

AI pedagogical practices and learning outcomes among Business Education Students in tertiary Institutions, Lagos State

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Abstract

Several studies have revealed importance of AI in education. A few has been studied on AI in business education. This study AI pedagogical practices and learning outcomes as a transformation tool. Three objectives and three research questions were raised to guide the study. The study made use of descriptive survey using a target population of 1550 business education students. Using Taro Yamen formula, a sample of 318 was obtained. Of the questionnaires shared randomly to business education students, 270 were completely returned. A structured questionnaire was the instrument for data collection. The questionnaire contained close ended questions on a 4-point Likert scale. The data was analyzed using mean and standard deviation. Findings showed that AI assists in personalized learning and 24/7 learning assistance to business education students. More so, some opportunities were identified in the utilizing of AI among business education which was real world business simulations. The challenges identified in the study are inadequate policies and regulatory framework, data privacy and ethical concerns. Arising from the result, it was AI concluded that AI enhances student engagement. Also, AI boosts collaborative and ensures digital literacy to create a better pedagogical practice and learning outcomes. It was recommended that government, private investors and international bodies should ensure adequate measures to boost digital infrastructure.

Keywords: Artificial Intelligence (AI), Business Education Pedagogical practices and Learning Outcomes

1. Introduction

Researchers, educational practitioners and policy makers utilize AI to improve teaching and learning process, assessments and personalized learning (Chiu et al, 2023). AI stimulates the evolution of teaching and learning through technologies such as Chatbots, digitalized artifacts, intelligent tutoring system and market research (Ukata & Agburuga, 2024b). AI improves learning contexts by reviewing educational contexts. It minimizes human intelligence processes and makes more effects on teaching and learning in education. The enhancement of AI as a transformation tool in education as automated feedback and personalized learning are utilized traditional pedagogical practices. Traditional pedagogical practices bring limited differentiation, insufficient support for diversity among learners and rigid instructional methods. The validation of AI responses in advancing inclusive pedagogical practices through assisted technologies reducing the analytic level of business education students are very limited. Despite AI inclusiveness globally, its socio-cultural background does not benefit fully business education students in tertiary institutions. AI creates inequality and ineffective learning

experience which affects the learning outcomes of business education graduates in tertiary institution.

Aribisala, O.O. (2026) sees AI as a transformation tool deep rooted in digital literacy for collaboration and educational efficiency. AI functions as an enabler of adaptive and learner-centred instruction in the teaching and learning process. AI driven systems analyze learners' interactions and provide tailored feedback, thereby supporting differentiated learning pathways. In business education, this is particularly relevant for complex subjects such as accounting, marketing and entrepreneurship, where students often demonstrate varying levels of prior knowledge and analytical ability. AI has effect on learning outcomes among students in tertiary institutions which affects the learning process. Its' effectiveness cannot be erased in managing education practices especially among Business education students. Its automated response has filled the gap of a teacher in the teaching and learning process. The optimal usage of AI has reduced engagement in the classroom creating a trauma in the Nigeria educational system. Chat GPTs optimizes educational functions incorporating it into several programs such as

Edge, Bing and Microsoft Office (Forento-Corba & Negre Bennasar, 2024). Teachers need competence digitally because of the involvement of AI in education activities (Zafari et al, 2021). The promotion of pedagogical practices integrates AI strengthen delivery on instructions, promoting personalizing leading, learner-centred approaches and accommodating learning diverse needs. AI as a technological tool in education presenting opportunities and challenges (Surugiu, Gradinaru & Surugiu, 2024).

AI conceptualizes in advancing pedagogy by shifting the instructional focus from content transmission to knowledge construction. AI powered simulations, intelligent tutoring systems and decision support tools allow students to experiment with business scenarios, test assumptions, and receive immediate feedback. This aligns with constructivist and experiential learning perspectives, which emphasize active engagement and reflection as core elements of effective pedagogy. The main objective of the study is to explore the role of AI in enhancing pedagogical practices and learning outcomes among Business Education Students in tertiary Institutions, Lagos State. In line with the aforementioned objectives, the following questions were raised:

- i. What are the effects of AI on pedagogical practices outcomes among business education students?
- ii. What are opportunities faced utilizing AI in fostering learning practices among business education students in tertiary institutions in Lagos State?
- iii. What are the challenges faced utilizing AI in teaching and learning among business education students in tertiary institutions in Lagos State?

Research Hypothesis

There is no significant difference between the mean response of AI on pedagogical practices on learning outcomes among business education students

2. Literature Review

The integration of AI into pedagogical practice necessitates a conceptualization of the instructors' role in business education. Rather than serving solely as knowledge transmitters, instructors become facilitators, designers and evaluators of AI supported learning experiences. This shift emphasizes pedagogical judgement, ethical guidance, and contextual interpretation – areas where human expertise remains indispensable. AI reshapes business education curricula (pedagogy and content), shifting lecturers' role in facilitating or tasking, handling route personalizing and assessing formally. Tamar, B. and Jennifer J. Xu (2021) stated that there is a lack of materials for and experience in teaching AI for non-technical audiences. The development of AI in business schools is a fundamental balance examining students learning outcomes and creates better perception with AI experience. Also, AI is regarded as instrument in the sphere of inclusive education, enhancing personalized accessibility experiences for students. The reduction of workload administratively on teachers establishing more engagement pedagogical and practices of high impact (Zalurin et al, 2024). AI based system is data sensitive to improving learning in person, data management and protecting rights

of students. Conceptually, AI complements rather than replaces the instructor. While AI can provide feedback and data driven insights, instructors contextualize learning, foster ethical reasoning, and support collaborative learning.

Fundamentally, artificial intelligence (AI) is a collection of technologies that can be used to improve teaching strategies, such as machine learning, natural language processing, and data analytics. The notion of artificial intelligence in education has a strong emphasis on how technology can be used to automate administrative activities, personalize learning, and provide intelligent data analysis to enhance student results. AI can, for example, examine a student's performance, preferences, and learning styles to create instructional materials that are specifically tailored to their requirements. Incorporating AI into classrooms not only creates a more stimulating learning environment but also gets students ready for a time when AI will be used extensively across a range of industries. According to Shin (2022), In an AI-driven environment, problem-solving and decision-making abilities are critical, and AI thinking promotes these abilities through an integrated thought process. In tertiary institutions, particularly within developing or resource constrained contexts, the pedagogical advancement offered by AI is shaped by infrastructural, institutional and cultural factors. Limited access to digital resources, inadequate AI adoption as a systematic process rather than an isolated pedagogical intervention. Institutional support, curriculum alignment and professional development are critical mediating factors that determine whether AI advances or merely supplements existing pedagogical practices.

AI conceptually advances pedagogical practices in business education by enabling adaptive learning, enhancing engagement, supporting experiential learning and redefining instructional roles. However, its effectiveness depends on pedagogical intentional, institutional readiness and ethical framing. Conceptually, AI extends beyond innovation to function as a pedagogical mediator that reshapes interactions among learners, instructors and knowledge (Zawacki-Richter et al., 2019). More so, another dimension of AI in pedagogy relates to academic integrity. In business education, where ethical decision making is a core learning outcome, the uncritical use of AI poses risks to originality, accountability and skill development. Pedagogical practices must therefore integrate ethical guidelines and reflective activities that encourage responsible AI usage.

According to Ukata (2019a; Ukata, 2019b), teaching is the process by which a teacher and pupils (learners) share ideas about what should be learned, how to learn it, what to use to learn it, and what to do with it. An educational strategy known as "adaptive learning" makes use of technology to offer individualized learning experiences based on each student's requirements, preferences, and development. It uses artificial intelligence and data-driven algorithms to dynamically modify the pace, content, and delivery of instruction in response to student performance and engagement. Adaptive learning maximizes engagement, improves educational results, and fosters effective and efficient learning by adjusting to the unique needs of each learner. We examine the importance of adaptive learning in online education, emphasizing its

advantages. The potential of adaptive learning to increase student motivation and engagement highlights its significance. Students are more likely to actively engage in their education when the activities and resources they use suit their unique interests and learning style.

Evolving the concepts reviewed, the study developed a conceptual model for the variables. Figure 2.1 illustrates a conceptual framework of the relationship between AI and pedagogical practices and learning outcomes among business education students in tertiary institutions.

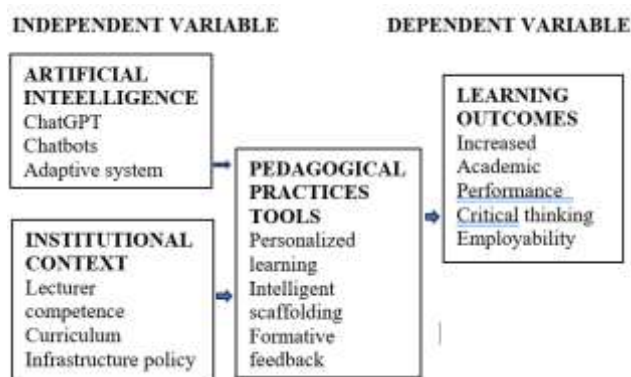


Fig. 2.1: Conceptual Framework of the relationship between AI and pedagogical practices with learning outcomes

Source: Researchers' Depiction 2026

2.1 Theoretical Framework

Technology Acceptance Model: This was propounded by Davis, 1989) posited that users adoption of a technology is primarily determined by Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), which influence behavioral intention and actual use. TAM has been extensively validated in educational technology research and remains appropriate for examining emerging tools such as AI. In business education, AI tools are not institutionally mandated but are often voluntarily adopted by students. TAM therefore provides a strong theoretical basis for explaining variations in AI use among students. If AI is perceived as useful for understanding business concepts and easy to operate, students are more likely to integrate it into their learning practices.

Constructivist Learning Theory: This posits that learning occurs through active engagement, interaction, and meaning construction rather than passive reception of information (Piaget, 1970; Vygotsky, 1978). In higher education, constructivism underpins students centered, problem based, and experiential learning approaches. AI tools can function as cognitive scaffolds, supporting exploration reflection and application of knowledge. In business education, AI enabled simulations, case analysis and feedback system align with constructivist principles by enabling students to interact with complex business problems. However, constructivist theory also cautions that learning gains depend on how technology is pedagogically used, not merely on its availability. AI influences learning outcomes indirectly through pedagogical practice, not automatically.

Self-Regulated Learning: This theory emphasizes learners' ability to plan, monitor and evaluate their own learning processes (Zimmerman, 2002). It is particularly relevant in technology-rich learning environments where learners exercise autonomy. AI tools often require students to decide when, how and why to use them. Students with higher self-regulation are more likely to use AI strategically for learning rather than for superficial tasks completion. SRL explains why similar levels of AI access may produce different learning outcomes.

3. Methodology

The study adopted a quantitative cross sectional survey design to examine the relationship between Artificial Intelligence (AI) use of pedagogical practice and learning outcomes among business education. This design was considered appropriate because it allows for the collection of standardized data from a defined population at a single point in time and supports statistical analysis of relationships among variables. The target population comprised of undergraduate students enrolled in business education in a public tertiary institution during the 2024/2025 academic session. A simple random sampling random technique was used. A self-administered structured questionnaire was used. The questionnaire was content validated using two experts in business education and educational technology independently for clarity, relevance and construct alignment. The population of the study comprised of 1,050 business education students in Lagos State and this was used to calculate the sample size using the Taro Yamen Formula as developed by Yamen (1967):

$$n = \frac{N}{1 + Ne^2}$$

Where: n = sample size; N = population; e = degree of error expected. With a degree of error expected at 0.05 and a population at 950 it brings the proposed sample size to about 282 as computed below:

$$\begin{aligned} n &= \frac{950}{1 + 950(0.05)^2} \\ &= 281.48 \\ &\approx 282 \end{aligned}$$

Of the 282 questionnaires issued, 128 were completed and returned. A simple random sampling technique was employed to minimize selection bias and ensure that each eligible student had an equal probability of participation. In ensuring content validity, the drafted questionnaire was reviewed by three experts in business education educational technology. Also, questionnaires contained closed-ended questions because they were easier and faster for respondents to answer. The research questions in the survey were scored on a 5-point Likert scale of "Very High Extent (5), High Extent (4), Moderate Extent (3), Low Extent (2), Very Low Extent (1)." The questionnaire is one of the data collection methods chosen since it is inexpensive and does not take as much work from the questioner as verbal interview. The explicit description of the sampling frame, selection procedures, reliability thresholds and data collection timeline ensures that this study can be replicated in comparable business education contexts with high methodological fidelity. The items were analyzed using descriptive statistics mean and standard deviation.

The administered surveys were tested to confirm their reliability. The method used for testing for the internal consistency was the Cronbach's Alpha, which is computed with the model:

$$\alpha = \frac{Nr}{1 + r(N - 1)}$$

Where: α = Cronbach Alpha; N = the number of items in the scale; r = the mean inter-item correlation.

Table 3.1. Results of Reliability Test

	Number of Items	Cronbach Alpha
Effects of AI on pedagogical practices	6	0.84
Effects of Opportunities faced utilizing AI	3	0.92

Source: Researchers Compilation, 2026

The context of this researcher shows level of alpha values are higher than 0.80 thresholds regarded as reliable. Cronbach's alpha > 0.80. The descriptive statistics were analyzed using Mean and Standard Deviation to assess the influence of Independent Variable and Dependent Variable.

4. Data Presentation and Analysis

Establishing exploring the role of Artificial Intelligence in enhancing pedagogical practices and learning outcomes among Business Education Students in tertiary Institutions, Lagos State, a Likert scale was used to gather data on the degree of agreement on a scale of 1 to 4, with 1 being the strongly disagree indicator and 4 being the strongly agreed indicator. The gathered responses were analyzed using means and standard deviations to demonstrate the diversity of individual replies from the aggregate means of the responses for each variable of the research.

Table 4.1. Effects of AI on pedagogical practices and learning outcomes among business education students

S/N	Items	Mean	SD	Decision
	Pedagogical practices			
1.	It enhances personalize learning	3.58	1.59	High Extent
2.	It ensures intelligent scaffolding	3.09	1.66	Moderate Extent
3.	It increases formative feedback	3.62	1.56	High Extent
	Learning Outcomes			
4.	It leads to improved academic performance	4.00	1.76	High Extent
5.	Application of business theories to real world situations	2.85	1.23	Low Extent
6.	It enhances critical thinking	2.86	1.24	Low Extent
	Grand Mean	3.33		

Source: Researcher's Computation, 2026

Table 4.1 shows that item numbers 1,3 and 4 falls within the range of high extent; item numbers 2 falls within the range of moderate extent while item number 5 and 6 falls within the range of low extent. It can be concluded that AI has effect on pedagogical practices and learning

outcomes. The standard deviation shows the extent of consistency of scores among business education students.

Table 4.2: Opportunities faced utilizing AI in fostering learning practices among business education students in tertiary institutions in Lagos State.

S/N	Items	Mean	SD	Decisions
7.	Bridging Urban-Rural Learning Gaps	3.67	1.65	High Extent
8.	Increased Efficiency in Resource Management	2.78	1.10	Low Extent
9.	Real-World Business Simulations	3.26	1.24	Moderate Extent
	Grand Mean	3.24		

Source: Researcher's Computation, 2026

The result in Table 4.2 shows that item numbers 7 falls within the high extent; 9 falls within moderate extent while 8 has low extent. It can be concluded that opportunities faced while utilizing AI in fostering learning practices among business education students.

Table 4.3: Challenges faced utilizing AI in teaching and learning among business education students in tertiary institutions in Lagos State

S/N	Items	Mean	SD	Decisions
10.	Over-Reliance on Technology	3.82	1.45	High Extent
11.	Inadequate Policy and Regulatory Framework	2.85	1.23	Low Extent
12.	Data Privacy and Ethical Concerns	3.94	1.51	High Extent
13.	Curriculum Misalignment	3.22	1.26	Moderate Extent
	Grand Mean	3.46		

The result in Table 4.3 shows that item numbers 10 and 12 fall within high extent; 13 falls within moderate extent while item 11 falls within low extent. Thus, the grand mean of 3.46 falls within the range of high extent.

4.1 Test of Hypothesis

There is no significant difference between the mean response of AI on pedagogical practices on learning outcomes among business education students

Table 4: t-test statistics on mean scores of AI on pedagogical practices on learning outcomes among business education students.

Variables (Year of study)	N	Mean	SD	df	t-cal	t-tab	Remark
Lower level of students	46	3.22	1.46	123	1.33	1.96	Not significant
Higher level of students	82	3.19	1.48				

Data in Table 4 of the t-test analysis showed that the t-cal 1.33 is lesser than t-tab value 1.96 at 0.05 level of significance and 127 degree of freedom. Hence, the null hypothesis that there is no significance on mean scores of AI on pedagogical practices on learning outcomes among business education students.

5. Discussion of Findings

This study examined the relationship between artificial intelligence (AI) supported pedagogical practices and learning outcomes among business education students in tertiary institutions. The findings of this study however appears to disagree with earlier work by (Zawacki-Richter et al., 2019) who noted that AI reshapes interactions among learners, instructors and knowledge. This deficiency has indicated a generally positive association between students' engagement with AI tools and their perceived learning outcomes. These results are broadly consistent with prior studies suggesting that educational technologies can enhance learning effectiveness when integrated into instructional processes.

In line with Aribisala O.O. (2026), AI ensures digital literacy. However, the discussion does not probe deeply into contradictions with existing literature. While some prior studies have reported mixed or negligible effects of AI on learning outcomes, particularly where technological adoption outpaces pedagogical readiness, this study does not sufficiently interrogate why its findings diverge from or align such evidence. Also, Davies(1989) further supported that AI tools are not institutionally mandated but are often voluntarily adopted technological. The analysis primarily emphasizes areas of agreement with previous research, thereby limiting critical engagement with conflicting empirical results.

In addition, the discussion gives limited attention to boundary conditions under which AI supported pedagogical practices may be effective or ineffective. Factors such as institutional infrastructure, instructors' pedagogical competence with AI tools to clarify business concepts and doing assignments, students digital literacy are acknowledged. As a result, the findings are presented in relatively general terms, without clearly specifying the contexts in which the observed relationships are most likely to hold.

The study also offers a limited exploration of the mechanisms through which AI influences learning outcomes. Although self-regulated learning is identified as a relevant factor, the discussion does not fully unpack how AI tools bridges urban rural learning gaps, shape learners cognitive or real world business simulations. For instance, it remains unclear whether AI enhances learning primarily by providing personalized feedback, increasing engagement, reducing cognitive load or increasing efficiency for resource management.

6. Recommendations

Based on the findings of this study and the information obtained from the review of related literature, the following recommendations are made for the improvement on Artificial Intelligence in Advancing Inclusive Pedagogical Practices and Learning Outcomes

among Business Education Students in Tertiary Institutions in Lagos State:

1. The government, private investors and international bodies should invest in digital infrastructure.
2. There should be continuous support of teacher professional development programs to equip business education lecturers with practical AI teaching skills and inclusive digital pedagogy.
3. Collaboration with EdTech companies, AI developers and NGO's to provide cost effective AI tools, open-source platforms and research support for inclusive teaching.
4. Adoption of AI powered adaptive learning tools should be based on individual student performance.
5. Incorporation of AI tools (intelligent tutoring systems and chatbots) to provide additional explanations, practice exercises and personalized feedback to students with varying abilities.
6. Educators should combine AI driven insights with human mentorship to foster critical thinking and creativity.

7. Conclusion

The conclusions of this study are firmly grounded in the empirical evidence presented. It was fully demonstrated that overreliance of AI affects the immense potential to transform teaching and learning in tertiary institutions, particularly in business education where diverse learning needs and outcomes must be addressed. The statistical results show that AI adoption in business education is associated with improved learning outcomes by applying business theories to real world situations, not merely due to technological novelty but through its alignment with pedagogical practices that promote active and self-regulated learning.

Thus, AI bridges the gap in inclusive ensuring that no student is left behind regardless of ability, background or learning pace. The findings reinforce the view that effective integration of AI in business education requires pedagogical intentionality, learner engagement and institutional support rather than over reliance on technology alone.

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