standard deviation on the business educators' awareness level about artificial intelligence tools

S/N	Business Educators' Awareness Level about Artificial Intelligence Tools	Mean	SD	Remark
1.	Business educators can maintain exam Integrity using an AI tool.	2.02	.741	Disagreed
2.	Chatbots are used for personalized learning path.	2.15	.796	Disagreed
3.	There is an effective AI tool that business educators can use to detect plagiarism.	3.20	.721	Agreed
4.	There is enhanced Online Discussion Board for facilitating discussions between teachers and students.	2.12	.823	Disagreed
5.	Jill Watson can provide virtual learning assistant to business educators.	2.22	.945	Disagreed
6.	Brainly is an effective AI tool that can enhance the teaching and learning of business education	2.01	.791	Disagreed
7.	Existence of Nuance is known to business educators	2.00	.723	Disagreed
8.	Through Palitt, lecture series, syllabus or textbooks can be built by business educators.	2.16	.698	Disagreed
9.	WizIQ is an effective Learning Management System that could enhance the performance of business educators	2.54	.764	Agreed
Average Mean and SD		2.27	.778	Disagreed

Source: Field Survey (2024)

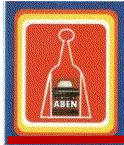
Table 1 shows the mean and standard deviation on the business educators' awareness level about artificial intelligence tools in Kwara State colleges of education. The table shows that the respondents agreed that they were aware about plagiarism detection and learning management systems (items 3 and 9) because their mean scores were above the criterion mean of 2.50 and above while they disagreed to be aware about exam integrity, chatbots, enhanced online discussion board, jill Watson, brainly, nuance and palitt (items 1, 2, 4, 5, 6, 7 and 8) because they had mean scores that were between 2.49 and below.

Research Questions Two: Are business educators ready to use artificial intelligence in instructional delivery in Kwara State colleges of education?

Table 2

Mean and standard deviation on the business educators' readiness to use artificial intelligence in instructional delivery

S/N	Business Educators' Readiness to Use Artificial Intelligence in Instructional Delivery	Mean	SD	Remark
10.	I am ready to Exam Integrity to improve my instruction.	3.43	.750	Agreed
11.	My knowledge about computer has prepared me to use chatbots in instructions.	2.37	.793	Agreed



12.	I have been using Plagiarism Detection in my research studies.	3.17	.808	Agreed
13.	My skills on zoom have prepared me to use Enhanced Online Discussion Board in instructions.	3.09	.850	Agreed
14.	With enabling environment, I am ready to use Jill Watson in instructions.	3.05	.954	Agreed
15.	I am ready to use Brainly to attend to students' questions.	3.43	.718	Agreed
16.	I am ready to use Nuance to improve students' reporting skills.	3.45	.740	Agreed
17.	I am ready to use Palitt for building lecture series, syllabus or textbooks.	3.21	.814	Agreed
18.	With enabling environment, I am ready to use Learning Management Systems such as WizIQ for instructions.	2.53	.773	Agreed
Average Mean and SD		3.08	.800	Agreed

Source: Field Survey (2024)

Table 2 shows the mean and standard deviation on the business educators' readiness to use artificial intelligence in instructional delivery in Kwara State colleges of education. The table shows that the respondents agreed that they were ready to use AI tools in instructional delivery (items 10 – 18) because their mean scores were above the criterion mean of 2.50 and above.

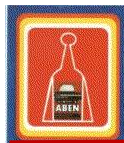
Discussion of Findings

Analysis of research question one revealed that business educators were not aware of artificial intelligence tools in Kwara State colleges of education with average mean and standard deviation of $M = 2.27$; $SD = .778$ respectively. This was in tandem with the study of Edumadze et al. (2014) which assessed the awareness and perception of lecturers in using e-learning tools for teaching and it was revealed that 75.8% of the respondents were aware of the existence of Learning Management Systems since they had heard of the term LMSs. However, only 2% of the respondents specifically mentioned the various types of LMS in existence out of 75.8%. The low awareness of specific LMSs was therefore attributed to lack of experience in using the technologies in instructional delivery.

Analysis of research question two revealed that business educators were ready to use artificial intelligence tools in instructional delivery with average mean and standard deviation of $M = 3.08$; $SD = .800$ respectively. This was also in line with the findings of the Edumadze et al. (2014) which stated that 95.3% of the respondents indicated willingness and readiness towards the adoption of LMSs in teaching and learning process. Therefore, instructional significance of artificial intelligence is enormous. Also, the findings also conformed to the position of Agboola (2006) that lecturers (including business educators) were prepared to embrace e-learning tools for instructional delivery in order to enhance their teaching and improve their students' performance.

Cosnclusion

Artificial intelligence is a general innovation that can be used in any field of endeavor. In business education, artificial intelligence tools such as Plagiarism Detection, Exam Integrity, Chatbots, Jill Watson, Brainly, Palitt and others could be used in teaching business subjects. If adopted, the behavioural objectives set at the beginning of the lesson will be achieved. It was



crystal clear that that before this study, business educators were not aware of many artificial intelligence tools which they could apply in instructional delivery. However, with the education created by this study particularly, through the interactions between the researchers and the business educators who were the respondents, there was high level of readiness among them to use artificial intelligence in instructional delivery.

Recommendations

Based on the findings from this study, it is recommended that sensitization activities and trainings in form of workshops and seminars should be conducted for business educators in Kwara State colleges of education tailored towards creating awareness about artificial intelligence tools and their educational significance when adopted in instructional delivery. Also, government and other relevant stakeholders in education such Association of Business Educators of Nigeria (ABEN), school administrators should equip Kwara State colleges of education and others institutions with adequate computer hardware, software and internet facilities that would enable business educators and students to have unrestricted access to artificial intelligence tools which they can use in teaching and learning. Once, this is done, business educators would become better informed, skillful and efficient in using artificial intelligence tools in instructional delivery.

References

- Borotis, S. & Poulymenakou, A. (2008). Critical success factors for e-Learning adoption: Handbook of research on instructional systems and technology. *IGI Global*. 2nd Edition. 131-134.
- Dörfler, V. (2022). *Artificial Intelligence*. <https://doi.org/10.4135/9781071872383.n15>
- Edumadze, J. K. E., Ossei-Anto, T. A., Edumadze, G., Tamakloe, W. K., Asamoah, E. & Boadi, E. (2014). Evaluating the awareness and perception of lecturers in using e-learning tools for teaching in University of Cape Coast. *International Journal of Computing Academic Research (UCAR)*, 3(1), 1-11.
- Falode, O. C., Gambari, A. I., Alabi, T. O. & Falode, M. E. (2018). Investigation on awareness and readiness towards the adoption of WizIQ platform for instructional delivery among education lecturers in tertiary institutions of Niger State, Nigeria. *International Conference on Education, Development & Innovation*, 239-245.
- Falode, O. C., Mohammed, A., Gambari, A. I. & Ojoye, B. T. (2016). Civil servants' ICT self-efficacy, awareness and readiness for distance e-learning programmes' enrolment in Minna, Niger State, Nigeria. *Journal of Science, Technology, Mathematics and Education*, 12(3), 142-150.
- Mircea, M. (2023). Impact of artificial intelligence on education. *Research Association for Interdisciplinary Studies*.
- Mohammed P. S. & Watson E. N. (2019). Towards inclusive education in the age of artificial intelligence: Perspectives, challenges, and opportunities. In Knox J., Wang Y., Gallagher M. (eds) *Artificial intelligence and inclusive education: Perspectives on rethinking and reforming education*. Singapore: Springer. https://doi.org/10.1007/978-981-13-8161-4_2
- Osinbanjo, O., Adeniji, A., Falola, H. & Heirsmac, T. (2014). Compensation packages: A strategic tool for employees' performance and retention. *Leonardo Journal of Sciences*, 25(1), 15-18.
- Riki, N. & Marlina, N. (2023). The use of AI (artificial intelligence) in education (literature review). *Indonesian Journal of Primary Education*, 7 (2), 143-158.
- Schreurs J., Ehlers, U. D. & Sammour, G. E. (2008). E-learning Readiness Analysis (ERA): a health case study of e-learning readiness. *International Journal. Knowledge and Learning*, 4(5), 14-23.
- Wartman, S. A., & Combs, C. D. (2018). Medical education must move from the information age to the age of artificial intelligence. *Academic Medicine*, 93(8), 1107-1109.
- Xue, Y., & Wang, Y. (2022a). Artificial intelligence for education and teaching. *Wireless Communications and Mobile Computing*, 1-10. <https://doi.org/10.1155/2022/4750018>