



ARTIFICIAL INTELLIGENCE-DRIVEN TUTORIAL SYSTEMS: BENEFITS AND CHALLENGES FOR BUSINESS EDUCATORS IN FEDERAL COLLEGES OF EDUCATION IN SOUTH EAST NIGERIA

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Abstract

This study examines the implementation and implications of Artificial Intelligence (AI)-driven tutorial systems for Business Educators in Federal Colleges of Education in South East Nigeria. These systems are transforming instructional delivery by enabling adaptive, student-centered learning environments. The research employs a mixed-method approach combining quantitative survey analysis and qualitative interviews to assess both the perceived benefits and critical challenges of AI integration. Findings reveal enhanced learner engagement, personalized instruction, and improved teaching efficiency as key benefits. However, issues such as infrastructural deficits, lack of digital competencies, inadequate training, and resistance to change present substantial obstacles. The paper concludes with strategic recommendations for policy development, educator capacity building, and infrastructural investment to support the effective adoption of AI tutorial systems in Nigeria's teacher education system.

Keywords: Artificial Intelligence, Tutorial System, Business Educators, Federal Colleges of Education, South East Nigeria, Educational Technology, Teacher Training

1. Introduction

In the 21st-century educational landscape, Artificial Intelligence (AI) has emerged as a transformative force, reshaping traditional pedagogical approaches. Business education, a field integral to equipping future professionals with administrative, technological, and entrepreneurial skills, is no exception. The global shift towards Artificial Intelligence (AI) in education has sparked transformative changes in teaching and learning processes. In developing countries like Nigeria, the application of AI in tertiary education is gradually gaining traction, especially within teacher training institutions such as Federal Colleges of Education (FCEs). This study investigates the benefits and challenges of implementing AI-driven tutorial systems for Business Educators in FCEs located in South East Nigeria.

Business education in Nigeria is instrumental in equipping future teachers with competencies in commerce, entrepreneurship, and digital literacy. However, traditional teaching methods often fail to engage learners or address individual needs. AI-driven tutorial systems provide a promising alternative through adaptive learning, intelligent feedback, and automation of instructional tasks. Yet, despite their potential, numerous challenges hamper effective integration. In Business Education, which prepares students for entrepreneurial and administrative roles, the use of AI can offer personalized support and adaptive learning pathways. This research paper explores the concept, benefits, and challenges of implementing AI-driven tutorial systems among business educators in Federal Colleges of Education in South East Nigeria.

1.2 Statement of the Problem

Despite the global adoption of AI in education, its use in Nigeria's Colleges of Education, particularly in Business Education, remains minimal. There is limited empirical data on the readiness of business educators to adopt AI tools and the potential barriers they face. This research addresses this gap by evaluating benefits and challenges from the educators' perspectives.

1.3 Objectives of the Study

1. To examine the perceived benefits of AI-driven tutorial systems in Business Education programmes.
2. To identify the challenges encountered in the implementation of AI-driven tutorial systems.
3. To make recommendations for enhancing AI integration in business education.

1.4 Research Questions

1. What are the perceived benefits of AI tutorial systems among business educators?
2. What challenges do business educators face in adopting AI-driven tutorial systems?
3. What strategies can be employed to improve AI adoption in Business Education?

1.5 Scope of the study

This study focuses on examining the benefits and challenges of integrating Artificial Intelligence (AI)-driven tutorial systems in the teaching of Business Education within Federal Colleges of Education in South East Nigeria. It is limited to selected federal institutions in the region and targets business educators involved in instructional delivery, curriculum implementation, and educational technology usage. The study assesses the educators' awareness, usage, and perception of AI tools, the infrastructural and institutional support available, and the pedagogical impact of AI on teaching efficiency and student engagement. It

does not cover other disciplines or educational levels outside of Federal Colleges of Education in the South East geopolitical zone.

2. Literature Review

2.1 Concept of AI-Driven Tutorial Systems

AI driven tutorial systems are intelligent platforms that simulate human tutoring behavior. They use algorithms to track student progress, predict learning outcomes, and customize learning content. Examples include intelligent tutoring systems (ITS), chatbots, learning analytics tools, and virtual teaching assistants. These systems are designed to deliver personalized, adaptive, and automated learning experiences (Nkanga, 2021).

Globally, AI driven tutorial systems is transforming how educators deliver instruction, assess learning, and provide feedback (Luckin et al., 2016). Systems such as IBM Watson Tutor and Carnegie Learning have proven successful in various fields like mathematics and science, enhancing engagement and performance. In teacher training institutions, AI driven tutorial systems supports microteaching simulations, lesson planning, automated feedback, and virtual reality-enhanced pedagogy. For business educators, this means the opportunity to teach concepts such as accounting, marketing, and entrepreneurship with intelligent support tools (Alghamdi & Rutter, 2022). Business education, with its dual focus on theoretical knowledge and practical skills, benefits significantly from AI's ability to simulate real-life scenarios, provide instant feedback, and support skill development through interactive tools.

2.2 Benefits of AI-Driven Tutorial Systems for Business Educators

Personalized and Adaptive Learning: AI systems tailor instruction to each student's learning pace, strengths, and weaknesses. This is particularly helpful in large business classes where individual attention is difficult to provide. (Holmes, 2019).

Enhanced Instructional Efficiency: AI automates time-consuming tasks like grading, lesson planning, and performance tracking. This allows educators to focus on higher-order teaching responsibilities such as mentoring and curriculum innovation, Uche & Okonkwo (2022).

Real-Time Assessment and Feedback: AI provides instant diagnostic assessments and feedback, which helps students to immediately identify and correct their mistakes. It also allows educators to track class-wide learning progress efficiently, Nkanga, D. (2020).

Engagement through Simulation and Gamification: Business educators can use AI to simulate business scenarios, conduct virtual trade or marketing projects, and enhance student motivation through gamified learning experiences, Alghamdi & Rutter (2022).

Data-Driven Instructional Decisions: AI analytics enable educators to interpret learning data for strategic planning, curriculum design, and student support. This promotes evidence-based teaching, Kazeem, O. (2021).

Scalability and Accessibility: AI-driven tutorial systems can reach more students, including those in remote areas, through asynchronous and digital learning environments, thereby democratizing access to quality business education

2.3 Challenges of driven tutorial system in Education

Infrastructural Limitations : Federal Colleges of Education in South East Nigeria face poor internet connectivity, unreliable electricity supply, and lack of smart devices—major constraints to implementing AI driven tutorial system in Federal Colleges of Education in South-East Nigeria. (Uzochukwu, 2021).

Low Digital Literacy: Most business educators lack training in digital tools and AI literacy, which hinders usage and confidence (Okeke & Adigwe, 2023).

Resistance to Change: There is skepticism, especially among senior educators, regarding AI's role in replacing human functions, leading to low adoption rates (Eze, 2022).

Data Privacy and Ethical Concerns: Educators are concerned about the ethical implications of using AI—especially regarding data ownership, consent, and surveillance.

2.4 Federal Colleges of Education in South East Nigeria

There are five Federal Colleges of Education in South East Nigeria:

S/N	Name of Institution	Location	State
1	FCE (Technical), Umunze	Umunze	Anambra
2	Alvan Ikoku FCE	Owerri	Imo
3	FCE (Technical), Asaba	Asaba	Delta
4	FCE Eha-Amufu	Eha-Amufu	Enugu
5	FCE Obudu (Zone extension)	Obudu	Cross River

Empirical Review

Yusuf & Onasanya (2020) carried out a research on “Artificial Intelligence in Nigerian Tertiary Education: Opportunities and Constraints. 200 educators in universities and colleges of education across Nigeria were surveyed, findings revealed that Over 70% of respondents had heard of AI tools, but only 20% actively used them. Educators cited infrastructural deficiencies, lack of training, and resistance to change as major challenges. Benefits identified include efficient grading, real-time feedback, and personalized learning. Nwankwo et al. (2021)in

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South East Nigeria, conducted a study on “Digital Readiness of Business Educators in South East Nigeria for EdTech Adoption” . Descriptive survey involving 110 business educators across 4 FCEs in the South East was used. Finding had it that,65% of educators acknowledged the importance of AI in modern business education. Only 25% had practical experience using intelligent learning platforms. Challenges included inadequate digital devices, low ICT proficiency, and lack of AI-specific pedagogy. Eze & Njoku (2022), conducted a study in Nigeria on “Perceived Usefulness of AI-Assisted Learning Tools Among Teacher Educators”. Collection was data involved the use of mixed methods; focus groups and online surveys. Findings revealed that, Educators who used AI tools reported improved student engagement and faster feedback cycles. However, mistrust in AI systems, fears of job displacement, and lack of institutional support was frequently reported. Participants requested training workshops and policy guidelines on AI integration. Luckin et al. (2016) on global perspective, researched on “ Intelligence Unleashed: An Argument for AI in Education. Methodology: Meta-analysis of over 100 studies across the US, UK, and Asia. Findings: AI-driven systems increased student retention and achievement in personalized learning environments. Teacher productivity improved due to automated grading and learning analytics. Emphasized need for equity in access and human-centered design in AI systems.

3. Methodology

3.1 Research Design

Descriptive survey and case study design were employed. A total of 120 Business Educators from the five colleges participated in the study. Data were collected using structured questionnaires and semi-structured interviews.

3.2 Population of the Study

All business educators in Federal Colleges of Education in South East Nigeria.

3.3 Sample Size and Sampling Technique

120 business educators selected using stratified random sampling from 5 federal colleges.

3.4 Instrumentation

Structured questionnaire titled: AI Tutorial System in Business Education Questionnaire (AITSBEQ) and Interview Guide on Perceptions and Challenges

3.5 Data Analysis

Quantitative data were analyzed using descriptive statistics and inferential analysis (mean scores, standard deviation, t-tests), while qualitative responses were thematically analyzed.

4. Findings and Discussion

Benefits of AI Tutorial Systems: Personalized Learning: Adaptive AI systems adjust content to student needs. (Mean = 4.2)

Increased Efficiency: Automation of grading and feedback frees up instructional time. (Mean = 4.0)

Real-time Assessment: Immediate evaluation of student performance aids early intervention. (Mean = 3.8)

Engagement and Motivation: Interactive AI tools enhance learner interest. (Mean 3.6)

Data-Driven Decision Making: Analytics support curriculum planning and pedagogical strategies. (Mean = 4.5)

4.2 Challenges Identified

Poor Infrastructure: Limited internet access, outdated computers, and unreliable electricity. (Mean = 4.5)

Low AI Literacy: Majority of educators lack training in AI tools. (Mean =4.2)

Institutional Resistance: Resistance from traditional educators and administrators. (Mean =3.6)

Policy Gaps: Absence of national frameworks for AI in education. (Mean = 4.1)

Cost of Implementation: High costs of acquiring and maintaining AI systems. (Mean=4.1)

The findings align with global studies on AI in education. However, local infrastructural and capacity challenges remain a concern.

4.3 Comparative Perception Based on Experience

Senior educators (10+ years) showed more skepticism, while younger faculties were more open to AI, reflecting a generational divide.

5. Recommendations

AI-driven tutorial systems hold great promise for business education, particularly in enhancing personalized learning and performance tracking. However, significant challenges, particularly infrastructural and pedagogical, must be addressed. Above mention can be summarized thus:

Capacity Building: Regular training workshops on AI tools for business educators.

Policy Formulation: Development of a national AI education strategy.

Infrastructure Investment: Provision of stable power supply, internet, and devices.

Curriculum Integration: Infuse AI competencies into Business Education curriculum.

Public-Private Partnerships: Leverage support from edtech firms and NGOs for deployment and training.

5.2 Conclusion

AI-driven tutorial systems supports immense opportunities to revolutionize business education in Nigerian colleges of education, particularly in the South East region. However, systemic challenges must be addressed for sustainable adoption., issues such as infrastructural deficits, lack of digital competencies, inadequate training, and resistance to change present substantial obstacles. The paper concludes with strategic recommendations for policy development, educator capacity building, and infrastructural investment to support the effective adoption of AI tutorial systems in Nigeria’s teacher education system. A concerted effort by the government, institutions, and educators is essential to unlock AI’s full potential in transforming teacher education.

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