

UTILIZATION OF ARTIFICIAL INTELLIGENCE (AI) TOOLS FOR ONLINE EDUCATION BY E-TUTORS IN DISTANCE LEARNING CENTER (DLC), AHMADU BELLO UNIVERSITY, ZARIA

By

ISHAQ USMAN

Abstract

The study investigated the utilization of Artificial Intelligence (AI) tools by e-tutors for online education in Distance Learning Center (DLC, Ahmadu Bello University, Zaria. Quantitative research method supported by survey research design was adopted. The population of the study was 321 and the sample size was 175 with 170 (97%) response rate. Questionnaire was the instrument of data collection administered online to the e-tutors. Stratified sampling technique was used to select respondents for the study. The data collected was analyzed using simple descriptive statistical tools according to variables, frequencies and percentages as well as mean, variance and standard deviation with presentation of the data using tables and charts. The findings revealed that, e-tutors had a good confidence level of skills in utilization of AI tools, but there was individual differences on their ability to effectively use these technologies. The study also discovered that, the major barrier to effective utilization of AI tools by the e-tutors was lack of a comprehensive policy framework that governs integration of AI technologies in educational settings in Nigeria. It was recommended, the Federal Ministry of Education of Nigeria should develop a clear policy framework for the use of AI tools in education in order to improve online instructional efficiency.

Keywords: Artificial intelligence, AI tools, online education, e-tutors, distance learning

Introduction

The term Artificial Intelligence (AI) was first coined in 1956 by the computer scientists namely, John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon in their research project aimed at using computers to simulate human intelligence. The technology began to take shape in the mid-20th century, driven by the development of computer science and the advent of digital computers. Artificial Intelligence (AI) has emerged as a transformative technology that is revolutionizing various industries including education, healthcare, finances, entertainment etc. Many sectors have been leveraging the technology to innovate processes

including higher education. For colleges and universities, the impact of AI is particularly felt with online learning. Thatcher (2023) observes that, though the concept of AI dates back to the 1950s when it was first coined by John McCarthy group of computer scientists, it was until 1980s that AI began to gain traction in the education sector. In the 1990s and 2000s, AI-powered learning platforms began to emerge, offering personalized learning experiences and intelligent assessment tools.

The world is gradually heading towards a society where many sectors are becoming technology-driven. This include teaching and learning where online education models have made education more accessible to everyone interested in learning about any topic of popular interest. The development of Artificial Intelligence (AI) in the education sector has been rapid, with significant advancements in areas such as natural language processing, machine learning, and data analytics. This has enabled e-tutors to provide more effective and personalized online teaching experiences for students (Kulm, 2022). AI-powered adaptive learning systems, for instance, adjusts the difficulty level of course materials based on a student's performance, providing a tailored learning experience that is unique to each individual (Dziuban & David, 2021). AI-powered grading tools quickly and accurately assess student assignments, freeing up e-tutors to focus on providing more meaningful and personalized feedback. This has been shown to improve students' motivation and self-directed learning skills.

AI has led to significant changes in the way educational institutions are organized and managed. Boulos (2023) stated that, AI-powered learning analytics platforms have enabled institutions to track student progress and identify areas where students may need additional support. Artificial Intelligence (AI) today has become an essential part of modern life, offering increased efficiency and convenience across a variety of industries where in education sector it has led to exciting opportunities and valid concerns about how to effectively incorporate these tools into the classroom, particularly in remote learning environments. Artificial Intelligence enables e-tutors to provide more personalized and effective learning experiences for students, while also improving their own efficiency and effectiveness. Among the most significant benefits of AI in online learning is its ability to personalize instructional materials, automate routine tasks, and

create adaptive assessments (Gracia & Rodriguez, 2020). The tools help in supporting online learning, making virtual and often large courses more interactive and individualized. Today, artificial intelligence tools are governing developments in worlds of education which are overwhelmed by the potential that such devices, through human ingenuity and technology, can lead society toward a prosperous and better modernity.

Statement of the Problem

The rapid growth of online education in the 21st century has created a pressing need for effective and efficient learning systems that can cater for the diverse needs of students. Distance Learning Center (DLC) of Ahmadu Bello University, Zaria is one of such institutions that have been at the forefront of online education in Nigeria. Artificial intelligence has the potential to revolutionize online education by providing personalized learning experiences, improving student engagement, and increasing efficiency.

E-teaching and learning in developing countries such as Nigeria face challenges especially in respect to non-availability of good infrastructure couple with the problem of skills for utilization of advanced information technologies such as AI tools by e-tutors. E-tutors usually encounter obstacles due to insufficient digital literacy skills required to navigate AI-driven teaching system. Poor funding of education sector by the federal government of Nigeria also further exacerbates the situation limiting the ability of many higher educational institutions including Ahmadu Bello University Zaria to fully implement effective use of AI tools for online education. It is against this problem that, the study investigated utilization of artificial intelligence tools by e-tutors for online education in Distance Learning Center (DLC) of Ahmadu Bello University, Zaria.

Research Questions

The research questions were:

1. What were the types of artificial intelligence (AI) tools utilized by e-tutors for online education in Distance Learning Center (DLC), ABU, Zaria?

2. What were the potential benefits of using AI tools by e-tutors for online education in Distance Learning Center (DLC), ABU, Zaria?
3. What was the level of skills of e-tutors in utilization of AI tools for online education in Distance Learning Center (DLC), ABU, Zaria?
4. What were the barriers to effective utilization of AI tools by e-tutors for online education in Distance Learning Center (DLC), ABU, Zaria?

Literature Review

Artificial intelligence (AI) has emerged as a revolutionary component within various disciplines, fundamentally defined by its ability to create intelligent systems capable of performing tasks usually associated with human cognition, such as problem-solving, learning, reasoning, and decision-making (Phillip, 2023). Historically, the term “artificial intelligence” was introduced by John McCarthy in the 1956 Dartmouth Conference, where it was defined as the science and engineering of creating intelligent machines that could emulate aspects of human thought processes (Grewal, 2014). Throughout its development, numerous definitions have surfaced, illustrating AI's interdisciplinary nature, which encompasses fields such as computer science, cognitive psychology, and philosophy (Mintz & Brodie, 2019). As noted by Holmes (2019), AI technologies mirror human cognitive processes by employing methodologies akin to those used in human thought. This simulative quality enables machines to handle complex tasks ranging from natural language understanding to visual comprehension. Wagar (2023) further elaborates on the socio-economic implications of AI, highlighting that while its deployment can minimize labor costs in various sectors, it also raises concerns about privacy and data ethics, indicating the necessity for a balanced approach to AI adoption amidst growing reliance on technology.

Furthermore, the advent of advanced computational capabilities, coupled with the surge in data availability, has accelerated the development of powerful AI tools. These advancements have facilitated the proliferation of applications in deep learning, natural language processing, and computer vision, which are increasingly integrated into educational contexts (Hamal, 2022). AI can diagnose medical conditions, assist in automated academic assessments, and even engage in

sophisticated interactions with humans, marking a significant transformation in the educational landscape. The American Council on Education (2015) argues that, online education leverages technology to support and enhance learning processes, including the delivery of instructional content and evaluation of student learning. The Sloan Consortium (2023) reaffirms this by characterizing online education as the deployment of digital technologies for creating learning experiences, enabling remote engagement for students traditionally absent from physical classrooms. The proliferation of Learning Management Systems (LMS) exemplifies a significant adoption of AI in educational institutions.

Learning Management System (CLMS) stands out, utilized widely in various educational settings for its ability to assess student performance in real time (Phillip, 2023). The LMS's capabilities extend to mobile access, enabling users to participate in learning activities from diverse devices, thereby broadening accessibility. Another critical dimension is the myriad benefits that stem from effectively employing AI in online education. Zawacki-Richter (2019) emphasizes that AI can optimize online education through profiling and prediction, assessment evaluation, adaptive learning systems, and intelligent tutoring mechanisms. AI-driven platforms facilitate customized feedback tailored to individual learner profiles, thereby enhancing the educational effectiveness by addressing students' unique needs. The ability of these systems to generate insightful analytics translates to a more adaptive teaching approach that can cater to diverse learning paces and preferences. James Rhodes (2017), in his guide on online learning success, notes that this mode of education fundamentally changes how instructional content is delivered, ensuring accessibility and flexibility that supports varied learning needs.

AI chatbots, for example, have gained traction as automated agents that offer support and assistance to learners in real-time. Notably, platforms such as Embibe utilize AI chatbots like "Knowledge Buddy" to facilitate personalized learning by engaging students through interactive questioning and feedback mechanisms (Hamal, 2022). Furthermore, the implementation of Intelligent Tutoring Systems (ITS) creates a simulated tutoring environment where AI analyzes student performance and adapts instructional strategies accordingly (Wilson, 2023). This technology emphasizes individualized learning pathways, shifting the dynamics from traditional

classroom settings to more personalized approaches. Generative AI has also become relevant within education, offering a creative dimension that allows for the automatic creation of content including text, images, and videos. This capability enables e-tutors to craft tailored instructional materials that resonate with students' learning preferences and styles.

Johnson (2019) found that around 70% of e-tutors feel inadequately trained to employ AI-based learning systems effectively. This lack of proficiency can lead to underutilization of AI tools, stifling their potential impact on learning outcomes. However, Lee (2021) reveal skepticism among educators about the effectiveness of AI algorithms in grading and providing comprehensive feedback, particularly as systems often fail to capture the nuances of student work, including creativity and critical thinking. Additionally, ethical concerns surrounding data privacy and security persist, with studies highlighting that 80% of e-tutors are wary of the implications arising from AI's handling of sensitive student data (Kim, 2020). The intersection of these concerns underscores the necessity for institutional support and strategic infrastructure investments to foster a conducive environment for AI integration in educational settings (Smith & White, 2021). Notable studies indicate that a considerable number of e-tutors are experimenting with AI-powered tools, with statistics showing that a significant percentage report enhanced student engagement and improved academic outcomes (Wilson, Anderson & Cruz, 2020). The growth trajectory of AI technologies in education further portends an increasing reliance on adaptive systems and virtual learning environments, with evident benefits in student motivations and performance metrics (Chen, 2023).

Therefore, as the field continues to evolve, further investigation into these dynamics is vital to ensure that AI technologies are leveraged effectively to enhance educational outcomes while addressing the complexities associated with their implementation. While strides have been made in applying AI within online education, ongoing empirical research remains essential to bridge gaps in understanding and to inform the development of supportive structures that equip e-tutors with the necessary skills to harness AI's full potential. The insights gleaned from the literature provide a robust foundation for examining the application of AI tools by e-tutors, specifically within the framework of the Distance Learning Center (DLC) at Ahmadu Bello University, Zaria,

further contributing to the discourse surrounding technology-enhanced education in contemporary academic settings.

Methodology

The study adopted quantitative method and descriptive survey design. The approach involved systematic collection of numerical data, enabling the identification of patterns and trends in the utilization of these tools by e-tutors. The population of the study was 321 and the sample size was 175 respondents. Stratified sampling technique was adopted and questionnaire was used as instrument for the collection data. The questionnaire was administered and retrieved online using Google form with 170 (97%) response rate. Statistical techniques were then applied to analyze numerical data collected in order to identify patterns and correlations in the e-tutors' adoption of AI tools at the ABUDLC. The methodology provided a measurable and objective understanding of the current state of AI tool integration within the e-tutoring context in ABUDLC, Zaria.

Data Analysis and Discussion

Table 1: Types of AI Tools Utilize by E-Tutors for Online Education in ABUDLC, Zaria

AI Tool	Frequency	Percentage
Learning Management System (LMS) Software	143	84.1%
AI Chatbots	135	79.4%
Automated Grading System software	81	47.6%
Virtual Teaching Assistants	70	41.2%
Natural Language Processing (NLP) Software	64	37.6%
Learning analytics tools	55	32.4%
Adaptive Learning System (ALS)	65	38.2%
Knowledge Buddy	55	32.4%
Content Creation and Curation software	52	30.6%
Video analysis software	28	16.5%
Others	22	12.9%

Table 1 shows the number and proportion of respondents who utilized various AI tools at ABUDLC, Zaria. The table indicates that the most widely utilized AI tools among the e-tutors were the Learning Management System (LMS) software and AI chatbots, with usage rates of

84.1% and 79.4%, respectively. These high percentages implies that these tools were integral to online education at ABUDLC. Automated grading systems and virtual teaching assistants were also used significantly, with 47.6% and 41.2%, reflecting their role in enhancing instructional efficiency. Other tools such as NLP software, adaptive learning systems, and knowledge buddies had moderate adoption rates, ranging from approximately 32% to 38%. Content creation software and learning analytics tools were less frequently used, with 30.6% and 32.4%. Video analysis software and other unspecified tools had notably lower usage, at 16.5% and 12.9%, respectively. The data reflected a strong reliance on foundational AI tools like LMS and chatbots, with a gradual incorporation of more specialized tools. This indicated the importance of these technologies in facilitating online education at ABUDLC, Zaria.

Table 2: Potential Benefits of Using AI Tools by E-tutors at ABUDLC, Zaria

Benefits	Frequency	Percentage
Uses in online tutoring	92	54.1%
Enhanced instructional efficiency and effectiveness	85	50.0%
Helps in virtual meeting	70	41.2%
Used in speech to text conversion	60	35.3%
Used in language translation	85	50.0%
Used in online exam monitoring and assessment	75	44.1%
Used in virtual mentoring for job applications	68	40.0%
Used for grading of students	55	32.4%
Used for project supervision	80	47.1%
Used in drafting lecture manual	65	38.2%
All of the above	90	52.9%
Others	60	35.3%

The data in Table 2 revealed that a significant proportion of e-tutors at ABUDLC, Zaria, recognized the diverse benefits of using AI tools. Over half of the respondents, 54.1%, indicated that they utilized AI tools for online tutoring. This indicates AI role in remote instruction. Similarly, 50% of the tutors indicated that AI enhances instructional efficiency and effectiveness, highlighting its contribution to improving teaching quality and saving time. Another 50% also identified language translation as a key benefit, facilitating communication across language barriers and promoting inclusivity in the learning environment. AI's support in virtual meetings

was acknowledged by 41.2%, reflecting its importance in maintaining seamless communication during online interactions. Speech-to-text conversion was indicated by 35.3% of respondents, which assist in transcription and accessibility for learners with hearing impairments or for note-taking purposes.

Additionally, 44.1% of the tutors employed AI in online exam monitoring and assessment, indicating its role in ensuring exam integrity and automating grading processes. Virtual mentoring for job applications was indicated by 40%, demonstrating AI's utility beyond traditional teaching roles, extending into career guidance. AI's application in student grading was indicated by 32.4%, suggesting some reliance on automation to streamline evaluation. Use of AI in project supervision benefits was indicated by 47.1% of respondents, indicating its role in guiding student projects and research activities. Drafting lecture manuals with AI assistance was indicated by 38.2%, which. Notably, over half of the respondents, 52.9%, indicated that they benefited from all of these applications collectively, reflecting a comprehensive adoption of AI tools across various teaching functions. Interestingly, none of the respondents reported that they do not benefit from any of these applications, emphasizing a collective positive perception of AI's role in their teaching practices. Lastly, 35.3% of respondents identified other benefits not explicitly listed, implying that AI's potential applications were broader and possibly evolving in their use. The findings indicate that AI tools were widely regarded by the e-tutors as advantageous in multiple aspects of online tutoring, with a strong consensus on their value in enhancing educational delivery and administrative efficiency.

Table 3: Level of confidence of E-tutors using AI tools for online education (Scale: 1-5, where 1 is Highly Not Confident at all and 5 is Highly Confident)

Confidence Level	Frequency (f)	Value (x)	f(x)	(x - μ)	(x - μ) ²	f(x - μ) ²
Highly not confident	2	1	2	-2.95	8.7025	17.405

Not confident	15	2	30	-1.95	3.8025	57.038
Average confidence	24	3	72	-0.95	0.9025	21.660
Confident	75	4	300	0.05	0.0025	0.1875
Highly confident	54	5	270	1.05	1.1025	59.505
Total	170		674			155.795
Mean (μ)						3.95
Variance (S^2)						0.92
Standard Deviation (σ)						0.96

Table 3 shows the level of confidence of e-tutors in using AI tools. The data shows that, e-tutors at ABUDLC exhibited a mean confidence level of approximately 3.95, which indicates a general tendency towards confidence in using AI tools, with some variability, as captured by a standard deviation of approximately 0.96. The mean score of 3.95 indicates that, on average, the e-tutors at ABUDLC possessed a confidence level that leans toward confident, just below the confident mark in the scale. This is a noteworthy finding as it indicates a trend towards acceptance and utilization of AI in online education, which are beneficial for improving teaching strategies and student engagement.

Furthermore, the standard deviation of 0.96 indicates a fairly narrow spread in the confidence levels, meaning that while there is some variance, most e-tutors cluster around the mean value. The smaller standard deviation suggested that confidence levels were relatively consistent among the tutors, implying a common ground of understanding and experience with AI tools. This indicates that while most e-tutors felt confident, there were differences in how strongly individual e-tutors felt about their ability to utilize AI tools for online education.

Table 4: Barriers to Effective Utilization of AI Tools for Online Education at ABUDLC

Barriers	Frequency	Percentage
Lack of familiarity with AI tools and technology	69	40.6%
Limited resources and infrastructure	65	38.2%
Institutional/organizational barriers	60	35.3%
Technical glitches with network when using AI tools	55	32.4%
Lack of policy framework for use of AI tools in education	86	50.6%
Inadequate training and support	71	41.8%
Resistance to change and innovation from students	45	26.5%
Concerns regarding the reliability and accuracy of AI tools	40	23.5%
Others	33	19.4%

Table 4 shows that the most significant barrier to the effective utilization of AI tools for online education at ABUDLC, was the lack of a policy framework as indicated by 50.6% of the respondents. This implies that over half of the respondents believed the absence of clear policies and guidelines as a major obstacle to adopting AI in their teaching practices. The second most prominent barrier was inadequate training and support, indicated by 41.8%, highlighting the importance of proper capacity building and technical assistance to effectively utilize AI tools. Limited resources and infrastructure were also notable, with 38.2% of respondents identifying it as a key challenge, pointing to infrastructural deficiencies impeding AI integration. Lack of familiarity with AI tools and technology was selected by 40.6%, indicating that a significant proportion of tutors lacked the necessary skills to confidently use AI. Institutional barriers were indicated by 35.3%, reflecting possible bureaucratic and structural issues within the institution that hinder AI adoption.

Technical glitches with network connectivity, indicated by 32.4%, was another concern, especially considering the reliance on stable internet for AI functionalities. Resistance to change and innovation from students (26.5%) were less prominent. Concerns about the reliability and accuracy of AI tools were selected by 23.5%, showing some apprehension regarding AI's dependability. Lastly, 19.4% of respondents indicated other unspecified barriers, indicating that additional challenges exist but may not be explicitly listed. The finding indicated that policy gaps, lack of training, infrastructural deficits, and limited familiarity were the primary hurdles to harnessing full AI effectiveness in online education at ABUDLC.

Recommendations

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

1. The e-tutors in ABUDLC should improve in utilization of other types of AI tools in addition to investing in upgrading its Learning Management System (LMS) to incorporate advanced features that enhance user experience, such as interactive learning modules, enhanced analytics for tracking student engagement, and integrated communication tools.
2. The ABUDLC should develop and implement training programs that focus on familiarizing its E-tutors with AI tools and technology, as well as providing ongoing support and guidance to help them effectively utilize AI tools in their teaching practices.
3. The ABUDLC should implement a mentorship program that pairs less confident e-tutors with more experienced peers who are proficient in using AI tools, in order to provide a platform for knowledge sharing and skills enhancement.
4. The Federal Ministry of Education of Nigeria should develop a clear policy framework for the use of AI tools in education ensuring the effective use of these technologies in improving online instructional efficiency.

Conclusion

The study has provided a comprehensive understanding of state of AI tools utilization by E-Tutors at the Distance Learning Center (DLC) Ahmadu Bello University, Zaria. The increasing adoption of AI tools by e-tutors is a testament to the growing recognition of their potential to enhance instructional efficiency, improve student outcomes, and increase flexibility in online education. The benefits of using AI tools, including enhanced instructional efficiency and effectiveness, improved online tutoring, and project supervision, are undeniable. The study also emphasized the importance of addressing the barriers to lack of clear policy framework on use of AI tools for online education, ineffective utilization of AI tools, lack of familiarity with AI tools and technology, technical glitches, and inadequate training and support. These barriers hinder the effective use of AI tools and limit their potential benefits.

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