ASSESSMENT OF THE INTEGRATION OF ARTIFICIAL INTELLIGENCE IN MODERNIZING BUSINESS AND ENTREPRENEURSHIP EDUCATION IN TVET INSTITUTIONS IN KWARA STATE

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Abstract

This study assesses the integration of Artificial Intelligence (AI) in the modernization of business and entrepreneurship education at Technical and Vocational Education and Training (TVET) institutions in Kwara State, Nigeria, specifically at Kwara State Polytechnic and Federal Polytechnic Offa. The study assesses the extent of modernity in business and entrepreneurship education, specifically on the improvement of students' learning experiences and the cultivation of entrepreneurial abilities within institutions. The results indicate that both schools have made considerable progress in integrating innovation, soft skills, and digital entrepreneurship into their courses. Nonetheless, obstacles such as insufficient infrastructure, inadequate faculty training, and restricted financing impede the comprehensive incorporation of AI techniques. Notwithstanding these obstacles, AI is acknowledged for its transformational capacity, especially in domains such as data-driven decision-making, tailored education, and instantaneous feedback. A T-test analysis revealed no significant difference in the responses of students and educators from the two institutions, suggesting that the issues encountered by both groups are analogous. The study indicates that although AI integration is promising, significant enhancements in digital infrastructure, faculty development, and governmental backing are crucial for surmounting current obstacles. And recommends; infrastructural enhancements, educator professional development, and augmented investment from governmental and industrial stakeholders to optimize the utilization of AI in business and entrepreneurship education.

Keywords: *Artificial Intelligence, TVET, Business Education, Entrepreneurship, AI Integration, Curriculum Modernization*

Introduction

In an environment of fast technological growth, education systems worldwide are increasingly responding to the demands of the digital age. In particular, the integration of Artificial Intelligence (AI) into educational curricula has become a vital aspect in updating numerous fields of study, and is transforming teaching and learning globally. As of 2025, the global AI in education market reached $7.57 billion, representing a 46% growth from the previous year, with forecasts estimating it will expand to $112.3 billion by 2034 (Precedence, 2025). This rapid expansion emphasizes the revolutionary potential of AI in

increasing educational results, particularly in business and entrepreneurship education (Precedence, 2025). Business and entrepreneurship education, as a major feature of Technical and Vocational Education and Training (TVET) institutions, plays a fundamental role in molding the future of work and stimulating entrepreneurial innovation. In affluent economies, premier institutions are incorporating AI into curricula to stimulate innovation and educate students for expanding labor market. For instance, 78% of business schools globally have introduced generative AI into their programs, emphasizing its role in automating chores and creating ideas to equip students for AI-integrated workplaces (GMAC, 2024). Similarly, AI solutions are being deployed to automate administrative work, saving educators significant time and allowing for more tailored student involvement (World Economic Forum, 2024). Within the field of Technical and Vocational Education and Training (TVET), AI offers great prospects to modernize curricula, better teaching methods, and prepare students for the demands of the expanding global economy. In particular, business and entrepreneurship education inside TVET institutions stands to profit from AI integration, since it can greatly impact the development of practical skills, critical thinking, and entrepreneurial creativity.

In Nigeria, the integration of AI into Technical and Vocational Education and Training (TVET) institutions is gaining steam. A comprehensive review underlines the potential of AI to overcome skill gaps and boost workforce readiness by offering adaptive learning experiences and real-time feedback (Merino-Campos, 2025). However, difficulties like deficient infrastructure, inadequate training for instructors, and aversion to technological change restrict the widespread deployment of AI in Nigerian TVET institutions (Okorieocha & Ugwunali, 2025). Kwara State Polytechnic, headquartered in Ilorin, is one of the premier institutes for technical and vocational training in the state. It provides a wide range of programs, including technical, vocational and business-related courses geared to build practical skills and entrepreneurial thinking. Similarly, Federal Polytechnic Offa, a prominent educational institution in the region, provides different academic and vocational programs, including skills-oriented courses focused at cultivating the future generation of business leaders and innovators. In order to evaluate the modernization of business and entrepreneurship education at these institutions, with a specific focus on the integration of AI into their curricula, this study examines the integration of AI into the business and entrepreneurship education programs at these two well-known TVET institutions in Kwara State. This study compares the two chosen institutions to determine the differences in implementation, difficulties encountered, and results observed in order to shed light on the current state of AI adoption within TVET institutions in Kwara State by analyzing the extent of adoption and its influence on educational outcomes. The findings will give vital knowledge to policymakers, educators, and stakeholders, allowing them make informed decisions about further incorporating AI into the curricula to boost the quality and relevance of business and entrepreneurship education.

Literature Review

Artificial Intelligence (AI)

Artificial Intelligence (AI) is a discipline of computer science that focuses on constructing machines or systems capable of doing activities that traditionally require human intelligence. These tasks include learning from experience, reasoning, problem-solving, understanding voice and visuals, and making judgments. Unlike traditional computer programs that follow fixed instructions, AI systems are supposed to adapt, improve, and make predictions based on data inputs (Russell & Norvig, 2020). However, Artificial Intelligence AI can be roughly divided into narrow AI and general AI. Narrow AI refers to systems that are specialized in a certain activity, such as virtual assistants, recommendation engines, or chatbots. General AI, which is still theoretical, refers to machines with the ability to accomplish any intellectual task that a person can do. In fact, most AI applications today use machine learning, a subset of AI where algorithms are trained on big datasets to discover patterns and make predictions. The applications of AI are increasingly obvious in everyday life, from smart assistants and self-driving cars to fraud detection in banking and personalized shopping recommendations. The advantages of AI include efficiency, precision, and the capacity to tackle difficult jobs at high speed. (Pedro et al., 2019).

Artificial Intelligence in Education

Artificial Intelligence (AI) in education is the application of intelligent systems to enhance teaching, learning, research and administrative operations by emulating human cognitive functions (Russell & Norvig, 2020). However, the importance of Artificial Intelligence (AI) in education has been developing fast in recent years, altering how teaching, learning, research and administration are conducted. Globally, AI is widely acknowledged as a transformative tool that enables individualized learning, automates administrative work, and delivers real-time feedback to improve student outcomes. According to Pedro et al., (2019), AI in education is being utilized to construct adaptive learning systems that respond to specific student needs, giving data-driven insights and enhancing the teaching-learning process. AI's potential to tailor material, automate routine chores, and enhance teacher-student interactions has led to its widespread use across various educational levels, including higher education, vocational training, and professional development (Holmes et al., 2019).

In Africa, AI usage in education is still in its early stages but is progressively gaining speed. AI is seen as a solution to difficulties faced by many African educational systems, such as huge class sizes, a dearth of competent teachers, and the need for more inclusive and individualized learning experiences (APHRC, 2025). The African Union (2023) underlines the growing acceptance of AI as a means to improve educational quality, notably in STEM subjects. However, challenges including poor infrastructure and restricted access to high-speed internet continue to offer barriers to the large-scale application of AI across the continent (Africa.com, 2023). While in Nigeria, AI adoption in education is starting to take root, albeit with significant hurdles. The government has encouraged digital literacy and technology integration in education (Federal Republic of Nigeria, 2020), the application of AI in schools and TVET institutions is still in the early stages. The government has recognized the relevance of AI in upgrading curricula, especially in TVET institutions, to equip students with digital skills for the economy. However, difficulties such as poor infrastructure, lack of access to relevant technology, and insufficient teacher training prevent the widespread implementation of AI in Nigerian education (Pedro et al., 2019).

Evolution and Modernizing of Business and Entrepreneurship Education at TVET Institutions

Business and entrepreneurial education at TVET institutions has seen a remarkable transition throughout the years. Originally, these programs concentrated heavily on technical skills targeted at training students for certain jobs. However, with the needs of the 21st-century workforce, the scope has widened to include competences such as critical thinking, innovation, business acumen, and entrepreneurial capability skills that are crucial in today's knowledge-driven economy. UNESCO (2022) recognizes that the evolution of business education in TVET has evolved from a solely technical focus to a holistic framework that integrates technical skills with managerial and entrepreneurial training. Globally, institutions in developed countries have adapted to the changing economy by infusing digital technology within their curricula. Artificial Intelligence (AI) has emerged as a vital instrument in this modernization process, particularly through business simulations that simulate complicated scenarios, provide real-time feedback, and stimulate experiential learning. World Economic Forum, (2024) illustrates how AI-powered simulations have become crucial in enabling students to make data-driven decisions while getting better insights into company dynamics. Such innovations not only increase classroom participation but also equip graduates with the agility required in technology-driven enterprises.

In Nigeria, business and entrepreneurship education inside TVET institutions has similarly evolved, with government policy stressing entrepreneurship as a method to reduce unemployment and drive economic growth. Integrating entrepreneurial education into TVET accords with national aims of diversifying the economy beyond oil dependence and boosting self-reliance (Kwami, 2024). Yet, despite the growing recognition of AI's revolutionary potential, adoption remains limited due to difficulties such as insufficient infrastructure, lack of faculty training, and little knowledge of AI's benefits and ethics. Still, pioneering projects at institutions like Kwara State Polytechnic and Federal Polytechnic Offa, highlight the promise of AI in altering entrepreneurship education by enabling individualized learning, boosting digital entrepreneurship, and mimicking real-world business situations. A number of recent research reinforce this promise, Onatere and Ubrurhe (2025) studied how AI may be utilized to revamp TVET assessment methods

to better capture creativity, innovation, and problem-solving among students. Using a descriptive survey methodology with 285 respondents, their findings demonstrated that while traditional assessment methods were moderately effective in testing technical skills, they were poor in evaluating 21st-century competencies like creativity and innovation. Although 57.9% of respondents were aware of AI in education, confidence in its usage was just moderate. Key AI tools such as adaptive testing, learning analytics, and automated grading were positively evaluated, but constraints such as insufficient infrastructure, high costs, and aversion to change limited uptake. Their study concluded that with focused support such as educator training, legislative frameworks, digital infrastructure, and engagement with technology providers AI integration may dramatically improve TVET programs and better prepare students for innovation-driven businesses.

In a similar spirit, Abubakar et al. (2025) studied the transformative potential of AI in reinventing edupreneurship within Nigerian academic institutions. Their analysis underlined how systemic challenges ranging from limited finance and outdated curricula to infrastructure inadequacies and shortages of competent personnel undermine educational quality. They stated that AI may serve as a powerful solution through personalized learning, administrative optimization, and enhanced data analytics. However, they underlined the requirement of government investment in technology, curriculum revisions that include AI literacy, and continuing professional development for workers. By emphasizing ethical protections, bridging the digital gap, and increasing collaboration among government, institutions, industry, and foreign partners, their study positioned AI as a pathway to a robust, globally competitive education system. Ukala and Iheukwumere (2025) supplied further evidence through their study of AI integration in public TVET institutions in Abia State, Nigeria. Drawing data from 334 respondents, including academic staff and SME managers, they discovered that the availability of AI tools in TVET programs was insufficient to effectively support student learning and skill development. While the potential of AI to bridge skill gaps was clear, the study concluded that without appropriate resources, infrastructure, and proper implementation techniques, meaningful integration would remain out of reach. Similarly, Edidiong et al. (2024) studied AI-driven adaptive learning systems in Nigerian TVET institutions and their function in boosting student engagement and skill acquisition. They emphasized that traditional “one-size-fits-all” teaching strategies generally failed to satisfy the different learning needs of students, contributing to skill mismatches and high dropout rates. Their study indicated that adaptive AI systems offer individualized pathways that link educational outcomes with labor market needs, but successful deployment required infrastructure investment, educator training, and policies that address data privacy. Collaboration with industry was also encouraged to ensure curricula are matched with real-world demands, hence boosting student preparation for the workforce. Adding a broader perspective, Abdullahi et al. (2025) conducted a systematic evaluation of AI use for skills development in Nigeria. Guided by the Diffusion of Innovations (DoI) theory, their review integrated 51 peer-reviewed publications and grouped findings into five clusters: awareness and preparation, institutional capacity, impediments to implementation, robotics and computational thinking, and ethical/policy considerations. Their results demonstrated great interest in AI among stakeholders but identified critical shortages in infrastructure, instructor expertise, and governance. They offered a path that stressed stakeholder participation, professional development, infrastructure investment, curriculum innovation, and robust ethical frameworks. Their approach provides a policy-driven model for growing AI in Nigerian TVET, stressing sustainability and inclusivity. Reviewing all the previous studies on AI integration as clearly shows that to achieve the educational standard, TVET institutions needs to fully key into adoption of AI in modernizing the program.

Research Questions

i. To what extent does the modernization of business and entrepreneurship education occur in TVET institutions in Kwara State?

ii. To what extent does AI integration influence business and entrepreneurship curricula in TVET institutions in Kwara State?

iii. What are the key challenges faced by TVET institutions in Kwara State in adopting and integrating AI into their business and entrepreneurship education programs?

Research Hypotheses

i. There is no significant extent of modernization in business and entrepreneurship education within TVET institutions in Kwara State.

ii. The integration of artificial intelligence has no significant influence on business and entrepreneurship curricula in TVET institutions in Kwara State.

iii. There are no significant challenges faced by TVET institutions in Kwara State in adopting and integrating AI into their business and entrepreneurship programs.

Methodology

This study applies a quantitative research approach to analyze the integration of Artificial Intelligence (AI) in modernizing business and entrepreneurship education in Technical and Vocational Education and Training (TVET) schools in Kwara State. The research focuses on two institutions: Kwara State Polytechnic and Federal Polytechnic Offa, which were selected owing to their leadership role in business and entrepreneurship training within the state and their potential exposure to digital and AI-driven learning systems. The target population included 452 respondents, of whom 243 were from Kwara State Polytechnic and 209 were from Federal Polytechnic Offa. These respondents included HND I and HND II students from business education departments, as these students have advanced exposure to business and entrepreneurship courses and are therefore qualified to assess the integration of AI in the curriculum alongside educators. Using Yamane's (1967) formula at a 5% level of precision, a sample size of 212 was determined.

Where:

n = sample size,

N = total population (452),

e = level of precision (0.05).

Substituting:

$$n = \frac{452}{1+452(0.05)^2} = \frac{452}{1+1.13} = \frac{452}{2.13} = 212$$

Thus, a sample size of 212 respondents was established for the investigation. To ensure representativeness, proportionate stratified random sampling was employed to disperse the sample across the two institutions depending on their population numbers. Accordingly:

For Kwara State Polytechnic (243 population)

$$\frac{243}{452} \times 212 = 114$$

For Federal Polytechnic Offa (209 population)

$$\frac{209}{452} \times 212 = 98$$

Proportionate stratified random sampling was then applied to assure fair representation throughout the two institutions and across students, educators obtaining 114 respondents from Kwara State Polytechnic and 98 from Federal Polytechnic Offa. Data were obtained using a standardized e-questionnaire designed in line with the study objectives and research questions. The instrument includes parts on demographic information, modernization of business and entrepreneurial education, extent and efficacy of AI integration, and problems and possibilities related with AI adoption. Items were measured on a four -point scale ranging from Strongly Agree, Agree, Disagree and Strongly Disagree. Data obtained were evaluated using descriptive statistics such as mean, and standard deviation to summarize the characteristics of respondents and their perceptions, while inferential statistics, including t-tests were applied to discover significant differences between the institutions. Statistical analysis was conducted using SPSS version 25.

Results

Table 1: Mean and Standard Deviation of Respondent on Modernization of Business and Entrepreneurship Education in TVET Institutions in Kwara State Polytechnic

S/N	Questions	Mean	Std. Dev	Remark
1	Business and entrepreneurship education at my institution has been updated to include current trends in digital business practices.	2.82	0.84	Agreed
2	The business and entrepreneurship curriculum at my institution incorporates the latest technology and digital tools relevant to modern business practices	2.69	1.03	Agreed
3	There is a focus on innovation and creativity in the business and entrepreneurship programs at my institution.	3.09	0.93	Agreed
4	The curriculum integrates soft skills like critical thinking, problem-solving, and adaptability alongside technical business skills	3.22	0.87	Agreed
5	Experiential learning (e.g., business simulations, case studies) is a key component of business and entrepreneurship education at my institution.	2.72	0.65	Agreed
6	There is a growing emphasis on digital entrepreneurship in the business and entrepreneurship curriculum at my institution	2.87	0.85	Agreed
7	The curriculum encourages students to use technology in real-world business scenarios to enhance learning.	2.79	0.72	Agreed
8	Online learning platforms and digital resources are regularly used in the delivery of business and entrepreneurship education	2.11	0.85	Disagreed
9	The institution provides adequate resources (e.g., computer labs, software) to support modernized business education	2.52	0.86	Agreed
10	There is a structured plan to continuously update the business and entrepreneurship curriculum in response to changes in global business trends	2.58	0.95	Agreed
	Weighted Average	**2.74**	**0.86**	**Agreed**

The responses revealed in table 1 demonstrates a reasonable agreement with the modernization of business and entrepreneurship education at Kwara State Polytechnic. The weighted average mean of 2.74 suggests a widespread consensus that modernization initiatives are underway, with a standard deviation of 0.86, suggesting some heterogeneity in perceptions. The primary areas of strength are the integration of innovation (Mean = 3.09) and soft skills (Mean = 3.22), which received great support. Respondents also believe that there is an emphasis on digital entrepreneurship (Mean = 2.87) and experiential learning (Mean = 2.72), though not substantially so. However, there is substantial disagreement over the utilization of online learning platforms (Mean = 2.11), suggesting that digital resources may not be effectively integrated into the curriculum. Additionally, while respondents believe that resources are available (Mean = 2.52), there appears to be space for improvement in terms of adequacy.

Table 2: Mean and Standard Deviation of Respondent on Modernization of Business and Entrepreneurship Education in TVET Institutions in Federal Polytechnic Offa

S/N	Questions	Mean	Std. Dev	Remark
1	Business and entrepreneurship education at my institution has been updated to include current trends in digital business practices.	3.01	0.84	Agreed
2	The business and entrepreneurship curriculum at my institution incorporates the latest technology and digital tools relevant to modern business practices	2.98	0.72	Agreed
3	There is a focus on innovation and creativity in the business and entrepreneurship programs at my institution.	3.25	0.69	Agreed
4	The curriculum integrates soft skills like critical thinking, problem-solving, and adaptability alongside technical business skills	3.16	0.93	Agreed
5	Experiential learning (e.g., business simulations, case studies) is a key component of business and entrepreneurship education at my institution.	3.39	0.60	Agreed
6	There is a growing emphasis on digital entrepreneurship in the business and entrepreneurship curriculum at my institution	3.24	0.57	Agreed
7	The curriculum encourages students to use technology in real-world business scenarios to enhance learning.	2.68	0.90	Agreed
8	Online learning platforms and digital resources are regularly used in the delivery of business and entrepreneurship education	2.76	0.73	Agreed
9	The institution provides adequate resources (e.g., computer labs, software) to support modernized business education	2.11	0.87	Disagreed
10	There is a structured plan to continuously update the business and entrepreneurship curriculum in response to changes in global business trends	2.85	0.78	Agreed
	Weighted Average	**2.94**	**0.76**	**Agreed**

The responses received from Federal Polytechnic Offa in table 2 reveal an adequate agreement with the modernization of business and entrepreneurship education, as reflected by the weighted average mean of 2.94 and a standard deviation of 0.76. This shows a widespread consensus that modernization initiatives are occurring, with some diversity in perceptions. The significant strengths are the integration of innovation and creativity (Mean = 3.25) and soft skills (Mean = 3.16), which received strong endorsement. Respondents also believe that experiential learning (Mean = 3.39) and an increasing emphasis on digital entrepreneurship (Mean = 3.24) are significant components of the curriculum. However, there is disagreement over the availability of necessary resources (Mean = 2.11), suggesting that digital tools and infrastructure may be insufficient to sustain updated teaching. Additionally, while there is agreement on the use of technology in real-world scenarios (Mean = 2.68) and the usage of online learning platforms (Mean = 2.76), these areas still require additional refinement.

Table 3: Mean and Standard Deviation of Respondent on AI Integration in Business and Entrepreneurship Education in Kwara State Polytechnic

S/N	Questions	Mean	Std. Dev	Remark
1	AI tools are used in the business and entrepreneurship curriculum at my institution.	2.58	0.95	Agreed
2	The use of AI tools has enhanced learning experience in business and entrepreneurship courses	3.08	1.01	Agreed
3	AI-driven simulations have improved students' ability to make business decisions based on data analysis.	3.31	0.46	Agreed
4	AI tools have made it easier for students to understand complex business concepts and theories	3.37	0.66	Agreed
5	AI has helped students personalize learning experience by adapting to specific educational needs.	2.92	0.96	Agreed
6	The use of AI tools has increased students' engagement in business and entrepreneurship education	2.83	0.72	Agreed
7	AI-based tools (e.g., predictive analytics, business modeling) have supported the development of student's entrepreneurial skills.	3.34	0.74	Agreed
8	AI has facilitated real-time feedback on assignments and performance in students' business and entrepreneurship courses	3.49	0.50	Agreed
9	AI integration has helped me gain practical skills that are directly applicable in real-world business scenarios	2.95	0.68	Agreed
10	The adoption of AI in business and entrepreneurship education has helped the student to develop a better understanding of digital business strategies	3.25	0.96	Agreed
	Weighted Average	**3.11**	**0.76**	**Agreed**

The results from Kwara State Polytechnic in table 3 suggest significant agreement with the integration of AI into business and entrepreneurship education, as indicated by the weighted average mean of 3.11 and a standard deviation of 0.76. This shows that AI technologies are being broadly accepted as beneficial in strengthening the curriculum, however with considerable heterogeneity in the responses. The significant features were AI-driven simulations (Mean = 3.31) and the capacity of AI to boost knowledge of complicated business ideas (Mean = 3.37), both of which received great endorsement. Respondents also think that AI tools have considerably increased the learning experience (Mean = 3.08), and helped in personalizing learning experiences (Mean = 2.92). Additionally, AI-based tools (e.g., predictive analytics, business modeling) were judged to be useful in building entrepreneurial skills (Mean = 3.34), while the usage of AI for real-time feedback (Mean = 3.49) was also positively acknowledged. However, engagement in AI tools (Mean = 2.83) and practical application of the skills taught (Mean = 2.95) show moderate support, showing space for growth in ensuring these tools are fully exploited.

Table 4: Mean and Standard Deviation of Respondent on AI Integration in Business and Entrepreneurship Education in Federal Polytechnic Offa

S/N	Questions	Mean	Std. Dev	Remark
1	AI tools are used in the business and entrepreneurship curriculum at my institution.	2.55	0.88	Agreed
2	The use of AI tools has enhanced learning experience in business and entrepreneurship courses	3.20	0.94	Agreed
3	AI-driven simulations have improved students' ability to	3.45	0.58	Agreed

	make business decisions based on data analysis.			
4	AI tools have made it easier for students to understand complex business concepts and theories	3.25	0.79	Agreed
5	AI has helped students personalize learning experience by adapting to specific educational needs.	3.17	0.59	Agreed
6	The use of AI tools has increased students' engagement in business and entrepreneurship education	3.04	0.83	Agreed
7	AI-based tools (e.g., predictive analytics, business modeling) have supported the development of student's entrepreneurial skills.	3.31	0.80	Agreed
8	AI has facilitated real-time feedback on assignments and performance in students' business and entrepreneurship courses	3.31	0.67	Agreed
9	AI integration has helped me gain practical skills that are directly applicable in real-world business scenarios	2.88	0.89	Agreed
10	The adoption of AI in business and entrepreneurship education has helped the student to develop a better understanding of digital business strategies	3.47	0.96	Agreed
	Weighted Average	**3.16**	**0.79**	**Agreed**

The responses received from Federal Polytechnic Offa in table 4, demonstrates a solid agreement with the integration of AI into business and entrepreneurship education, with a weighted average mean of 3.16 and a standard deviation of 0.79, demonstrating consistency in the opinion of AI's positive influence. Notable strengths include the utilization of AI-driven simulations (Mean = 3.45), which considerably improve students' capacity to make business decisions based on data analysis, and the augmentation of the learning experience (Mean = 3.20). AI tools were also commended for increasing the grasp of complicated business concepts (Mean = 3.25) and for personalizing the learning experience (Mean = 3.17). Furthermore, AI-based tools, such as predictive analytics and business modeling, were considered to be crucial in strengthening students' entrepreneurial skills (Mean = 3.31), while the usage of AI for real-time feedback (Mean = 3.31) was positively regarded. However, the integration of AI to promote student engagement (Mean = 3.04) and to help learn practical skills applicable to real-world business circumstances (Mean = 2.88) showed modest support, showing space for growth in these areas.

Table 5: Mean and Standard Deviation of Respondent on Challenges in AI Integration in Kwara State Polytechnic

S/N	Questions	Mean	Std. Dev	Remark
1	There are significant challenges in integrating AI into the business and entrepreneurship curriculum at my institution.	2.93	0.58	Agreed
2	Lack of infrastructure (e.g., internet, computers) is a major obstacle to full AI adoption in business and entrepreneurship education at my institution	2.91	0.75	Agreed
3	There is a lack of training for educators on how to effectively integrate AI tools into business and entrepreneurship education.	2.91	0.54	Agreed
4	AI adoption in business and entrepreneurship education faces resistance from both students and staff	2.96	0.68	Agreed
5	The cost of implementing AI tools in business and entrepreneurship education is a significant challenge.	3.02	0.93	Agreed
6	The Nigerian government should provide more funding	3.48	0.50	Agreed

	to support AI integration in business and entrepreneurship education			
	Weighted Average	**3.04**	**0.66**	**Agreed**

With an average mean of 3.04 and a standard deviation of 0.66, the responses from Kwara State Polytechnic in table 5 show a moderate level of agreement with the difficulties encountered when integrating AI into business and entrepreneurship education, indicating some variation in viewpoints. The cost of implementing AI was cited as a major obstacle (Mean = 3.02), and respondents strongly agreed that more financial support is required. Another major challenge was the Nigerian government's lack of sufficient funding to support AI integration (Mean = 3.48). Other problems such as lack of infrastructure (Mean = 2.91), lack of educator training (Mean = 2.91), and opposition from both students and staff (Mean = 2.96) were also agreed upon, demonstrating that these issues hamper AI implementation.

Table 6: Mean and Standard Deviation of Respondent on Challenges in AI Integration in Federal Polytechnic Offa

S/N	Questions	Mean	Std. Dev	Remark
1	There are significant challenges in integrating AI into the business and entrepreneurship curriculum at my institution.	3.35	0.48	Agreed
2	Lack of infrastructure (e.g., internet, computers) is a major obstacle to full AI adoption in business and entrepreneurship education at my institution	3.10	0.59	Agreed
3	There is a lack of training for educators on how to effectively integrate AI tools into business and entrepreneurship education.	3.42	0.59	Agreed
4	AI adoption in business and entrepreneurship education faces resistance from both students and staff	3.25	0.65	Agreed
5	The cost of implementing AI tools in business and entrepreneurship education is a significant challenge.	3.26	0.91	Agreed
6	The Nigerian government should provide more funding to support AI integration in business and entrepreneurship education	3.51	0.74	Agreed
	Weighted Average	**3.32**	**0.66**	**Agreed**

As indicated by an average mean of 3.32 and a standard deviation of 0.66, the responses from Federal Polytechnic Offa in table 6 show consistent recognition of the difficulties in incorporating AI into business and entrepreneurship education. Significant obstacles noted include the absence of training for educators (Mean = 3.42), which received great support, and the lack of infrastructure (Mean = 3.10), particularly in terms of internet and computer access, which were also considered as impediments to AI adoption. The cost of AI implementation (Mean = 3.26) was also regarded as a major obstacle, with respondents admitting that financial constraints hinder AI integration. Respondents also strongly agreed that additional funding from the Nigerian government (Mean = 3.51) is needed to boost AI integration in education. Additionally, there is some opposition to AI adoption from both students and staff (Mean = 3.25), showing that change management and awareness are crucial for the successful application of AI in educational settings.

T -Test Analysis

Table 7a: Group Statistics of Kwara State Polytechnic and Federal Polytechnic Offa Respondents

Group	N	Mean	Std. Deviation	Std. Error Mean
Kwara State Polytechnic	26	2.92	0.83	0.16
Federal Polytechnic Offa	26	3.09	0.89	0.17

According to Table 7a, Kwara State Polytechnic's mean score is 2.92 with a standard deviation of 0.83, which indicates a moderate level of agreement with the respondent's comments. While the mean score for Federal Polytechnic Offa is 3.09, with a standard deviation of 0.89, demonstrating a slightly increased level of agreement. The standard error mean is lower for Kwara State Polytechnic (0.16) compared to Federal Polytechnic Offa (0.17), showing higher consistency in replies at Kwara State Polytechnic.

Table 7b: Independent Samples Test of Kwara State Polytechnic and Federal Polytechnic Offa Respondents

Levene's Test for Equality of Variances	t	df	Sig. (2-tailed)
Equal variances assumed	-1.76	50	0.085
Equal variances not assumed	-1.76	48.9	0.085

Levene's Test for Equality of Variances determines if the variances of the two groups (Federal Polytechnic Offa and Kwara State Polytechnic) are equivalent, as table 7b above illustrates. The p-value is 0.085, which is larger than 0.05, indicating that the premise of equal variances can be accepted. The t-statistic is -1.76 and the p-value for the two-tailed test is 0.085, which is greater than 0.05. This shows that there is no significant difference between the means of the two groups, implying that the replies from Kwara State Polytechnic and Federal Polytechnic Offa are statistically similar.

Discussion of Findings

This study analyzes the integration of Artificial Intelligence in Modernizing Business and Entrepreneurship Education in TVET Institutions in Kwara State, focusing on Kwara State Polytechnic and Federal Polytechnic Offa. The report evaluates the extent to which AI is modernizing the business education curriculum and its impact on students' learning experiences in the institutions. The findings of the study revealed that both Kwara State Polytechnic and Federal Polytechnic Offa have made considerable strides in modernizing their business and entrepreneurship education programs, with moderate support for the incorporation of Artificial Intelligence (AI). The comments from both schools revealed a consensus that the integration of innovation, soft skills, and digital entrepreneurship are key parts of the modernized curriculum, although obstacles remain in fully realizing the promise of AI technologies inside these programs. This coincides with the national purpose of using education as a vehicle to diversify the economy, reduce unemployment, and develop self-reliance, as underlined by the Federal Republic of Nigeria (2020). However, the gap between AI's promise and its actual integration points to various challenges, including insufficient infrastructure, limited teacher training, and a lack of awareness of AI's larger benefits. The integration of AI tools in business and entrepreneurship education, as stated by both schools, is widely perceived positively, particularly in areas such as AI-driven simulations, real-time feedback, and tailored learning experiences. These technologies have been identified as boosting students' ability to make data-driven business decisions and helping them better understand complicated business concepts and theories. This finding corroborates the findings of Onatere and Ubrurhe (2025), who discovered that AI can boost creativity and problem-solving skills within TVET programs, although their study also highlighted that difficulties linked to infrastructure and cost continue to restrict AI adoption. Both institutions indicated difficulty in these areas, with the cost of applying AI technologies and the absence of enough funding from the government being key impediments. These issues coincide with Abubakar et al. (2025), who stated that institutional impediments, including outdated curricula and insufficient resources, limit the full integration of AI into Nigerian educational systems.

In terms of AI adoption, both Kwara State Polytechnic and Federal Polytechnic Offa faced comparable issues. The absence of infrastructure, including dependable internet and access to the requisite technology, surfaced as a widespread issue. This is similar with Ukala and Iheukwumere's (2025) study,

which underlined that the availability of AI technologies in Nigerian TVET institutions is typically insufficient to facilitate effective learning. Furthermore, both universities recognized a shortage in educator training, which has slowed down the complete integration of AI tools into teaching approaches. This finding is in accordance with Edidiong et al. (2024), who underlined that the effectiveness of AI integration rests not only on access to technology but also on the training and preparation of the teaching personnel. Despite these hurdles, there is a strong understanding of AI's revolutionary potential, as both institutions acknowledge the need for increased financing and government investment to effectively integrate AI into curricula. The heavy focus on the importance of government support correlates with findings from Abdullahi et al. (2025), who stated that AI adoption in Nigerian TVET requires a coordinated effort among stakeholders, including the government, educational institutions, and industrial partners. The study further stressed the significance of building an ethical framework for AI adoption to address issues like data privacy, which were also acknowledged as concerns by the respondents in this study.

Interestingly, the data from both institutions did not demonstrate any significant variation in their comments regarding AI integration, as validated by the T-test analysis. This shows that the obstacles experienced by Kwara State Polytechnic and Federal Polytechnic Offa in incorporating AI are similar, despite their distinct institutional environments. The commonality in responses alludes to a deeper, systemic difficulty in the adoption of AI in TVET institutions across Nigeria, which transcends particular institutional distinctions. This result supports the findings of Olatunde-Aiyedun (2024), who pointed out that although AI has the potential to close the skills gap and enhance educational outcomes, real-world obstacles like poor infrastructure, high implementation costs, and resistance to change still prevent its widespread adoption in Nigeria.

Conclusion

This study concluded that the integration of Artificial Intelligence in Modernizing Business and Entrepreneurship Education in TVET Institutions in Kwara State still requires extra input in achieving a global standard TVET institution, with a focus both schools have made headway, difficulties such as limited infrastructure, lack of staff training, and exorbitant expenses hinder complete AI implementation. Respondents from both schools agreed that AI tools boost learning and entrepreneurial skills, although these benefits are hampered by resource limits. The findings imply that AI integration in Nigerian TVET institutions, while promising, requires major changes in infrastructure, financing, and educator preparation.

Recommendations

The following suggestions are offered in light of the study's findings:

i. Improving digital infrastructure such as improve internet connectivity, computer laboratories, and software tools to enable AI adoption by the institutions management.
ii. The institutions should ensure adequate Implementation, continuous professional development programs to educate educators and students with AI integration abilities and updating curricula to include AI-driven simulations and data analytics, guaranteeing alignment with industrial needs.
iii. Institutions should prioritize securing higher government investment and creating public-private partnerships to supply essential resources needed for effective AI driven academic.

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