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EXPLORING PRE-SERVICE TEACHERS' AWARENESS, READINESS AND UTILIZATION OF ARTIFICIAL INTELLIGENCE IN EDUCATION: A CASE STUDY OF A FEDERAL INSTITUTION IN EKITI STATE

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Abstract
Artificial Intelligence has become one of the sought-after tools and platforms due to its significant role in education, offering educators and students innovative approaches of teaching and learning, assessment, acquiring skills, communicating and interacting with learning materials. Despite its transformative potential, university students in Nigeria have yet to fully harness the capabilities of AI in their educational pursuits. This underutilization may be attributed to inadequate awareness, limited readiness and insufficient utilization capacity. Hence this study explored the pre-service teachers' awareness, readiness and utilization of Artificial intelligence in education in a Federal institution in Ekiti State. The study employed descriptive survey research design. A total of 559 pre-service teachers were selected through a multistage sampling technique. Three research questions were raised to guide the study. Data were collected using a validated research instrument titled Pre-Service Teachers' Awareness, Readiness, and Utilization of Artificial Intelligence in Education, which was reviewed by experts and had a reliability coefficient of 0.78 using Cronbach's alpha. The data were analyzed using descriptive statistics (mean and standard deviation) with IBM SPSS Statistics version 24. The findings of the study revealed that pre-service teachers are aware, but not ready and able to utilize artificial intelligences in education. Based on the findings of the research, it was recommended that teacher education programs should include more training in artificial intelligences for teaching and learning to help pre-service teachers develop the skills and confidence needed to use this

technology effectively in the classroom. Collaborative efforts should be made by government, educators, and industry to promote the use of artificial intelligences in education. This can help to increase awareness and support for the integration of this technology into teaching and learning.

Keywords: Artificial intelligence in education, pre-service teachers, awareness, readiness

Introduction

Institution of higher education has been referred to as citadels of knowledge play important roles in bringing about remarkable changes in society. This is why, throughout the world, particularly in developed nations, university education is regarded tremendously seriously since its results in the form of knowledgeable citizens are critical to such nations' technical and socioeconomic advancement. This implies that the primary contributions of universities to society are in the creation and dissemination of useful knowledge, as well as in collaborating with society on the application of such knowledge (Akinyemi *et al*, 2022). This highlights the responsibilities and importance of well-trained, 21st-century pedagogically informed, and professionally sound teachers in conveying knowledge to students in society via effective teacher education programmes.

Teacher education is a type of intensive training provided to aspiring teachers in Nigerian institutions for them to gain content knowledge, pedagogical skills, and values that they are supposed to effectively impart to learners during their in-service. It is an educational programme in which trainee teachers are specifically taught content and pedagogical skills for them to be properly equipped for the demands of the teaching profession (Dange & Siddaraju, 2020). Quality education remains the objective of the Nigerian education system to promote long-term national development, and teachers play a critical role in achieving quality education in any country (United Nations, 2015). Teachers' quality is evident in their classroom activities since teaching and learning are conceived, planned, and guided by teachers (Ajani, 2020). Due to the importance of teacher education in producing a well-trained teaching workforce for the upbringing of conscious citizens who can contribute to the socio-economic and sustainable development of the country, the Federal Republic of Nigeria (2014) mandated all Faculties of Education in Nigerian universities to produce highly encouraged, effectively motivated, and efficient classroom teachers who are versed in inquiry and creativity in teaching. Pedagogical skills (a strong understanding of various teaching techniques and supporting facilities) stand out among the other crucial skills that pre-service teachers are supposed to acquire to become professional teachers (Akinyemi *et al.*, 2022).

There has been growing concerned about not only what students learn, but also how they learn it (Akinyemi *et al.*, 2022). This is especially relevant given the considerable changes in 21st-century pedagogies that rely on the efficacy and efficiency offered by Information and Communication Technology (ICT) tools such as Web 2.0, smartphones, digital technologies, and so on in education (Mynbayeva, Sadvakassova & Akshalova, 2018). Many modern methods, such as project-based, problem-based, flipped classroom, project-based learning, thinking-based, gamification, design thinking, learning, and competency-based learning approaches have resulted from significant changes in 21st-century pedagogies. The integration of technology in education has led to significant transformative changes in the teaching and learning processes globally. Following the aftermath of the COVID-19 pandemic, several institutions expeditiously adopted virtual learning via various online platforms to ensure the continuity of academic activities. Among the various technological advancements tools and platforms that allow seamless integration of ICT tools and other digital technology adopted, Artificial Intelligence (AI) stands out as one of the impactful innovations with the potential to revolutionize educational practices (Chetry, 2024; Ogunsola *et al.*, 2021, Zheng, 2022).

Artificial intelligence according to Verma (2018) described it as the process of making computer programs and machines to solve complex problems same as humans could solve the problems in acting, identifying, recognising and reasoning. The use of Artificial Intelligence (AI) in Education has helped to close the communication gap between students and teachers. AI in education encompasses a wide range of applications from intelligent tutoring systems to adaptive learning platforms, and it serves as a tool to offer students learning possibilities, aids the instructor's inefficient instruction, increases pedagogical practices, improves learning experiences and provide real-time feedback (Chen et al., 2020; Yunli, & Yu, 2020). For instance, educationists use AI-enabled technologies like ezTalks Cloud Meeting, WeVideo, scribble, and Dropbox to give students a platform for learning. Similarly, Artificial intelligence (AI) enables computers and machines to replicate human perception and decision-making processes in order to execute jobs successfully in the use of software algorithms and techniques (Murphy, 2019). In addition, Agarwal (2018) and Karsenti (2019) identified examples of AI technologies as computer programmes such as online platforms and computerized machines.

AI assists can assist instructors to personalise their lessons to meet learners' different learning abilities by creating digital content. For example, with Gooru, instructors can create personalised learning opportunities for students, organize course content into comprehensible units of the study and create assessments with access to immediate feedback (Agarwal, 2018). AI tools help to deliver higher standards of teaching as the teachers are assisted by technologies, less time is spent

in talking and more time spent gaining useful insights and professional development. This was buttressed by Pokrivcakova (2019) who noted that AI-enabled technologies aid in the development of a sophisticated educational environment in which learning can be more personalised, teaching can be more flexible, and administration can be more inclusive. For example, Duolingo, a language-learning programme based on AI and voice recognition, is used by many teachers to liven up their language classes (Karsenti, 2019).

A pre-service teacher is a term used to describe student teachers who are enrolled in a teacher education program in tertiary institution. A tertiary institution saddled with the responsibility of training students to obtain degree certificates in various disciplines. Pre-service Teachers' awareness, readiness and utilization of AI is paramount for Pre-service Teachers to use AI. Awareness refers to teachers' ability to understand the available AI technologies and resources, as well as how they can be used to performed academic tasks (Abba & Adamu, 2019). For Pre-service Teachers' to optimally use AI, they need to be aware of its utilisation and impact on their academic activities and be proficient in its use. The knowledge of Pre-service Teachers on the utilisation of Artificial Intelligence for education is fundamental to enable Pre-service Teachers successfully utilise it for their academic activities.

This was emphasized by Ankrah and Atuase (2018) who stated that users were unable to realise the potential of information resources to suit their information demands due to their lack of awareness of them. Results that emanated from Kwafo (2019) study revealed that most of the students are aware of AI through seminars, journals, and media. However, studies have shown a contradicting conclusion in terms of pre-service tteachers' awareness of modern technologies in education. Studies have shown that teachers' awareness of modern technologies is low (Garba, 2017; Ipsos Mori, 2017; Ferikoğlu & Akgün, 2022; Sulaiman *et al.,* 2017). While studies by Abba and Adamu (2019), Adetomiwa and Oshiotse (2018) and Uygun *et al.* (2024) showed that teachers have moderate knowledge of modern technology.

However, research evidences have shown that majority of the teachers are fully aware of modern technologies in education (Eyiolurunshe *et al.,* 2017; Falode *et al.,* 2018; Nannim *et al.,* 2018; Oriogu*et al.,* 2018). Anisimova *et al.* (2020) reveal teachers' lack of readiness to deploy educational programmes with technologies, and the literature revealed that teachers are not always eager to employ new digital technology in their classrooms (Badia & Iglesias, 2019). Teachers sometimes lack knowledge of technology or how to integrate it into their classroom teaching (Bers *et al.*, 2013; Chalmers, 2018). Despite the growing interest and the remarkable potentials of AI in education which has greatly enhance teaching and learning experiences in the classroom, pre-service teachers are yet to fully harness its

capabilities. This could be attributed to several contributing factors, including the limited awareness among pre-service teachers, inadequate training in the application of artificial intelligence (AI) tools, resistance to the adoption of emerging technologies, and curricular constraints that do not prioritize the integration of AI into educational practices. Given this, the current study investigates the pre-service teachers' awareness, readiness and utilization of Artificial intelligence in education in a Federal institution in Ekiti State.

Research Questions

The study sought to provide answers to the following research questions;

i. Are the pre-service teachers aware of the use of artificial intelligence in education?

ii. Are the pre-service teachers ready to deploy artificial intelligence in education?

iii. Are the pre-service teachers utilizing artificial intelligence in education?

Methodology

A descriptive survey research design was employed this study. This research was designed to investigate the extent to which pre-service teachers' awareness, readiness and utilization of artificial intelligence in education in a federal institution. The population of this study comprised all pre-service teachers in Ekiti State. However, the target population of this study were pre-service teachers of the Faculty of Education, Federal University Oye-Ekiti, Ekiti State. A total of 559 pre-service teachers responded, constituting the sample size for the study. A multi-stage sampling procedure was employed for the study. Stratified sampling was used to stratify pre-service teachers across the departments in the Faculty of Education, Federal University Oye-Ekiti into the already existing four (4) levels, namely 100, 200, 300 and 400 levels. Purposive sampling technique was used to select 400 level pre-service teachers. The rationale to choose 400 level pre-service teachers is that they have gone through series of educational training as they are nearing the point of graduation. Proportionate sampling technique was used to select 80% of the pre-service teachers in 400 levels. Random sampling technique was used to approach the pre-service teachers. The instrument used for the data collection was researcher's structured questionnaire named "Pre-Service Teachers' Awareness, Readiness and Utilization of Artificial intelligence in Education in Oye-Ekiti metropolis, Ekiti State". The questionnaire contains series of statement designed for information needed from the respondents. The questionnaire was categorized into four sections A, B, C and D. Section "A" contain questions on the socio-demographic characteristics of the respondents and section 'B', 'C' and 'D' contain questions on the pre-service teachers' awareness, readiness, and utilization of

artificial intelligence in education respectively. The responses were indicated using the four-point Likert rating scale of Strongly Agree (SA), agree (A), Disagree (D) and Strongly Disagree (SD) weighted 4,3,2 and 1 point respectively. The benchmark of 2.5 was used in making decisions. However, any mean score of 2.5 and above is acceptable or termed positive and any mean score that is below 2.5 will be rejected or termed negative. The validity of this instrument was peer reviewed by experts in Computer Department and Measurement and Evaluation in Federal University Oye-Ekiti to check if the instruments were viable to obtain the intended data. Fifty pre-service teachers participated in the pilot study at the Ekiti State University to confirm the internal constituency of the instrument. The reliability index of the instrument was subjected to Cronbach's alpha and yield 0.78 reliability coefficient score. The completed copies of the questionnaire for this study were collected, sorted, coded and subjected to appropriate statistical analysis. Section A which contains the demographic data of the respondents was analyzed using descriptive statistics of frequency counts and percentages. The mean ranking order was used to answer the research questions and analyzed the descriptive statistics using the Statistical Package for Social Sciences (SPSS) version 24.0.

Results

Table 1

Gender Distribution of Students

Gender	Frequency	Percent
Male	288	51.52 %
Female	271	48.48%
Total	559	100.0

The table 1 shows the respondents by their gender. The male respondents are greater than that of the female respondents, with the males making 51.52% of the sampled population and females making up the remaining 48.48% of the sampled population.

Table 2

Pre-service teachers' awareness of the use of artificial intelligence in education

S/N	Items	N	Mean	Std.	Decision
1	I have heard about the use of artificial intelligence being used in education.	559	2.67	0.885	Aware
2	I have used or worked with a artificial intelligence device for educational purposes.	559	2.58	0.904	Aware
3	Artificial intelligence has potential benefits for teaching and learning process in the classroom	559	2.72	0.813	Aware
4	I believe there are several advantages of integrating artificial intelligence into education	559	2.70	0.865	Aware
5	I have had training and coursework on using artificial intelligence for educational purposes	559	2.71	0.832	Aware
6	I am interested in learning more about how to use artificial intelligence in my future teaching practice	559	2.71	0.884	Aware
	Grand Mean		2.66		Aware

Table 2 shows the mean and standard deviation of a student's response regarding the pre-service teacher's awareness of the use of artificial intelligence in education. The table provides specific scores for each of the six items being evaluated, with the mean and standard deviation for each item. Each item (1-6) had a mean score

greater than the decision mean of 2.50. The grand mean score of all six items combined was 2.66, which is greater than the decision mean score of 2.50. This indicates that pre-service teachers are aware of artificial intelligence for teaching and learning.

Table 3

Pre-service teachers ready to deploy artificial intelligence in education

S/N	Items	N	Mean	Std.	Decision
1	I have received formal training relating to integrating artificial intelligence into teaching and learning	559	2.45	0.849	Not Ready
2	I am comfortable using and troubleshooting artificial intelligence devices in the classroom	559	2.40	0.867	Not Ready
3	I have used artificial intelligence as a teaching tool before	559	2.41	0.837	Not Ready
4	I am ready to use artificial intelligence to enhance teaching and learning	559	2.44	0.961	Not Ready
5	I am prepared to assess student learning and progress when using artificial intelligence in the classroom	559	2.44	0.974	Not Ready
6	I am ready to address the challenges when incorporating artificial intelligence into your teaching	559	2.65	0.903	Not Ready

Grand Mean	2.46	Not Ready

Table 3 shows the mean and standard deviation of a student's response regarding the pre-service teacher's readiness towards the use of artificial intelligence in education. The table provides specific scores for each of the six items being evaluated, with the mean and standard deviation for each item. Each item (1-5) had a mean score less than the decision mean of 2.50 while item six (6) had a mean score of 2.65 which was greater than the criterion means of 2.50. The grand mean score of all six items combined was 2.46, which is greater than the decision mean score of 2.50. This indicates that pre-service teachers are not ready to use artificial intelligence for teaching and learning.

Table 4

Utilization of Artificial intelligence by pre-service teachers

S/N	Items	N	Mean	Std.	Decision
1	I incorporate artificial intelligence into my lesson plans	559	2.40	0.971	Not Utilized
2	I make use of artificial intelligence for classroom activities	559	2.52	0.929	Not Utilized
3	There are positive changes in student engagement and motivation since incorporating artificial intelligence into your teaching	559	2.47	0.982	Not Utilized
4	I assess student learning and progress when using artificial intelligence in the classroom	559	2.35	1.003	Not Utilized
5	I have encountered challenges when using artificial intelligence in the classroom	559	2.54	0.935	Not Utilized
6	Artificial intelligence serves as a teaching tool for teaching and learning in the classroom	559	2.30	1.006	Not Utilized

Grand Mean	2.43	Not Utilized

Decision Mean: 2.50

From the table 4, it can be observed that the mean scores for four items out of the six (6) items were less than the decision mean score of 2.50, indicating that the pre-service teachers had a low level of usage of artificial intelligence. This is further supported by the fact that the grand mean score of all ten items was 2.43, which is also below the decision mean score.

Discussion of Findings

The study investigated pre-service teachers' awareness, readiness and utilization of artificial intelligence in education in Ekiti State. The findings of the study revealed that pre- service teachers are aware of artificial intelligence in education, which means that there is growing level of exposure to digital tools and emerging technologies among future educators. This awareness may stem from their use of AI-powered applications in their daily lives or from their academic exposure to educational technology concepts during training. This aligned with findings by Akinyemi and Ezekiel (2022); Thomas *et al*., (2025); Adekunle and Adebayo (2021) found that over 70% of Nigerian pre-service teachers could identify at least one AI tool used in education, demonstrating a global trend toward technological consciousness among future educators. And in disagreement with the submission by Oladimeji and Musa (2021) reported that a significant proportion of teacher trainees in Nigerian colleges of education were unaware of AI-driven tools such as intelligent tutoring systems, AI-based assessment platforms, and chatbots in education. Similarly, Bello and Chukwuma (2022) concluded that although pre-service teachers had heard of AI, their understanding was unclear and often confused with general digital tools.

The finding that pre-service teachers are not ready to utilize artificial intelligence (AI) in education highlights a significant gap between awareness and practical competence. Although AI technologies such as automated grading systems, intelligent tutoring platforms, and adaptive learning tools are increasingly integrated into global educational systems, many future educators lack the training and confidence to implement them effectively. The findings backed up the notion from the study by Oladokun and Bello (2022), who reported that while over 70% of teacher trainees had heard of AI in education, only 18% felt confident using such tools in a teaching context. Similarly, Okonkwo et al. (2021) found that inadequate

exposure to AI during teacher training and limited access to AI tools were critical barriers to readiness among pre-service teachers.

The finding that pre-service teachers do not utilize artificial intelligence (AI) in education reflects a concerning gap in the integration of modern educational technologies into teacher training programs. Despite increasing global encouragement on the incorporation of AI in teaching and learning, this result suggests that many pre-service teachers remain detached from practical use of AI tools in educational process. This agreed with Adeleke and Yusuf (2021), who reported that although pre-service teachers had some level of awareness of AI concepts, actual usage in teaching-related tasks was negligible, over 80% of respondents had never interacted with AI-driven educational tools such as adaptive learning platforms or automated feedback systems. Similarly, Ngige and Okonkwo (2023) observed that the absence of structured digital literacy training, particularly on AI, limited both competence and confidence among student-teachers.

Conclusion

Despite growing awareness of artificial intelligence in education among pre-service teachers, there remains a significant gap between awareness and practical utilization. The findings of this study indicate that while many pre-service teachers may have heard about AI and understand its general purpose, they lack the readiness, confidence, and skills required to meaningfully integrate AI tools into their future teaching practices. Therefore, the study concludes that awareness alone is not enough; there must be a deliberate and sustained effort to enhance pre-service teachers' preparedness and practical engagement with AI tools in order to improve the quality and relevance of teacher education in the digital age.

Recommendations

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

1. Curriculum developers in Colleges and Faculties of Education should incorporate hands-on AI literacy courses, workshops, and simulated teaching practices involving AI tools. Doing so would bridge the gap between awareness and practical application.
2. Educational stakeholders should invest in capacity-building initiatives, provide access to educational technologies, and foster partnerships between colleges of education and edtech companies.
3. AI training should be embedded within the teacher preparation curriculum, with an emphasis on practical usage, critical thinking, and ethical awareness.

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