



University Of Uyo Journal of Vocational Education

3122-0495

Article

Factors Influencing Teachers' Integration of Artificial Intelligence (AI) for Effective Teaching of Business Education in Colleges of Education in Anambra State

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Abstract

Received 23 Feb. 2026

Accepted 12 Mar 2026

Published 27 Apr 2026

Citation: Onukwuli, A.G, Amah U.V. & Ihevueme, A.N.(2026).Factors Influencing Teachers' Integration of Artificial Intelligence (AI) for Effective Teaching of Business Education in Colleges of Education in Anambra State. *University of Uyo Journal of Vocational Education*, 2(1),1-12. doi

The integration of artificial intelligence technologies in educational settings has emerged as critical for enhancing effective teaching, particularly in business education where technological competency is essential for preparing students for the digital economy. Despite global AI advancements, integration of artificial intelligence in business education across colleges of education in Anambra State appears minimal, creating a gap between technological advancement and educational practice attributed to internal and external factors. This study determined factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State, specifically examining external and internal factors. A descriptive survey design involved 86 business educators from two colleges of education in Anambra State using census sampling technique, with data collected through a validated 13-item questionnaire achieving reliability coefficients of 0.74 and 0.72 respectively. Findings revealed that all seven external factors (ICT infrastructure, technical support, external partnerships, institutional policies, AI tools availability, internet access, and institutional training) significantly influence AI integration with cluster mean of 3.32, while six internal factors (teacher confidence, alignment with teaching goals, training limitations, fear of mistakes, ethical concerns, and openness to experimentation) were equally significant with cluster mean of 3.42, both exceeding 2.50 cutoff point. The study concludes that business educators recognize the importance of both external infrastructural support and internal psychological-pedagogical factors in AI integration, demonstrating readiness for adoption when adequate support systems are provided, highlighting the need for targeted interventions in infrastructure development and professional development programs.

Keywords: Artificial Intelligence, Business Education, External Factors, Internal Factors, Effective Teaching, Colleges of Education.

Introduction

Artificial intelligence in most Nigerian schools is broadly applied through intelligent tutoring systems, chatbots, robots, and automated assessment tools, across various digital platforms to enhance educational performance across subjects (Chiu et al., 2023; Martin et al., 2024). For instance, ChatGPT, a chatbot created by OpenAI, simplifies the integration of AI in teaching and learning. AI employs natural language processing to generate human-like responses to user prompts, making it a valuable tool for creating exam-style questions,



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addressing homework or assignments, drafting academic essays, and automatically generating educational content (Zhai, 2022). Artificial intelligence's optimization for dialogue, makes it particularly adept at engaging in human-like conversations, contributing to its rapid adoption, reaching over one million users within five days of its release (De Angelis et al., 2023). The evolution of large language models (LLMs) like OpenAI's GPT series, Google's Palm, and Anthropic Claude models, along with their APIs, has been exponential. These advancements have enabled various third-party services to offer customized solutions (Yang et al., 2024). For example, Magic School provides teachers with over 60 AI tools for lesson planning, content creation, and students support, powered by multiple models (Khadim, 2024). Although AI has been present since the 1960s, its practical application in education, particularly with the early development of intelligent tutoring systems, has evolved into a significant area of research (Bond & Michael, 2024). Research in this field focuses on various aspects including assessment methods, instructional processes and pedagogical strategies, technical and ethical issues associated with using AI in educational environments (Nguyen et al., 2023).

Additionally, AI offers diverse opportunities for enhancing teaching and learning processes, such as language learning, research and writing support as well as professional development for teachers (Kasneci et al., 2023). AI also aids in the assessment and evaluation process by helping in Education and Information Technologies creation and review essays, research papers, and other academic assignments (Kasneci et al., 2023). AI tools for Education helps in effective teaching and learning processes which includes Intelligent Tutoring Systems are dynamic and continuously refined to present more sophisticated problem-solving strategies and adapt content delivery methods. This evolution has the potential to enhance student's engagement and learning outcomes (Touretzky et al., 2019). AI augments human skills in the workplace and serves as an educational partner, enhancing content and competencies (Tan, 2020). Elhajjar et al., (2021) advocate integrating AI into education to equip students with skills essential for future jobs and digital society's demands, such as innovation, creativity, and design thinking. Using artificial intelligence also enable the employment of diverse tools, techniques, and systems in educational activities (McGrath et al., 2023). Investing in human capital to embrace AI tools, is vital for societal development, despite widespread distrust and misconceptions about AI's role in human activities, especially in education (Antonenko & Abramowitz, 2023). AI in education (AIEd) is expected to grow significantly in the coming decades, presenting new opportunities and challenges (Ouyang et al., 2021). Researchers, policymakers, and practitioners are integrating AIEd to enhance teaching, personalized learning, assessments, and administrative services (Ouyang et al., 2021, 2021; Chiu et al., 2023). AI also aids in the assessment and evaluation process by helping in teaching of Business Education and Information Technologies create and review essays, research papers, and other academic assignments (Kasneci et al., 2023). AI tools for Business Education, like Intelligent Tutoring Systems, are dynamic and continuously refined to present more sophisticated problem-solving strategies and adapt content delivery methods. This evolution has the potential to enhance student's engagement and learning outcomes in business education. (Touretzky et al., 2019).

Business education is an educational programme that prepares students for entry and advancement in jobs within business and to handle their business affairs as well as to function intelligently as consumers and citizens in a business economy (Lindner et al., 2019). Business Education is a skill-based discipline studied in the universities, colleges of education and



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Polytechnics. As a core vocational education course, it has the capacity to equip learners with knowledge, positive attitudes and various employable and entrepreneurial skills in this 21st century. Umoru (2020) buttressed that when the students acquire vocational Business Education skills and general business skills, it will enhance their ability to fit into different careers within the business world. This means that, acquiring skills through Business Education course is seen as very vital to empowering of the recipients to be self-employed. Through Business Education programme, individuals are equipped with skills and knowledge for employment, thereby combating unemployment and enhancing entrepreneurial development.

Business education offer benefits on multiple levels, and stimulates the evolution of teaching and learning through technologies like AI chatbots, robots, automated assessment, digitized artifacts, and intelligent tutoring systems, despite occasional organizational challenges (Chiu et al., 2023). Amongst them, there are computer vision, predation systems, data mining, intelligent learning or teaching systems, learning analytics, facial recognition systems, voice or speech recognition systems, virtual laboratories, augmented reality, virtual reality, hearing and sensing technologies, edge computing, virtual personalized assistants, real-time analysis, image recognition, personalized learning approach, academic analytics, and adaptive learning method (Al-Zyoud, 2020; Han et al., 2022). Integration of Artificial Intelligence in Business education enhances entrepreneurial competencies and fosters creativity, benefiting businesses (Nuseir et al., 2020).

However, the successful integration of AI in business education is fundamentally dependent on effective teaching practices. Effective teaching in the context of AI integration refers to the strategic use of artificial intelligence tools to enhance pedagogical approaches, improve student engagement, facilitate personalized learning experiences, and achieve desired learning outcomes (Martin et al., 2024). It encompasses the teacher's ability to seamlessly blend traditional instructional methods with AI-powered technologies to create dynamic, interactive, and adaptive learning environments. Effective teaching with AI involves understanding how to leverage intelligent tutoring systems for individualized instruction, using AI-powered assessment tools for real-time feedback, and employing chatbots and virtual assistants to support student learning beyond classroom hours (Kasneci et al., 2023). Moreover, effective AI-enhanced teaching requires educators to develop digital literacy skills, understand the ethical implications of AI use, and maintain the human element of teaching while maximizing the benefits of technological advancement. The goal is not to replace human instruction but to augment and enhance the teaching process, making it more responsive to diverse learning needs and contemporary educational demands (Touretzky et al., 2019).

In this study, we analyzed the factors that influence the integration of AI for effective teaching of business education which include internal and external factors (Umoru, 2020). Several internal and external factors influence teachers' integration of AI into their teaching methods. External factors include resources like ICT infrastructure, funding, technical support, administrative regulations, and policies on AI usage (Alam, 2022). ICT infrastructure resources are another external factor affecting integration of AI in business education. This lack of ICT resources have been found to be inadequate in business education, hindering their successful integration (Touretzky et al., 2019). The critical issue in schools are that of inadequate internet access (Almosa, 2022). As such, without internet access, teachers are hindered significantly in achieving their aims. This is to say, the literature is clear in



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demonstrating that even when computers are available in educational settings, a lack of relevant educational software and other ICT resources, including the Internet, detrimentally impacts the value computers can bring to the learning experience (Alshowaye, 2022). ICT resources always need to be technically supported, checked up and maintained. Teachers refer the lack of such support to be one of the factors affecting AI integration in classrooms (Waite, 2022). Limited availability of resources, insufficient finance and technical support provided to the teachers are an additional obstacle for integration of AI in business education. Al-Zyoud (2020); Han et al., (2022) demonstrated that an absence of ongoing technical and financial support of AI in practice has a severely negative impact on the degree to which teachers are successful in their utilization of technology with respect to students learning outcomes. Failure to provide financial and technical support in classrooms is also identified as a major hindrance for integration of AI in business education such as (Chiu et al., 2023).

Furthermore, some internal factors also influence teachers' integration of AI in teaching. The internal factors can be divided into two main sub-groups: psychological and pedagogical. Psychological and pedagogical factors are more directly linked to teachers' attitudes and instructional practices in business education (Tan, 2020). However, psychological factors play a more fundamental role in either embracing or resisting new technologies. These factors originate from teachers' inner sense, which may not be readily apparent to others or even to themselves (Almosa, 2022). Psychological constructs encompass teachers' perceptions and attitudes, self-efficacy, and perceived benefits and risks. Pedagogical constructs involve the alignment of AI with instructional goals and teaching methods, adaptability, flexibility and ethical considerations. Psychological factors are particularly critical as teachers' viewpoints on AI largely determine their ability or reluctance to embrace these technologies within school environments (Chiu & Chai, 2020). Teachers' resistance often stems from negative attitudes towards innovations and a hesitancy to leave their comfort zones, thereby hindering their willingness to embrace AI in the classroom (Zhang et al., 2019).

Additionally, media-driven perceptions that AI may replace human roles contribute to resistance (Chiu & Chai, 2020), often obscuring the ways AI can actually enhance teaching and learning skills (Touretzky et al., 2019). This fear, driven by uncertainty about the unknown, might dramatically heighten the perceived risks over the benefits, as highlighted by Umoru (2020) in the context of barriers to AI adoption. However, Park & Lee (2022) submitted that teachers are more likely to perceive technology as useful and accept it when they feel confident about its usage. Effective integration of AI depends on its alignment with current pedagogical goals and methodologies specific to business education. When teachers recognize AI's functionality in achieving their instructional goals within the existing educational framework, such as enhancing students engagement through adaptive learning technologies or supporting individualized learning plans their attitudes toward AI become more positive, fostering a willingness to embrace it (Lindner et al., 2019). Adaptability is another crucial pedagogical construct, which can be considered in terms of AI's capability to adapt to existing curricula or its ability to foster adaptive learning environments. In the latter case, the goal of adaptive learning is to modify resources to meet teacher and learner needs, rather than altering the learning environment itself to fit the situation (Al-Zyoud, 2020). As AI changes interactions among teachers, students, and peers, it is essential to select AI systems that promote social skills, especially among adolescents. Ethical challenges also arise in the use of AI in business education, particularly regarding issues that may exacerbate existing



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inequalities, privacy concerns, intellectual property rights, and the inherent susceptibility of AI algorithms to bias, which may contribute to either embracing or resisting its usage Almosa (2022).

In the context of colleges of education in Anambra State, the integration of AI for effective teaching of business education becomes particularly critical given the unique role these institutions play in preparing future business educators. Colleges of education serve as the primary training ground for teachers who will subsequently influence business education at secondary school levels, creating a multiplier effect that extends far beyond the immediate institutional boundaries. The significance of this study is amplified by the fact that Anambra State, being one of Nigeria's commercial hubs, requires business educators who are technologically savvy and capable of preparing students for the digital economy. Furthermore, the limited number of colleges of education in the state (only two institutions) means that any barriers to AI integration could have far-reaching consequences for business education quality across the entire state. The study's criticality is underscored by the need to identify and address these barriers before they become entrenched, ensuring that future business educators are equipped with the necessary skills and confidence to leverage AI tools effectively in their teaching practice, thereby enhancing the overall quality of business education in Nigeria's evolving educational landscape.

Statement of the Problem

Despite the AI usage advancement in the world, the integration of Artificial Intelligence (AI) in Business Education across Colleges of Education in Anambra State appear to be minimal. This situation underscores a critical gap between technological advancement and educational practice. The seemingly integration of limited integration of AI may be attributed to internal and external factors. Observation of the school system suggests that, some institutions face inadequate funding, lack of ICT infrastructure, and limited technical support, all of which hinder the deployment and effective use of AI tools in the classroom (Nuseir et al., 2020). Furthermore, teachers often experience psychological resistance and pedagogical uncertainty when confronted with new technologies, especially in the absence of training and professional development. The absence of clear administrative regulations and comprehensive policies on AI usage further complicates the integration process. Without strategic frameworks to guide implementation, educators lack the direction and support needed to align AI tools with educational goals (Matzavela & Alepis, 2021). The combination of these internal and external factors creates a systemic barrier that restricts innovation in Business Education. Therefore, there is an urgent need for a systematic investigation into these internal and external factors. Hence, the study.

Purpose of the Study

The purpose of this study is to determine the factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State. Specifically, the study seeks to:

- i) Examine the external factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State.
- ii) Identify internal factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State.



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Research Questions

The following research questions were advanced to guide the study:

- i) What are the external factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State?
- ii) What are the internal factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State?

Research Methods

A descriptive survey design was adopted for the study. This was done by seeking the opinions of Business Education lecturers on the problem of the study. The study was carried out in the two Colleges of Education in Anambra State namely; Nwafor Orizu College of Education, Nsugbe (NOCEN) and Federal College of Education (Tech), Umunze (FCETU). 86 business educators (69 in FCETU and 17 in NOCEN). The whole population was studied hence census sampling technique was employed. The instrument for data collection was a questionnaire constructed by the researchers based on specific objectives and research questions. A structured questionnaire titled "Factors Influencing Teachers' Integration of Artificial Intelligence for Effective Teaching of Business Education Questionnaire (FITIAIETBEQ)" was used to collect data from the respondents. The questionnaire contained 13 items and was sub-divided into Parts 1 and 2. Part 1 with 7 items to elicit information on the external factors influencing teachers' integration of AI in business education for effective teaching and part 2 has 6 items on internal factors influencing teachers' integration of AI in business education for effective teaching. The instrument was validated by three experts from the Faculty of Education, Nnamdi Azikiwe University, Awka. The instrument was pilot tested to ensure its reliability and the data collected was analyzed using internal consistency method using Cronbach Alpha and reliability coefficient values of 0.74 and 0.72 for the two sections respectively and overall reliability coefficient of 0.73. The questionnaire was administered by the researchers using direct administration method. All the 86 copies of the questionnaire administered were retrieved and used for analysis representing 100% return rate. The instrument was rated on a 4-point scale ranging from strongly agree of 4 points to strongly disagree of 1 point. Any item with a mean response of 2.50 and above was considered 'agreed' while anyone with a mean response below 2.50 was considered 'disagreed' for research question 1 and 2. Data obtained were analyzed using mean and standard deviation.

Results

Research Question One: What are the external factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State?



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Table 1: Mean and Standard deviation of respondents on the external factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State

S/N	ITEMS	π	SD	REMARK
1	Sufficient ICT infrastructure for AI use.	3.48	0.85	Agreed
2	Regular technical support available to assist in using AI tools	3.24	0.61	Agreed
3	External partnerships to support AI integration in my department	3.57	0.58	Agreed
4	Favourable institutional policies to support the use of AI in teaching.	3.33	0.89	Agreed
5	Availability of digital AI tools in my department	3.24	0.75	Agreed
6	Reliable internet access in my institution to support AI-based instruction	2.95	1.39	Agreed
7	Availability of institutional training on the use of AI tools	3.42	0.79	Agreed
	Cluster mean	3.32	0.84	Agreed

From the presentation of data in Table 1 above, all the items were above the cut-off point mean scores of 2.50. This means that respondents agreed that they are external factors influencing teachers' integration of AI in business education in colleges of education in Anambra State. The cluster mean of 3.23 indicate that in the opinion business educators the items are external factors influencing teachers' integration of AI in business education in colleges of education in Anambra State. The standard deviation of .84 show that the data points are closely clustered around the mean, suggesting low variation in the opinion of respondents.

Research Question Two: What are the internal factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State?



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Table 1: Mean and Standard deviation of respondents on the internal factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State

S/N	ITEMS	π	SD	Remark
1	Teachers' confidence in his ability to use AI tools in teaching	3.67	0.47	Agreed
2	AI tools align well with my teaching goals and strategies	3.24	0.61	Agreed
3	Lack of training on the pedagogical use of AI limits my ability to integrate it	3.48	0.59	Agreed
4	Fear of making mistakes discourages me from using AI in teaching	3.38	0.58	Agreed
5	Ethical concerns (e.g., data privacy, algorithm bias) hinder my use of AI tools	3.52	0.79	Agreed
6	Openness to experiment with AI in my instructional practices	3.33	0.78	Agreed
	Cluster Mean	3.42	0.66	Agreed

From the presentation of data in Table 2 above, all the items were above the cut-off point mean scores of 2.50. This means that the respondents perceived all the items as internal factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State. The cluster mean of 3.42 indicate that in the opinion of business educators, all the items as internal factors influencing teachers' integration of AI in business education for effective teaching in colleges of education in Anambra State. The standard deviation of .66 show that the data points are closely clustered around the mean, suggesting low variation in the opinion of respondents.

Discussion of Findings

The first research question examined external factors influencing teachers' integration of AI in business education. The findings revealed that all seven external factors investigated (ICT infrastructure, technical support, external partnerships, institutional policies, availability of AI tools, internet access, and institutional training) were perceived as significant influences with a cluster mean of 3.32. This finding strongly aligns with previous research by Alam (2022) who identified resources like ICT infrastructure, funding, technical support, and administrative policies as critical external factors. Similarly, the results corroborate the observations of Al-Zyoud (2020) and Han et al. (2022) who demonstrated that absence of ongoing technical and financial support severely impacts teachers' successful utilization of AI technology. The finding also supports Touretzky et al. (2019) assertion that inadequate ICT resources hinder successful AI integration in business education. Notably, reliable internet access received the lowest mean score (2.95) among external factors, which directly supports Almosa's (2022) identification of inadequate internet access as a critical issue in schools. However, the relatively high mean scores across all external factors suggest that business educators in



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Anambra State colleges of education recognize the importance of these infrastructural and institutional support systems, indicating a readiness for AI integration if these external conditions are optimally provided.

The second research question explored internal factors influencing AI integration, revealing that all six internal factors examined (teacher confidence, alignment with teaching goals, training limitations, fear of mistakes, ethical concerns, and openness to experimentation) were perceived as significant with a cluster mean of 3.42. This finding aligns with Tan (2020) who emphasized that psychological and pedagogical factors are directly linked to teachers' attitudes and instructional practices. The high mean score for teacher confidence (3.67) supports Park & Lee (2022) submission that teachers are more likely to accept technology when they feel confident about its usage. The finding also corroborates Chiu & Chai (2020) observation that teachers' viewpoints on AI largely determine their ability to embrace these technologies. Interestingly, while Zhang et al. (2019) suggested that teachers' resistance often stems from negative attitudes and hesitancy to leave comfort zones, the current study shows business educators expressing openness to experimentation (mean = 3.33), suggesting a more positive disposition than previously reported. This contradiction might be attributed to the specific context of business education, where technological integration is more naturally aligned with the discipline's practical and industry-focused nature. The high scores for ethical concerns (3.52) align with Almosa's (2022) identification of ethical challenges in AI use, including privacy concerns and algorithm bias, indicating that business educators are consciously aware of these important considerations while still being open to AI integration.

Conclusion

This study investigated the factors that influence teachers' integration of artificial intelligence technologies. The research achieved its primary objective of determining both external and internal factors that influence teachers' integration of AI for effective teaching in business education. Through the first specific objective, the study successfully examined external factors and revealed that ICT infrastructure, technical support, external partnerships, institutional policies, availability of AI tools, internet access, and institutional training all significantly influence AI integration, with business educators showing strong agreement on their importance. The second specific objective was equally achieved as the study successfully identified internal factors including teacher confidence, alignment with teaching goals, training limitations, fear of mistakes, ethical concerns, and openness to experimentation as significant influences on AI integration. The findings demonstrate that while business educators in Anambra State colleges of education recognize the critical importance of both external and internal factors, they show particular readiness and openness to AI integration when adequate support systems are in place. The study contributes valuable insights into the multifaceted nature of AI integration challenges in business education, providing a foundation for targeted interventions to enhance effective teaching through artificial intelligence technologies in Nigerian colleges of education.

Recommendations

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

1. The Anambra State Government and the managements of Federal College of Education (Technical) Umunze and Nwafor Orizu College of Education Nsugbe should prioritize massive



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investment in ICT infrastructure development, establish reliable internet connectivity, provide sustained technical support systems, and develop comprehensive institutional policies that support AI integration in business education. Additionally, these institutions should actively seek external partnerships with technology companies and educational organizations to facilitate access to AI tools and resources, while implementing regular institutional training programs on AI tool utilization for business education faculty.

2. The Faculty Development Centers and Academic Planning Units of both Federal College of Education (Technical) Umunze and Nwafor Orizu College of Education Nsugbe should design and implement comprehensive professional development programs focused on building teacher confidence in AI tool usage, providing pedagogical training on effective AI integration strategies, addressing ethical concerns through workshops on responsible AI use, and creating supportive environments that encourage experimentation with AI technologies while reducing fear of making mistakes in the learning process.

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