

TEACHERS' AWARENESS AND UTILIZATION OF GENERATIVE AI TOOLS IN BASIC EDUCATION IN OTUKPO LOCAL GOVERNMENT AREA OF BENUE STATE

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Abstract

The study investigated teachers' awareness and utilization of Generative Artificial Intelligence (Gen-AI) tools in basic education within Otukpo Local Government Area (LGA), Benue State, Nigeria. With the global rise in educational applications of Gen-AI, such as ChatGPT, Canva AI, and Microsoft Copilot, there is a growing need to assess how these technologies are understood and used in local teaching contexts. The study adopted a descriptive survey design. A stratified random sample of 120 teachers from public and private basic schools participated in the study. Data were collected using a validated questionnaire and analysed using descriptive and inferential statistics. The findings revealed a moderate level of awareness of Gen-AI tools among teachers (Grand Mean = 2.87, SD = 0.81), with ChatGPT recording the highest level of awareness (Mean = 3.12, SD = 0.74). However, teachers' utilization of Gen-AI tools in instructional practices was low (Grand Mean = 2.21, SD = 0.78). The major factors influencing awareness and utilization included teachers' ICT knowledge (Mean = 3.21), availability of internet and computers (Mean = 3.04), administrative support (Mean = 3.16), training and workshops (Mean = 3.26), and teachers' positive attitude toward technology (Mean = 3.19).

A significant positive relationship was found between teachers' awareness and utilization of Gen-AI tools ($r = 0.62$, $p < 0.001$). Furthermore, a significant difference existed between urban and rural teachers in the utilization of Gen-AI tools ($t = 3.41$, $p = 0.001$), with urban teachers (Mean = 2.48, SD = 0.69) reporting higher utilization than rural teachers (Mean = 1.94, SD = 0.71).

The study concludes that while some teachers are aware of Gen-AI, poor teachers' ICT knowledge and infrastructural challenges hinder effective usage. It recommends teachers' training and improved in digital infrastructure, to create teachers' awareness and utilization of Gen-AI tools in basic education in Otukpo LGA.

Keywords: Generative AI, Teacher Awareness, Educational Technology, Basic Education

Introduction

The rapid advancement of digital technologies has continued to reshape educational systems across the globe. In recent years, one of the most transformative innovations in educational technology has been the emergence of Gen-AI. Gen-AI refers to artificial intelligence systems capable of producing original content such as text, images, audio, and code in response to user prompts. Tools such as ChatGPT, Canva (with AI features), and Microsoft Copilot are increasingly being adopted in educational settings worldwide to support lesson planning, content creation, assessment design, and personalized learning. The integration of such technologies signals a paradigm shift from traditional digital tools to intelligent systems capable of augmenting teaching and learning processes.

Holmes et al., (2019), noted that gen-AI has the potential to redefine instructional practices by supporting teachers in developing instructional materials, generating assessment

items, and providing differentiated learning resources. According to UNESCO (2023), artificial intelligence in education can enhance pedagogical innovation when teachers are adequately prepared and supported. However, the effective implementation of these technologies depends largely on teachers' awareness, digital competence, and willingness to integrate them into classroom practice. Without sufficient awareness and training, the benefits of AI tools may remain under-utilized, particularly in developing educational contexts. Following, the public release of ChatGPT in late 2022. Within months, it attracted millions of users' worldwide and sparked extensive debate about its implications for education (Dwivedi et al., 2023, p. 3). At the same time, concerns have been raised regarding issues of academic integrity, data privacy, ethical usage, and overreliance on automated systems (UNESCO, 2023, p. 12). These contrasting perspectives highlight the need to examine how teachers perceive and utilize such tools in their specific educational contexts.

In Nigeria, digital transformation in education has been uneven due to infrastructural, economic, and policy constraints. Although the National Policy on Education emphasizes the integration of information and communication technology (ICT) at all levels of education. Basic education, which forms the foundation for lifelong learning and national development, requires innovative strategies to enhance teaching effectiveness and learner engagement. Gen-AI tools, when appropriately integrated, could provide effective support for teachers by assisting with curriculum alignment, instructional material development, and learner feedback.

Despite these positive impacts, incorporating advanced technologies in Nigerian basic schools often faces significant barriers. Moreover, teachers' attitudes toward emerging technologies are influenced by their level of exposure, years of experience, and institutional support systems.

Furthermore, gen-AI has introduced new professional responsibilities for teachers, including critical evaluation of AI-generated content, ethical considerations in classroom use, and guiding students in responsible AI engagement. Without adequate awareness and training, teachers may either underutilize these tools or use them in ways that do not align with pedagogical best practices. As Dwivedi et al. (2023) observed the rapid diffusion of generative AI demands proactive institutional responses to ensure effective and ethical adoption. Within the context of Otukpo LGA, where educational resources may vary significantly between urban and rural schools, examining teachers' awareness and utilization of Gen-AI tools is both timely and necessary. Understanding the extent to which teachers recognize and apply tools like ChatGPT, Canva AI, and Microsoft Copilot will provide valuable insights into capacity gaps and infrastructural needs. This study also seeks to explore teachers' awareness and utilization of Gen-AI tools in Otukpo LGA. By examining the relationship between teaching experience, school location, and technology usage, the study contributes to ongoing discussions on digital innovation, teacher preparedness, and sustainable educational development in Nigeria.

TAM developed by Davis (1989), it posits that an individual's intention to adopt a technology is determined mainly by perceived usefulness and perceived ease of use (Davis, 1989). Perceived usefulness refers to the belief that a technology improves job performance, while perceived ease of use relates to the extent to which the technology is easy to learn and operate. In this study, teachers who perceive Gen-AI tools such as ChatGPT, Canva AI, and Microsoft Copilot as useful and easy to use for lesson planning, instructional material development, classroom instruction, and assessment are more likely to integrate them into their teaching.

The assumptions of TAM directly support this study. Teachers' awareness of Gen-AI tools is essential for developing favourable perceptions toward the technology, while their utilization depends largely on their beliefs about its usefulness and ease of use. Similarly, the Hypotheses examining the relationship between teachers' awareness and utilization is grounded in TAM's proposition that greater awareness and positive perceptions encourage technology acceptance and actual use.

Technological Pedagogical Content Knowledge

Technological Pedagogical Content Knowledge (TPACK) Framework proposed by Mishra and Koehler (2006), argues that effective technology integration requires the combination of technological knowledge, pedagogical knowledge, and content knowledge. Teachers must not only understand AI tools but also know how to integrate them appropriately into teaching and learning. Within the context of Gen-AI, teachers require the skills to use these technologies for lesson planning, classroom instruction, learner engagement, and assessment.

It also explains the factors influencing teachers' awareness and utilization of Gen-AI tools. Teachers' technological competence, professional training, pedagogical preparedness, and their ability to integrate AI effectively into classroom practice. It further provides a basis for explaining possible differences between urban and rural teachers, as disparities in access to ICT facilities, professional development opportunities.

Collectively, TAM, the TPACK framework, provides a strong theoretical foundation for this study. TAM explains teachers' acceptance and adoption of Gen-AI technologies, while TPACK emphasizes the knowledge and competencies required for effective classroom integration. These theories justify the study's investigation of teachers' awareness,

utilization, and the factors influencing the adoption of Gen-AI tools in basic education, as well as the relationship between awareness and utilization and the differences in utilization between urban and rural teachers.

Statement of the Problem

The emergence of Gen-AI tools such as ChatGPT, Canva (AI features), and Microsoft Copilot has introduced new possibilities for improving teaching and learning processes across educational levels. Globally, these tools are being utilized to support lesson planning, generate instructional materials, create assessment items, and provide personalized learning experiences. In many developed educational systems, teachers are increasingly incorporating Gen-AI into classroom practice to enhance productivity and instructional effectiveness. However, the extent to which such innovations are understood and applied in Nigerian basic education particularly in semi-urban and rural settings remains unclear.

In Nigeria, the integration of educational technology at the basic education level continues to face significant challenges, including inadequate infrastructure, limited internet connectivity, and insufficient professional development opportunities. While discussions about artificial intelligence in education are gaining momentum globally, many Nigerian teachers may not have adequate awareness of Gen-AI tools or the pedagogical knowledge required to integrate them effectively. Even when awareness exists, practical utilization may be constrained by contextual realities such as unreliable electricity supply, lack of digital devices, and insufficient institutional support.

Schools within Otukpo LGA vary considerably in terms of access to digital resources, teacher training opportunities, and technological infrastructure. Urban schools may have relatively better access to digital tools compared to rural

schools, potentially creating disparities in exposure to and utilization of innovative technologies like Gen-AI. Furthermore, teachers' years of experience, digital literacy levels, and attitudes toward technology may influence their readiness to adopt such tools.

The core problem addressed by this study is the uncertainty surrounding the level of awareness and the ways of utilization of Gen-AI tools among basic education teachers in both rural and urban areas of Otukpo LGA, as well as the factors influencing their adoption. Investigating this issue is essential to understanding existing gaps, informing professional development initiatives, and ensuring that the integration of Gen-AI in Nigerian basic education is both equitable and pedagogically sound.

Objectives of the Study

This study seeks to identify teachers' awareness and utilization of Gen-AI tools in Basic Education in Otukpo LGA of Benue State, Nigeria.

Specifically, the study aims to;

- a) determine the level of awareness of Gen-AI tools among teachers in public and private basic schools.
- b) examine teachers utilization of Gen-AI tools such as ChatGPT, Canva (AI features), and Microsoft Copilot in their instructional practices.
- c) Identify factors influencing teachers' awareness and usage of Gen-AI tools.

Research Question

The study was guided by the following research questions:

- 1) What is the level of teachers' awareness of Gen-AI tools in basic education in Otukpo LGA?
- 2) To what extent do teachers utilize Gen-AI tools in their instructional practices?

- 3) What factors influence teachers' awareness and utilization of Gen-AI tools in basic schools in Otukpo LGA?

Hypotheses

The following null hypotheses (H_0) were tested at 0.05 level of significance:

H₀₁: There is no significant relationship between teachers' level of awareness and their extend of utilization of Generative AI tools in basic education in Otukpo LGA.

H₀₂: There is no significant difference in the level of utilization of Gen-AI tools between teachers in urban and rural basic schools in Otukpo LGA.

Methodology

This study adopted a descriptive survey research design. The design was considered appropriate because it enabled the researcher to obtain data from a representative sample of teachers and describe their level of awareness and utilization of Gen-AI tools without manipulating any variables. Otukpo LGA comprises both urban and rural communities with public and private basic schools, making it suitable for examining possible differences in teachers' awareness and utilization resulting from variations in access to digital resources and professional development opportunities.

The target population consisted of teachers in public and private basic schools in Otukpo LGA. A sample of 120 teachers was selected using a stratified random sampling technique to ensure adequate representation based on school ownership (public/private) and location (urban/rural). The adequacy of the sample size was supported through an a priori power analysis conducted using conventional assumptions for social science research. Assuming a medium effect size ($r = 0.30$; Cohen's effect size), a significance level (α) of 0.05, and a desired statistical power of 0.80, a minimum sample of approximately 84 respondents was required for the planned

correlation analysis. Therefore, the final sample of 120 teachers exceeded the minimum requirement, providing adequate statistical power for detecting meaningful relationships. In addition, the sample size provided an acceptable margin of error of approximately $\pm 9\%$ at the 95% confidence level, which was considered adequate for this descriptive survey.

Data were collected using a structured questionnaire titled Teachers' Awareness and Utilization of Generative Artificial Intelligence Questionnaire (TAUGAIQ). The instrument consisted of Section A, which obtained respondents' demographic information, and Section B, which contained 30 Likert-scale items measuring teachers' awareness of Gen-AI tools, utilization of Gen-AI tools, and factors influencing their utilization. Responses were rated on a four-point scale ranging from Strongly Agree () to Strongly Disagree (). A criterion mean of 2.50 served as the decision point, with mean scores of 2.50 and above indicating moderate or high awareness/utilization and scores below 2.50 indicating low awareness/utilization.

The study variables were operationalized through the questionnaire. Teachers' awareness was measured by their familiarity with the existence and educational applications of Gen-AI tools, while utilization was assessed based on the extent to which they employed these tools for lesson planning, instructional delivery, assessment preparation, and instructional material development.

The instrument was subjected to face and content validation by two experts in Educational Technology and one expert in Measurement and Evaluation. Their suggestions improved the clarity, relevance, and organization of the questionnaire items. A pilot study involving 20 teachers from five basic schools in Ogbadibo LGA, which shares similar characteristics with the

study area, was conducted to refine the instrument. Based on the feedback, minor revisions were made to improve item clarity and simplify technical terms. The pilot participants were excluded from the main study.

The reliability of the instrument was established using Cronbach's Alpha. Reliability coefficients of 0.86 for the Awareness subscale, 0.88 for the Utilization subscale, and 0.82 for the Factors Influencing Utilization subscale were obtained, with an overall reliability coefficient of 0.85, indicating good internal consistency.

Data collection was conducted over a four-week period. Questionnaire was administered with the help of two trained research assistants. The assistants received orientation on the objectives of the study, questionnaire administration procedures, ethical considerations, informed consent, and confidentiality. No incentives were provided. A total of 120 questionnaires were distributed, while 116 were correctly completed and returned, representing a 96.7% response rate. Only properly completed questionnaires were used for analysis.

Ethical approval for the study was obtained from the Research Ethics Committee of the Federal College of Education, Oduibo. Permission was also obtained from the relevant school authorities before data collection commenced. Participants were informed about the purpose of the study, assured of the confidentiality and anonymity of their responses, and informed that participation was voluntary and that they could withdraw at any stage without any consequences.

Research question one and two were answered using mean and standard deviation, while research question three was addressed descriptively using scores to identify factors with

Teachers' awareness and utilization of Gen AI tools. The collected data were analysed using both descriptive and inferential statistics. Mean and standard deviation were used to answer the research questions, while Pearson Product-Moment Correlation and the independent-samples t-test were used to test the hypotheses at the 0.05 level of significance. Decisions on the hypotheses were based on the calculated p-values in relation to the chosen level of significance.

Results

Demographic Characteristics of Respondents

Table 1: Demographic Characteristics of the Respondents (N = 116)

Variable	Category	Frequency	Percentage %
Gender	Male	47	40.5
	Female	69	59.4
Age	20 – 29 yrs	24	20.6
	30 – 39 yrs	42	36.2
	40 -49 yrs	31	26.7
	50 yrs and above	19	16.3
Teaching Experience	Less than 5 yrs	18	15.5
	5 – 10 years	39	33.6
	11 – 15 years	30	25.8
	16 yrs and above	29	25
School ownership	Public	68	58.6
	Private	48	41.3
School location	Urban	58	50
	Rural	58	50

Source: Field survey 2025

Table 1 show that female teachers (59.5%) constituted the majority of the respondents, while male teachers accounted for 40.5%. Most respondents (36.2%) were between 30 and 39 years of age, suggesting that the sample largely consisted of teachers in their active professional years. In terms of teaching experience, 33.6% had taught for 5–10 years, indicating that many respondents possessed sufficient classroom experience to provide informed opinions regarding Gen-AI tools. Public school teachers represented 58.6% of the respondents, while private school teachers accounted for 41.4%. Equal representation was achieved between urban and rural schools (50.0% each), supporting meaningful comparison based on school location.

Research Question One

What is the level of teachers' awareness of Generative Artificial Intelligence (Gen-AI) tools?

Table 2: Teachers' Awareness of Generative AI Tools (N = 116)

Gen-AI tool	Mean	SD	95% CI	Decision
ChatGPT	3.12	0.74	2.98-3.26	High awareness
Canva AI	2.95	0.81	2.80-3.10	Moderate awareness
Microsoft Copilot	2.54	0.88	2.38-2.70	Moderate awareness
Grand Mean	2.87	0.81	2.74-3.00	Moderate awareness

Source: Field survey 2025

The Grand mean of 2.87 (SD = 0.81, 95% CI [2.74, 3.00]) indicates that teachers demonstrated a moderate level of awareness of Gen-AI tools. ChatGPT recorded the highest awareness (M = 3.12, SD = 0.74), suggesting that it is the most familiar AI application among respondents. Canva AI also recorded relatively high awareness, while Microsoft

Copilot was the least recognized. The standard deviations ranging from 0.74 to 0.88 indicate moderate variability in respondents' awareness levels. The relatively lower standard deviation for ChatGPT suggests greater consistency in teachers' awareness, whereas the higher standard deviation for Microsoft Copilot indicates greater differences in respondents' familiarity with that tool.

Research Question Two

To what extent do teachers utilize Generative AI tools in instructional practice?

Table 3: Teachers' Utilization of Generative AI Tools (N = 116)

Area of utilization	Mean	SD	95% CI	Decision
Lesson planning	2.34	0.79	2.20-2.48	Low
Instructional material development	2.28	0.83	2.13-2.243	Low
Assessment Preparation	2.15	0.76	2.01-2.29	Low
Classroom Delivery Support	2.07	0.72	1.94-2.20	Low
Grand Mean	2.21	0.78	2.09-2.33	Low utilization

Source: Field survey 2025

The overall utilization of Generative AI tools was low (M = 2.21, SD = 0.78, 95% CI [2.09, 2.33]). Lesson planning recorded the highest utilization, although its mean remained below the decision benchmark of 2.50. Classroom delivery support recorded the lowest utilization. The relatively moderate standard deviations (0.72–0.83) indicate that teacher' responses were fairly similar, suggesting that low utilization was a common pattern among respondents.

Research Question Three

What factors are associated with teachers' awareness and utilization of Generative AI tools?

Table 4: Factors Associated with Teachers' Awareness and Utilization of Gen-AI Tools (N = 116)

Factors	Mean	SD	95%CI	Decision
ICT Knowledge	3.21	0.69	3.08-3.34	Agree
Internet and Computer Availability	3.04	0.73	2.91-3.17	Agree
Administrative Support	3.16	0.71	3.03-3.29	Agree
Training and Workshops	3.26	0.66	1.14-3.38	Agree
Positive Attitude toward Technology	3.19	0.70	3.06-3.32	Agree
Grand Mean	3.17	0.70	3.05-3.29	Agree

Source: Field survey 2025

Teachers agreed that ICT competence, training opportunities, administrative support, internet availability, and positive attitudes toward technology were associated with awareness and utilization of Generative AI tools. Training and workshops recorded the highest mean score ($M = 3.26$), indicating that respondents considered professional development the most important factor influencing utilization. The relatively low standard deviations demonstrate a high degree of agreement among respondents.

Test of Hypotheses

Hypothesis One

H₀₁: There is no significant relationship between teachers' awareness and utilization of Generative AI tools.

Table 5: Pearson Product Moment Correlation between Awareness and Utilization (N = 116)

Variables	R	95% CI	P
Awareness and utilization	.62	[.49, .72]	< .001

Source: Field survey 2025

A Pearson product moment correlation showed a significant positive relationship between teachers' awareness and utilization of Generative AI tools, $r(114) = .62$, $p < .001$, 95% CI [.49, .72]. Therefore, the null hypothesis was rejected.

Hypothesis Two

H₀₂: There is no significant difference between urban and rural teachers in their utilization of Generative AI tools.

Table 6: Independent-Samples t Test Comparing Utilization by School Location

Location	N	Mean	SD			
Urban	58	2.48	0.69			
Rural	58	1.94	0.71			
T	Df	P	Cohen's d	Mean Difference	95% CI	
3.41	114	< .001	0.77	0.54	[0.23, 0.85]	

Source: Field survey 2025

The independent-samples t test revealed a statistically significant difference in utilization between teachers in urban and rural schools, $t(114) = 3.41$, $p < .001$, Cohen's $d = 0.77$, indicating a moderate to large effect size. Urban teachers reported significantly higher utilization of Generative AI tools than their rural counterparts. Accordingly, the null hypothesis was rejected.

Discussion of the Findings

The study revealed that basic school teachers in Otukpo LGA possess a moderate level of awareness of Gen-AI tools, with ChatGPT being the most recognized, followed by Canva AI and Microsoft Copilot. Although teachers are generally aware of these technologies, this awareness has not translated into widespread classroom use. This finding supports TAM by Davis (1989), which explains that technology adoption depends on perceived usefulness and ease of use. While teachers recognize the educational value of Gen-AI tools, inadequate digital competence, institutional support, and infrastructure continue to hinder effective utilization.

The study further identified ICT competence, training opportunities, internet availability, administrative support, and positive attitudes toward technology as key factors influencing teachers' awareness and utilization of Gen-AI tools. Training and workshops emerged as the most influential factor, reinforcing the TAM assumption that improving users' competence enhances technology acceptance.

Furthermore, the study established a significant positive relationship between teachers' awareness and utilization of Gen-AI tools, indicating that increased awareness enhances the likelihood of classroom adoption. However, utilization remains constrained by poor internet connectivity, unstable electricity supply, limited access to digital devices, and inadequate technical support. The study also found a significant difference between urban and rural teachers, with urban teachers reporting higher utilization due to better access to digital infrastructure and professional development opportunities. This urban-rural disparity highlights the need for government investment in rural ICT infrastructure, reliable internet connectivity, equitable distribution of digital resources, and continuous teacher training to promote

inclusive and effective integration of Gen-AI in basic education.

Conclusion

The findings showed that teachers possess a moderate level of awareness of Gen-AI tools, particularly ChatGPT, Canva AI, and Microsoft Copilot, but their classroom utilization remains low. Although awareness was relatively high (Grand mean = 2.87), utilization was considerably lower (Grand mean = 2.21), indicating that awareness has not translated into effective instructional practice. About half of the teachers reported using Gen-AI tools to some extent, while many rarely or never integrated them into lesson planning, instructional material development, classroom delivery, or assessment.

The study further established a significant positive relationship between teachers' awareness and utilization of Gen-AI tools, suggesting that increased awareness can enhance adoption. However, the findings indicate that awareness alone is insufficient, as inadequate ICT competence, poor internet connectivity, and unreliable electricity supply, limited access to digital devices and inadequate professional development continue to restrict effective classroom implementation. In addition, the study revealed a significant difference between urban and rural teachers, with urban teachers demonstrating greater utilization of Gen-AI tools, highlighting the persistent digital divide within the Nigerian basic education system.

The findings underscore the need for coordinated efforts by government, policymakers, school administrators, and teachers to promote effective AI integration in education. Investment in digital infrastructure, reliable internet access, stable electricity, teacher training, and supportive institutional policies is essential for enhancing teachers' capacity to use Gen-AI tools effectively. Teachers should also engage in continuous professional development to strengthen their

digital competencies and embrace AI as a complementary instructional resource.

Overall, this study provides empirical evidence on the current state of Gen-AI awareness and utilization among basic school teachers in Otukpo LGA. It offers useful insights for educational planning, policy formulation, teacher professional development, and technology integration, emphasizing that the successful adoption of Gen-AI in Nigerian basic education requires sustained collaboration among all educational stakeholders.

Recommendations

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

1. Federal and State Ministries of Education, State Universal Basic Education Boards (SUBEB), Local Government Education Authorities, and teacher education institutions should organize regular capacity-building programmes on the educational applications of Generative Artificial Intelligence. Organize quarterly workshops, seminars, webinars, and practical hands-on training covering lesson planning, instructional material development, assessment design, ethical AI use, and classroom integration, within timeline of six months. Expected Outcome: Improved digital competence, increased confidence in AI utilization, and higher classroom adoption of Gen-AI tools
2. Government should prioritize the provision of modern ICT facilities in public basic schools, especially those located in rural communities, within the timeline of one to three years. Expected Outcome: Improved access to digital technologies and increased utilization of Gen-AI tools in teaching and learning.
3. Integration of Gen-AI into teacher education curriculum; Teacher education institutions should revise their curricula and introduce compulsory courses and practical sessions

on AI literacy, prompt engineering, digital ethics, and AI-supported instructional design. Expected Outcome: Newly qualified teachers will possess the knowledge and practical competencies required for AI-supported teaching.

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