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ARTIFICIAL INTELLIGENCE (AI) TECHNOLOGIES AS A MEANS OF ENHANCING DIGITAL LITERACY OF FUTURE TEACHERS

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ABSTRACT:

There are opportunities and challenges that must be addressed for artificial intelligence technologies to be successfully integrated in teacher education for improved digital literacy skills of future teaches. Consequently, it becomes needful to examine Artificial Intelligence (AI) technologies as a means of enhancing digital literacy of future teachers. The study employed three research questions. Pre-test/post-test control group design was adopted for the research with a sample size of 50 participants which was made up of future teachers from Nnamdi Azikiwe University, Awka, Anambra State, Nigeria with age categories of 20-22 years. It was a quasi-experimental study. In addition, mean, standard deviation and t-test were the statistical tools used for data analysis. The findings showed that Artificial Intelligence (AI) literacy level among future teachers is high and these Artificial Intelligence (AI) technologies enhances their digital literacy skills. The study also showed that future teachers' perceptions regarding the use of Artificial Intelligence (AI) technologies were positive. Suggestions were made for further studies.

INDEXTERMS*:* Teacher Education; Educational Technology; Educational Development; Pedagogical Innovation

1. INTRODUCTION

Globally, education is the best legacy a state can bequeath to her citizens because it helps people to become functional members of any given society. In this vein, Offiah (2025) posits that it is through education people learn different skills for socioeconomic survival such skills is language learning skills as well as digital literacy. In the present time, digital literacy is

very important in education because of the fact that it enable people to effective use digital technologies to create, access and evaluation relevant information. Probably, this is why Cope, Kalantzis and Searsmith (2021) posits that digital literacy deals with different kinds of skills such as: visual literacy, digital citizenship and information literacy which are very vital for learners to achieve a remarkable success in school more particularly, now that the world is digitalized. Digital literacy enhances digital equity, digital responsibility as well as online safety. Consequently, students who have the relevant skills in today's digital age use their skills to communicate information ethically, protect their privacy and safety in online platforms, and understand digitalized tasks. Digital literacy also help to improve socioeconomic outcomes and improve career opportunities for the less privilege in the society. Digital literacy promotes employment opportunities for students after graduation by enabling them to access different kinds of information for their career, collaborate globally and engage with online learning platforms. In this vein, DeCoito and Estaiteyeh (2022) states that digital literacy is an important skill for every student for career success because many employers need a range of digital skills from their employees such as: data analysis and programming, and basic computer proficiency. It is very necessary that students possess critical thinking, communication skills, critical thinking as well as practical thinking, which are digital literacy skills for vital academic success and the prospects of future career. This indicates students with thrive in digital economy when they acquire digital literacy skills and can effectively utilize Artificial Intelligence technologies.

The importance of Artificial Intelligence (AI) in teacher training programme has drawn the attention of educational stakeholders because of the role it plays in enhancing teaching and learning in educational institutions. According to Offor, Nwaru and Offiah (2024), artificial intelligence is simply a systematic machine with the capacity to influence real or virtual environments and make predictions. Simply interpreted, Artificial Intelligence (AI) is a machine- based system that emulate, act and comprehend human capabilities to sense. However, Artificial Intelligence (AI) enhances professional development of teachers because it encourages pedagogical practices, and also provides personalized learning experiences. Through Artificial Intelligence (AI) powered tools, vast data are analysed which helps to determine specific areas where teachers need training and support in their professional development programme Kurebay. The development of adaptive learning systems is facilitated in today's education because of the presence of Artificial Intelligence (AI). These adaptive learning systems help to cater the needs and learning styles of teachers. Hence,

adaptive learning systems empower teachers to refine their knowledge and skills, provide guidance, resources and real-time feedback. Moreover, Gialamas Nikolopoulou and Koutromanos (2013) states that virtual reality experiences and AI-driven simulations help teachers to engage in pedagogical practices in a more safe and controlled environment. Evaluation and assessment processes in teacher training are supported by Artificial Intelligence (AI). This is because teachers develop and score assessments using Artificial Intelligence (AI) powered tools. One can therefore infer that Artificial Intelligence (AI) enhances the performance of teachers and it is through Artificial Intelligence (AI) that school administrators determine the areas where teachers should be supported and trained the more. Very importantly, integrating Artificial Intelligence (AI) in teacher training programme raises relevant questions regarding the role of teachers in the digitalized world. Teachers need to learn new skills and competencies to enable them to effectively use AI-powered tools and systems. Teachers therefore need to learn how to utilize Artificial Intelligence (AI) to address limitations, potential bias and to support teaching and learning. Thus, Artificial Intelligence (AI) is very important in teacher training because of its potential improve pedagogical practices, support teaching and learning effectiveness as well as enhancing teacher professional development. The scope of the analysis lies on oversight mechanisms to ensure transparency, accountability and the use of regulatory framework. Educators, policy makers and researchers are expected to work together to ensure that Artificial Intelligence (AI) are integrated into the school system in a way and manner that benefits students and teachers.

Research Problem Statement

Ideally, future teachers are expected to possess digital literacy skills that is comprehensive for integrating Artificial Intelligence (AI) technologies effectively into their pedagogical practice for enhancing students' academic engagement and achievement. They should have the capacity to utilized Artificial Intelligence (AI) powered tools to promote a learning environment that is more engaging and inclusive, enhance critical thinking and personalize instruction. Unfortunately, many teachers under training lack these skills. It appears that many teacher education programmes lack sufficient Artificial Intelligence (AI) literacy training, which make future teachers unprepared to utilize the advantages of Artificial Intelligence (AI) in the classroom more particularly during lesson. Studies revealed so far did not explore comparative aspect of Ukraine, Latvia, and Lithuania specifically in the context of martial law which could have provided valuable insights on how to effectively integrate AI, channeled to each country's unique cultural and legal context. This problem seems to

result to less confidence regarding the use of Artificial Intelligence (AI) technologies which may hinder the integration of Artificial Intelligence (AI) tools into pedagogical practices. Consequently, many future teachers struggle to deliver and design instruction that utilizes Artificial Intelligence (AI) powered tools; this may hinder the academic achievement of students and their commitment to learning. In addition, the absence of digital literacy skills for the use Artificial Intelligence (AI) tools among future teachers may increase educational inequalities because some students more particularly those from disadvantaged backgrounds will be marginalized by their teachers due to inability to use AI-powered tools effectively. Very importantly, there appears to be paucity of experimental research on Artificial Intelligence (AI) technologies as a means of enhancing digital literacy of future teachers. Few studies reviewed used descriptive research design with statistical tools that differ with the topic under study; the need to cover the experimental gap makes the study needful.

Research Objectives, Aim and Questions

The research investigate Artificial Intelligence (AI) technologies as a means of enhancing digital literacy of future teachers. The specific objectives are:

1. To determine the extent of Artificial Intelligence (AI) literacy among future teachers.
2. To ascertain the impact of Artificial Intelligence (AI) technologies on the digital literacy skills of future teachers.
3. To examine the perceptions of future teachers regarding the use of Artificial Intelligence (AI) technologies in enhancing their digital literacy.

Research Questions

The research questions posed for the study are:

1. What is the extent of Artificial Intelligence (AI) literacy among future teachers?
2. How do Artificial Intelligence (AI) technologies impact digital literacy skills of future teachers?
3. How do future teachers perceive the use of Artificial Intelligence (AI) technologies in enhancing their digital literacy?

Significance of the Study

The findings of the study will be of immense benefit to students, teachers, school administrators, government and researchers.

To students, the findings of the study will provide them a more relevant information on how they can benefit from pedagogical practices that utilizes Artificial Intelligence (AI)

technologies which will improve their academic achievement and also prepare them a world that is driven by Artificial Intelligence (AI) technologies.

Teachers will find the study interesting because the findings of the study will motivate them to acquire digital literacy skills. This will go a long way to aid them in delivering and designing instruction that utilizes Artificial Intelligence (AI) technologies for the purpose of enhancing their pedagogical practices

The study will also enlighten school administrators the more on the ways for integration of AI literacy into teachers' professional development programme and allocation of resources. By doing so, school administrators will be committed the more in enhancing digital literacy skills of future teachers now and in the long run.

Governments of different countries will benefit from the findings of the study because the study will enlighten them the more on the need for integrating Artificial Intelligence (AI) technologies into education in order to enhance the digital literacy skills of students and the entire citizens. Through this the government can address the challenges impeding effective utilization of Artificial Intelligence (AI) technologies in teaching-learning process.

Finally, researchers will benefit from the study as the study will add to existing body of knowledge on Artificial Intelligence (AI) technologies as a means of enhancing digital literacy of future teachers. Hence, researchers who are conducting studies on Artificial Intelligence (AI) technologies and digital literacy will find the outcome of this study useful because it will serve as a baseline to conduct other related studies.

Structure of the Paper

This paper examines Artificial Intelligence (AI) technologies as a means of enhancing digital literacy of future teachers. It is structured under five headings including: introduction, literature review, methodology, results and discussion as well as conclusions.

2. Literature Review

The literature review is structured and discussed under the following sub-headings:

Historical Context of Artificial Intelligence (AI) technologies

The application of Artificial Intelligence (AI) technologies in schools has a remarkable history because of the transformation in teaching-learning process. However, Holmes., Porayska-Pomsta, Holstein, Sutherland, Baker, Shum., Santos, Rodrigo, Cukurova,

Bittencourt and Koedinger (2022) notes that it is difficult to discuss the evolution of Artificial Intelligence (AI) technologies in schools without dating back to the early 1960s. This is because early applications focused on adaptive learning and intelligent tutoring systems in 1960s. Artificial Intelligence (AI) technologies is now widely used to enhance academic engagement of the students, support personalized learning and automate administrative responsibilities. In another view, How, Cheah, and Khor (2022) notes that the word Artificial Intelligence (AI) emanated from John McCarthy of MIT. Artificial Intelligence (AI) as a concept can be traced to ancient philosophers and mechanical devices. These mechanical devices were known to move independently of the intervention of human. According to Huang (2021), Artificial Intelligence (AI) emanated from cybernetics from 1940-1960 with aim of finding out how organic beings and machines work together. In 1950s binary logic and computers laid a major groundwork for the advent of Artificial Intelligence. As a result of the limited computing memory and power, Artificial Intelligence (AI) entered a "winter" around 1960s and as the day goes, Artificial Intelligence (AI) continues to gain popularity in all spheres of human activities.

Recently, Artificial Intelligence (AI) is seen as one of the powerful tools in education because it has the ability promote excellent academic achievement, enhance academic achievement of the students and also resolve needs of individuals in the society. According to Johnson (2019), Artificial Intelligence (AI) help to create adaptive learning systems in education. These adaptive learning systems provide more tailed learning experience because of its capacity to determine amend the course materials based on the performance of students. It is clear that history of Artificial Intelligence (AI) is an interesting one and should be integrated into the education system because its roles in teaching-learning process as well as improving academic performance of students.

Existing Research on Artificial Intelligence (AI) technologies in Academic Environment

There appears to be so many researches on Artificial Intelligence (AI) technologies in academic environment because Artificial Intelligence (AI) technologies in an evolving field in education and these studies have shown the applications, advantages and problems associated with Artificial Intelligence (AI) technologies in the context of education (Kong, Cheung & Zhang, 2021). Literature reviewed so far, indicates that Artificial Intelligence (AI) technologies have been integrated into different aspects of education more particularly, assessment, teaching and learning. Lee and Lee (2021) maintain that personalized learning is one of areas of Artificial Intelligence (AI) research in education. Educational experiences to students learning styles, needs and abilities are tailored by Artificial Intelligence (AI)

powered adaptive learning systems. Machine learning algorithms are used by adaptive learning systems to support students and provide real-time feedback in teaching-learning process.

Artificial Intelligence (AI) automating administrative task is another important area some studies have focused. To support this, Lee, Ahn and Choi (2021) states that different task such as data entry, grading and other administrative duties can be automated by Artificial Intelligence (AI) powered tools. This goes a long way to enhance reduce teachers workload and improves efficiency, making teachers to devote more time in pursuing high-value tasks. In education, AI-powered virtual assistants and chatbots are also utilized in education to provide learners with all the needed support and feedback which helps them to overcome coursework that is difficult and also overcome their queries in real time. In the words of Long and Magerko (2020), if AI-powered systems are trained on biased data, they can perpetuate these existing biases which can have negative effects for learners. Thus, training and designing Artificial Intelligence (AI) systems with fairness and equity is necessary in academic environment. Another problem is over reliance on modern technologies. There is need to strike a balance between human interactions an Artificial Intelligence (AI) technologies. To leverage this, educators must ensure that Intelligent Systems complete pedagogical practices and also support learning activities of students. The existing studies shows that there need to conduct researches on long term effect of Intelligent Systems in academic environs. Although there are many positive effects of the use of Intelligent Systems in school, more studies need to be carried out to determine the impact of Artificial Intelligence (AI) on academic performance of students, work load of teachers and the entire education system (Ng, Leung, & Chu, 2021).

By way of recapitulation, one can infer that many studies on Artificial Intelligence (AI) technologies have been carried out in education showing many problems and potential benefits in the context of education. However, as Artificial Intelligence (AI) continues to gain popularity in education, there is need to conduct more studies to ensure that Artificial Intelligence (AI) is used to support academic engagement, promote academic performance and to also completing pedagogical practices. It is therefore necessary to carry out an experimental study on Artificial Intelligence (AI) technologies as a means of enhancing digital literacy of future teachers.

Existing Methodologies, Techniques, Algorithms and Strategies

There are different methodologies, algorithms, techniques and strategies for integrating Intelligent Systems in education. According to Cope et al. (2021), several methodologies are

employed by AI-powered education. These methodologies include natural language processing, machine learning and deep learning and they aid Artificial Intelligence (AI) systems to make good decisions, analyse large datasets, and determine patterns. More-over, De Cremer and Kasparov (2022) states that unsupervised learning, reinforcement learning and supervised learning are techniques used in AI-powered education. Unsupervised learning deals with identifying patterns in data that is not labeled while supervised learning deals with the training of AI models on data that is labeled. On the other hand, reinforcement learning help Artificial Intelligence (AI) models to use trial and error in teaching. Furthermore, random forests, neutral networks and decision trees are the algorithms that are commonly used in AI-powered education. In this respect, DeCoito and Estaiteyeh (2022) notes that it through these algorithms that Artificial Intelligence (AI) systems identify complex pattern, make predictions as well as data classifications. In addition, many strategies are employed in AI-powered education such as personalized learning, adaptive learning and intelligent tutorial systems. In explaining the above assertion, Estevez et al. (2019) posits that personalized learning simply mean to channel pedagogical experiences to the abilities and needs of individual students. However, these strategies, algorithms, techniques, methodologies and AI-powered tools help to develop systems that enhance teaching-learning process.

Common Frameworks for Digital Literacy and their Applicability to Teacher Training

Digital literacy is a very important aspect of education because of the advent of Artificial Intelligence (AI) technologies. Consequently, there are development of different frameworks that provide the needed structure to guide the implementation of digital skills into teaching-learning process. Probably, this is why Lee et al. (2022) opines that digital literacy frameworks help teachers to develop the required competencies in modern education. Digital literacy therefore involves creativity, innovation and digital citizenship. Through these standards, a framework which help teachers to develop digital skills and competences is provided. Another digital literacy framework is the European Commision DigComp framework. Areas like collaboration and communication, data literacy are outlined by this framework (Holmes et al., 2022). There is also UNESCO ICT Competency Framework. According to Johnson (2019), this framework shows the digital competencies relevant for teaching effectiveness in modern education. It identifies the relevance of digital literacy in teaching-learning process and through this, teachers develop more skills and digital competencies. To sum up, teachers are provided with valuable insights regarding how to develop digital skills and competencies through digital literacy frameworks.

Previous Studies on AI-driven Learning Tools for Educators

So many researches on AI-driven learning tools for educators determined the role of Intelligent Systems in promoting the effectiveness of pedagogical practices by examining different Artificial Intelligence (AI) powered tools as well as platforms for supporting teachers in their instructional practices (Long & Magerko, 2020). According to Ng et al. (2021) AI-powered learning analytics aid teachers to determine areas where students needs academic and emotional support. Furthermore, some studies examined the use of AI-powered tools to enhance professional development programme of teachers. According to Offor et al. (2024) these tools help teachers' resources and personalized recommendations which are useful for supporting professional development programme of teachers. It is clear that teachers have showed the effects of Intelligent Systems to enhance teaching-learning process and it is through Artificial Intelligence (AI) technologies that teachers create personalized and personalized learning experiences which improves academic performance of students.

Research Gaps in AI's role in Improving Digital Literacy

Regarding the research gap, there is need for more researches to be carried out to find out the long effects of Artificial Intelligence (AI) technologies for enhancing digital literacy and academic performance of students. Although many studies have shown the positive effects of Artificial Intelligence (AI) in digital literacy, a more longitudinal and rigorous researches needs to be carried out to understand in detail its potential effects. Differently stated there is need to carry out an experimental study on how Artificial Intelligence (AI) technologies enhances digital literacy among future teachers as most of the related studies reviewed were not experimental studies. This will go a long way to provide a deeper understanding regarding how Artificial Intelligence (AI) improves digital literacy skills and competences more particularly among future teachers; hence, the need for the study.

3. Methodology

The research approach for the study is quantitative because it adopted pre-test/post-test control group design which helped the researcher to determine and compare the results of the control group and experimental group. The sample size of the study was 50 participants which was made up of future teachers from Nnamdi Azikiwe University, Awka, Anambra State, Nigeria. They had prior experience with AI technologies. The age categories of the study participants was 20-22 years old who were randomly assigned to either experimental group or the control group. To carry out this study effectively, AI-powered intervention was

received by the experimental group while traditional teaching method was received by the control group. The experimental group participated in AI literacy workshops which trained them on how to use AI tools for lesson planning, content creation and student assessment. After the workshops, participants were instructed to create AI-driven educational games. To determine baseline AI literacy levels, a digital literacy assessment was administered as pretest to participants in the two groups. After the intervention, a post-test was administered at the end of the intervention using the same assessment and the researcher compared the results of the two groups to determine whether artificial Intelligence (AI) technologies is a means of enhancing digital literacy of future teachers. Also, questionnaire was used to collected data on respondents' perception of AI technologies and their impact on digital literacy. In addition, t-test was used by the researcher to compare the test scores of the experimental group and the control group and concrete conclusions were made in accordance with the outcome of the study.

4. RESULTS

This section presents the data analysed for clarity purpose.

Table 1. Comparison of pre-experimental and pre-control group results.

Group	Average score (before)	Average score (after)	Standard deviation (before)	Standard deviation (after)
Experimental	25	85	10	14
Control	25	72	10	16

Table 1 shows that participants in the experimental group had significant higher mean score than students in the control group.

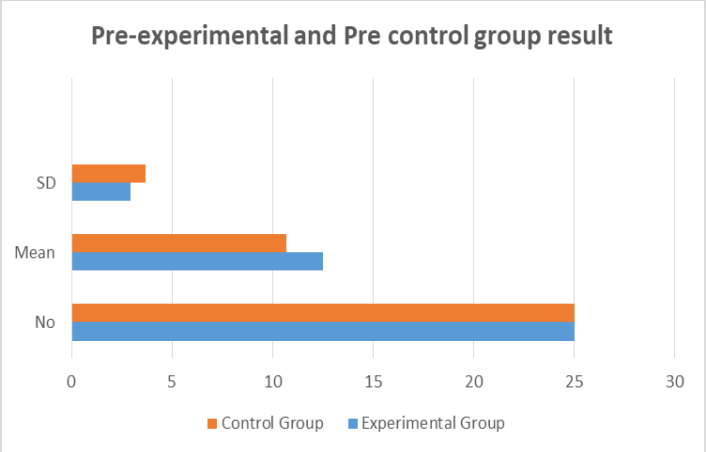

Figure 1: Average score and standard deviation of pre-experimental and post-experimental group.

Table 2. t-test Analysis on Mean Scores of the impact of Artificial Intelligence (AI) technologies on the digital literacy skills of future teachers.

Variable	No	Mean	SD	t-value	df	Sig. (2-tailed)	α-level	R
Experimental Group	25	12.52	2.95	1.95	48	.057	0.05	Not significant
Control Group	25	10.68	3.69					

Table 2 shows that students in the experimental group had a non-significant higher mean score than students in the control group.

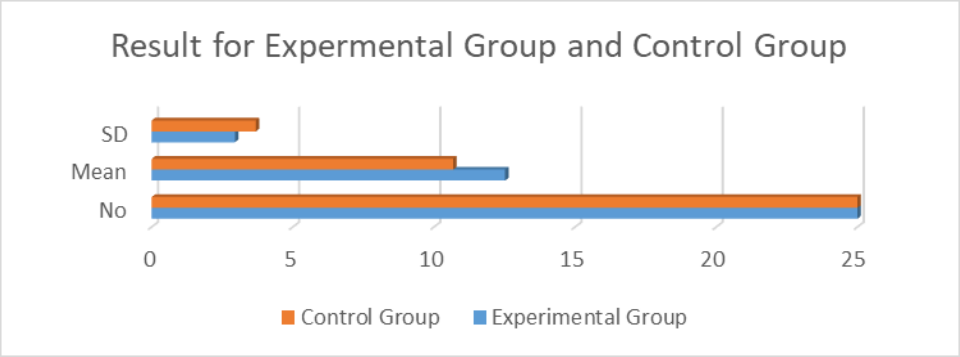

Figure 1: Experimental and control group result on the impact of Artificial Intelligence (AI) technologies on the digital literacy skills of future teachers.

Table 3: Perceptions of the Study Participants.

S/N	Questionnaire Items	Mean	Decision
	I use AI to generate essays with proper citation	3.12	Agreed
	I use AI-powered tools to acquire more knowledge	2.87	Agreed
	I interpret AI-generated content.	2.77	Agreed
	I use AI gain insights for their assignments.	2.96	Agreed
	I do not rely too heavily on AI.	3.09	Agreed
	I use AI-powered tools to acquire relevant information	3.14	Agreed
	I use AI for group work.	2.66	Agreed
	I use AI in research	2.71	Agreed
	I do not use AI to generate fake academic certificates	2.71	Agreed
	I use AI in a good way	2.56	Agreed

Data in Table 3 reveal that respondents in the experimental group had a positive perception regarding the use of Artificial Intelligence (AI) technologies in enhancing their digital literacy

Based on the data analysed, it was deduced that:

1. Artificial Intelligence (AI) literacy level among future teachers is high.

2. Artificial Intelligence (AI) technologies enhances the digital literacy skills of future teachers.
3. Future teachers have positive perception regarding the use of Artificial Intelligence (AI) technologies in enhancing their digital literacy.

DISCUSSION

The study showed that the literacy rate of artificial intelligence is high among future teachers which implies that future teachers are equipped with the knowledge and skills for utilizing Artificial Intelligence in their pedagogical practices. This trend means that there is effective use of digital technologies in modern education. Regarding the pattern, there is emphasis on the development of digital literacy skills which is very important for teachers to utilize artificial intelligence technologies. Moreso, artificial intelligence technologies have the capacity to enhance pedagogical practices as well as the need for teachers to continue with their professional training and development. A potential gap however exist in the use of artificial intelligence literacy, this is because future teachers are more likely to encounter difficulties in using artificial intelligence technologies during their teaching practice exercise. This findings are consistent with the findings by Cope et al. (2021) who posited that there is a positive significant correlation between artificial intelligence literacy and self –efficacy of teachers which means that artificial intelligence literacy levels make teachers to develop more confidence in their teaching practice exercises. In addition, this findings are similar to the findings by Offor et al. (2024) who reported that future teachers with ICT knowledge perform better in their teaching practice because of their high artificial intelligence literacy level.

The second findings of the study reviewed that artificial intelligence technologies have the capacity to enhance future teachers' digital literacy skills which is a growing trend in the context of education. This is because the integration of artificial intelligence technologies into teaching practices is increasing on daily basis and can go a long way to aid teachers improve their digital literacy skills, the use of Artificial Intelligence technologies therefore enhances personalized learning experience, encourage digital citizenship and facilitates collaboration. Recurring themes was used to deduce that the use of artificial intelligence Technologies by future teachers will improve teaching- learning effectiveness and as well improve academic performance of students. However, there is still gap in knowledge regarding the use of experimental design to conduct related studies, to support these findings, DeCoito and Estaiteyeh (2022) agreed that integrating Intelligent Systems in pedagogical practices

improves digital literacy of teachers. Similarly, Huang (2021) supported that artificial intelligence powered tools promotes pedagogical skills and digital literacy among teachers in educational institutions. It is therefore interesting to ascertain that artificial intelligence technologies have the capacity to enhance the digital literacy skills of future teachers. It was deduced from the findings of the study that the perception of future teachers regarding the use of artificial intelligence technologies was positive, which implies that artificial intelligence technologies were accepted by them to improve their digital literacy skills. This finding is attributed to the increase recognition and acceptance of the use of artificial intelligence in promoting teaching-learning effectiveness. However the potential biases, limitations and ethics to the use of artificial intelligence in modern education are yet to be addressed. The findings are in accordance with the findings by DeCoito and Estaiteyeh (2022) that both teachers and students attitudes for the integration of artificial intelligence technologies were positive and as well teachers make use of artificial intelligence powered tools in enhancing pedagogical practices. Similarly, Cope et al. (2021) agreed that teachers believe that their digital literacy skills as well as effective teaching could be enhanced through the use of artificial intelligence technologies.

Implications for Teacher Education

The finding of the study have important implications for teacher education, the findings therefore imply that artificial intelligence technologies as well as digital literacy skills should be integrated into teachers training programs. Through this, the ability of pre-service teachers will be developed in a way and manner that they can make use of artificial intelligence powered tools, promote critical thinking and reduce limitations and biases that may suffice in their pedagogical practices.

The Meaning of Result

The meaning of the study findings are very clear, it indicates that:

1. Artificial intelligence literacy was high among future teachers.
2. The digital literacy skills of future teachers can be improved through artificial intelligence technologies.
3. The opinion of future teachers on the use of Artificial intelligence technologies towards improving their digital literacy competencies were positive.

Practical Implications of the Review Technologies and Methods

The technologies and methods reviewed in the study have practical implications to educators as well as future teachers in teacher training programs. The findings of the study therefore

implies that teacher training programs should incorporate artificial intelligence technologies as well as digital literacy in preparing future teachers for pedagogical practices by so doing, teachers will learn how artificial intelligence technologies in their teaching practices. The point being stressed is that the integration of artificial intelligence technologies into teacher education program will certainly enhance digital literacy of future teachers.

Limitations of the Research

There were several limitations encountered in the course of this research, the first point to note is the issue of sample size as well as demographic variables of the respondents, because they may not really be a fair representation of future teachers. Hence, the sample size limits the generalizability of the result. Secondly the study used self-reported data which are subject to limitations and biases.

5. CONCLUSION

It was deduced from the analysis that the AI literacy level of future teachers was high which shows that they were familiar and competent with the use of AI technologies. The study showed that AI technologies have the capacity to enhance the digital literacy skills of future teachers because it equips them the necessary skills for teaching and learning. The future teachers showed a positive attitude towards the use of AI technologies. They believe that AI technologies would significantly enhance their digital literacy skills. This optimism shows the potential for AI to play a transformative role in teacher education by preparing future teachers to overcome the challenges of modern classrooms and utilize technology to enhance student learning. This led to the conclusion that the integration of AI in modern education has a significant positive impact on the development of digital literacy skills among teachers in training. Hence, embracing AI technologies empower teachers to better prepare students for the challenges of the digital age. Therefore, it is imperative for educational institutions and policymakers to prioritize the integration of AI in teacher education programs to ensure that future teachers are equipped with the necessary skills and knowledge to thrive in a rapidly changing world.

RECOMMENDATIONS

Based on the foregoing**,** the following recommendations were made:

1. There is need for teacher education institution to implement the use of artificial intelligence technologies in their training programs. This will enhance artificial intelligence

literacy among pre-service teachers as they will focus on artificial intelligence applications and bases.

2. Instructional designers must implement the use of artificial intelligence powered tools into teacher education curriculum. This will help future teachers to acquire hands-on learning experience with artificial intelligence facilitated teaching-learning process.

3. School administrators, teachers and government should work collectively in providing opportunities for future teachers to implement artificial intelligence tools in their pedagogical practices.

Directions for Future Research and Investigations

The researcher however suggest that other studies be carried out in the following areas.

1. Perceived Impact of the use of Artificial Intelligence Technologies on Enhancing Academic Performance of Students

2. Same topic should be carried out using sample size.

REFERENCES

1. Cope, B., Kalantzis, M., & Searsmith, D. (2021). Artificial Intelligence for education: Knowledge and its assessment in AI-enabled learning ecologies. *Educational Philosophy and Theory*, 53, 1229–1245. https://doi/10.1080/00131857.2020.1777937
2. De Cremer, D., & Kasparov, G. (2022). The ethical AI—Paradox: Why better technology needs more and not less human responsibility. *AI Ethics*, 2, 1–4. https://doi/10.1007/s43681-021-00128-6
3. DeCoito, I., & Estaiteyeh, M. (2022). Transitioning to online teaching during the COVID-19 pandemic: An exploration of STEM teachers' views, successes, and challenges. *Journal of Science Education and Technology*, 31, 340–356. https://doi/10.1007/s10956-022-09957-2
4. Estevez, J., Garate, G., & Graña, M. (2019). Gentle introduction to Artificial Intelligence for high-school students using scratch. *IEEE Access*, 7, 179027–179036. https://doi/10.1109/ACCESS.2019.2958466
5. Gialamas, V., Nikolopoulou, K., & Koutromanos, G. (2013). Student teachers' perceptions abossssut the impact of internet usage on their learning and jobs. Computers & Education, 62, 1–7. https://doi/0.1016/j.compedu.2012.10.021
6. Holmes, W., Porayska-Pomsta, K., Holstein, K., Sutherland, E., Baker, T., Shum, S. B., Santos, O. C., Rodrigo, M. T., Cukurova, M., Bittencourt, I. I., & Koedinger, K. R. (2022). Ethics of AI in education: Towards a community-wide framework.

International Journal of Artificial Intelligence in Education, 32, 504–526. https://doi/10.1007/s40593-022-00316-5

7. How, M. L., Cheah, S. M., & Khor, A. C. (2020). Artificial Intelligence-enhanced predictive insights for advancing financial inclusion: A human-centric AI-thinking approach. Big Data and Cognitive Computing, 4, 8. https://doi/10.3390/bdcc4020008
8. Huang, X. (2021). Aims for cultivating students' key competencies based on Artificial Intelligence education in China. *Educational Information Technology*, 26, 5127–5147. https://doi/10.1007/s10639-021-10544-3
9. Johnson, J. (2019). Artificial Intelligence & future warfare: Implications for international security. *Defense & Security Analysis*, 35, 147–169. https://doi/10.1080/14751798.2019.1565361
10. Kong, S. C., Cheung, W. M. Y., & Zhang, G. (2021). Evaluation of an Artificial Intelligence literacy course for university students with diverse study backgrounds. Computers and Education: *Artificial Intelligence*, 2, 100026. https://doi/10.1016/j.caeai.2021.100026
11. Lee, H. S., & Lee, J. (2021). Applying Artificial Intelligence in physical education and future perspectives. *Sustainability*, 13, 351. https://doi.org/10.3390/su13010351
12. Lee, S., Ahn, H. Y., & Choi, H. S. (2022). Effects of ego-resiliency on interpersonal problems among nursing students: *The mediating effects of aggression. Healthcare*, 10(12), 2455. https://doi.org/10.3390/healthcare10122455
13. Long, D., & Magerko, B. (2020). What is AI literacy? Competencies and design considerations. *In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–16. https://doi10.1145/3313831.3376727
14. Ng, D. T. K., Leung, J. K. L., & Chu, S. K. W. (2021). AI literacy: Definition, teaching, evaluation and ethical issues. *Proceedings of the Association for Information Science and Technology*, 58, 504–509.
15. Offiah C. (2025). Impact of 2025 insurgency on students' enrollment and educational infrastructure in public universities in northern Nigeria: Implications for national development. *International Journal Advanced Research Publications (IJARP).* 1(2), 1-15 https://doi-doi.org/101555/ijrpa.185
16. Offor U I., Nwaru P. & Offiah C. (2024) Challenges of artificial intelligence on Academic performance of undergraduates students in public universities in Anambra state: *African journal of educational management, teaching and Entrepreneurship studies*. 8 (5), 1555-1565 https://ajemates.org/index.php/ajemates/article/view/483