

IMPACT OF ARTIFICIAL INTELLIGENCE ON TEACHING AND LEARNING OF BUSINESS EDUCATION COURSES IN TERTIARY INSTITUTIONS IN ADAMAWA STATE, NIGERIA

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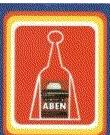
Abstract

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).

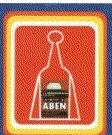


Artificial intelligence refers to computer systems capable of performing complex tasks that historically only a human could do, such as reasoning, making decisions, or solving problems. **Artificial intelligence** is the ability of a digital computer or computer-controlled robot to perform tasks commonly 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, Scholary, Elicit, Trinka, Google Scholar, Scite, Tableau, Mendeley, Consensus, and Zotero. Barua (2023) also identified AI tools such as SciSpace, Schoarlcy, 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.

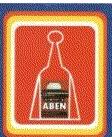


Aliyu (2020) said that conceptualised teaching is a process of facilitating, guiding, and generally moderating learners' behaviours through the provision of appropriate experiences so that the learner will achieve meaningful growth. According to Mohammed (2016), teaching is one with learning outcomes 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

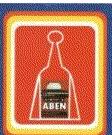
The following null hypotheses were tested at the 0.05 level of significant:

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.

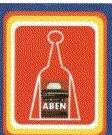
Results

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:

H_0 : 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.

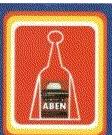


Table 3: Summary of T-Test Difference Between Mean Responses of Lecturers and Students Regarding the Positive Impact of Artificial Intelligence on Teaching and Learning of Business Education Courses.

Variable	N	Mean	Std. Dev.	Std. Err.	Df.	T-Cal.	T-Crit.	Sig. (P)
Lecturers	151	3.01	1.73	1.412				
Students	150	2.99	1.72	1.311	299	1.371	1.96	0.190

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.

H_0 : 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.

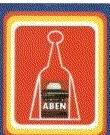
Table 4: Summary of T-Test Difference Between Mean Responses of Lecturers and Students Regarding the Negative Impact of Artificial Intelligence on Teaching and Learning of Business Education Courses.

Variable	N	Mean	Std. Dev.	Std. Err.	Df.	T-Cal.	T-Crit.	Sig. (P)
Lecturers	151	3.55	1.88	1.562				
Students	150	3.21	1.79	1.401	299	1.472	1.96	0.195

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.

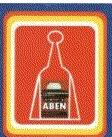
Conclusion

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.

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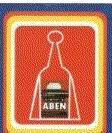
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