



**An Assessment of the Role of Artificial Intelligence in Enhancing Teachers' Instructional Effectiveness in Obio/Akpor Local Government Area**

**Onyejieke, Josephine Nwadi mkpa**

[Josephine-onyejieke@uniport.edu.ng](mailto:Josephine-onyejieke@uniport.edu.ng)

**Department of Health Promotion, Environmental and Safety Education  
University of Port Harcourt  
07088319393**

**&**

**Prof. Emmanuel U. Asogwa**

[emmanuel.asogwa@uniport.edu.ng](mailto:emmanuel.asogwa@uniport.edu.ng)

**Department of Health Promotion, Environmental and Safety Education  
University of Port Harcourt  
08033264030**

**Abstract**

The study assessed the role of artificial intelligence in enhancing teachers' instructional effectiveness in Obio/Akpor Local Government Area. The study adopted a descriptive survey research design. Conducted in public senior secondary schools, the population of the study was 756 teachers in 28 public senior secondary schools in Obio/Akpor Local Government Area. A sample size of 262 respondents made up the study's sample size. However, only 259 respondents participated in the study. The simple random sample technique through balloting was employed to select the respondents. A self-structured questionnaire titled: Role of AI Questionnaire (RAIQ) was used for data collection. The instrument yielded a reliability index of 0.83 using the Cronbach Alpha Method. Data was analyzed using the mean and standard deviation. The findings of the study revealed that to a low extent, teachers use Artificial Intelligence tools to enhance instructional effectiveness in public senior secondary schools in Obio/Akpor Local Government Area. The Perceptions of teachers regarding the effectiveness of AI tools in enhancing instructional practices was positive. While Inadequate training, insufficient institutional support amongst others constituted the challenges associated with integration of artificial intelligence in enhancing teachers' instructional effectiveness. Based on the findings, the study recommended among others that government should provide schools with better access to AI-based teaching resources and technological infrastructure. Schools should have dedicated ICT support teams that can address technical issues promptly and provide teachers with adequate technical support to ensure that AI tools are used effectively and efficiently.

**Keywords:** *Artificial Intelligence, Instructional Effectiveness, Teachers, Education*

**Introduction**

In the contemporary educational landscape, the imperative for teachers' instructional effectiveness has never been more critical. The current education systems face diverse challenges in the twenty-first century including technological development and student diversity so teachers must fulfill responsibilities beyond content delivery. Through their work



teachers develop all three areas of student development: cognitive ability together with emotional intelligence and social competencies. A teacher demonstrates instructional effectiveness through their ability to present educational material while maintaining student engagement and adaptation and inclusion for all learners and placing students at the center of learning. Over the recent years, the usage of technological innovations, including Artificial Intelligence (AI), are introduced into the education setting and provide educators with chances to enhance the effectiveness of their teaching activities.

Globally, educational policymakers with administrators and researchers value teacher effectiveness because they recognize it as the main element for student achievement. When instruction is effective the academic growth of learners occurs while they develop critical thinking skills alongside creativity and emotional resilience which will benefit them after school. As such, the focus on improving instructional effectiveness is not merely about teacher performance it is a strategic approach to transforming education, fostering equity, and preparing future generations to thrive in an increasingly dynamic and interconnected world.

Instructional effectiveness describes how teachers use their abilities to lead student learning through experiences which engage diverse learners and react to individual learning requirements. The practice requires merging teacher expertise with content mastery and classroom control mechanisms together with assessment procedures to create instruction that benefits students. Effective teaching outcomes stem from a classroom teachers' ability to use teaching adaptations for various student learning approaches together with nurturing supportive classrooms and assessment methods to monitor educational progress. Research evidence shows that these competencies matter because Aina et al. (2015) report that effective teachers drive student learning by enforcing high standards and encouraging students to learn independently. With the advent of AI-based educational technologies, there is the need to see how teachers use these technologies to improve their teaching efficiency.

Instructional effectiveness of teachers incorporates multiple elements that represent superior teaching competencies. The competency to effectively deliver content, control classroom interactions and employ multiple teaching approaches combines with reflection for teaching improvement constitutes instructional effectiveness. Education demands that teachers maintain meaningful interaction with their students while creating suitable learning conditions because of this. Sehgal et al. (2017) established that instructional effectiveness receives positive support from teacher self-efficacy and leadership and collaboration so both personal traits and



organizational elements fuel successful teaching practices.

The relevance of instructional effectiveness to education cannot be overstated. The approach establishes the foundation for educational success which builds both educational results together with learners' attitudes and their complete time at school. According to some research findings, teacher effectiveness leads to better outcomes for students at their academic level. Oviawe (2016) underlines teacher productivity which describes their ability to apply suitable teaching methods as the key factor that determines positive learning outcomes. The professional development of educators significantly boosts their instructional competence because ongoing training gives teachers innovative teaching practices alongside modern content information (Duru-Uremadu, 2017).

The importance of instructional effectiveness extends to various stakeholders within the educational ecosystem. Students benefit from efficient teaching through improved academic performance alongside higher student engagement and better development of analytical capabilities. Parents benefit from knowing that their children are receiving quality education, which can lead to better future opportunities. Effective teachers achieve both professional advancement and job contentment because of their successful performance in their duties. School administrators and policymakers rely on instructional effectiveness as a metric for evaluating educational quality and implementing reforms. Nationwide development depends on well-educated workers resulting from effective teaching methods applied in the educational system.

Multiple scholars have determined how teachers' instructional effectiveness relates to diverse organizational and institutional factors. Researchers continually prove that teaching self-efficacy together with professional development and institutional support function as fundamental indicators of instructional effectiveness. The researchers note that teachers who demonstrate confidence about their teaching abilities achieve better student engagement while delivering enhanced learning results (Olanrewaju and Olanrewaju 2023). The literature by Sehgal et al. (2017) demonstrated that self-efficacy levels of teachers alongside their collaborative practices and the leadership qualities of their principals create beneficial impacts on instructional effectiveness. Similarly, Oviawe (2016) emphasized that teachers' productivity, defined by their capacity to employ appropriate methods and strategies, is crucial for delivering favorable learning outcomes. These studies underscore the dynamic nature of instructional effectiveness and the various elements that contribute to it.



However, a notable gap persists in understanding the role of Artificial Intelligence (AI) in this context, especially within specific locales like Obio/Akpor Local Government Area in Nigeria. Educational institutions now show rising interest in AI implementations for improving teaching and learning approaches in recent years. Artificial Intelligence has made available two key applications that deliver tailored instruction with instant feedback to students for better instructional delivery.

AI brings its most influential educational benefit through adaptive learning system development. Educational content gets adjusted through algorithmic processes to fit individual student requirements which enable personalized learning. Research indicates that adaptive learning can effectively address diverse learning styles and paces, leading to improved student outcomes (Onesi-Ozigagun & Uwadinobi, 2019). For instance, intelligent tutoring systems (ITS) have been shown to provide immediate, customized feedback, emulating the benefits of one-on-one instruction (Ma et al., 2014).

AI provides fundamental support in the processes of evaluating and delivering student feedback. Automated tools for essay scoring together with plagiarism detection systems, help faculty members to evaluate student work faster through objective analysis. These technologies both increase efficiency and deliver standardized feedback structures that fuel student advancement, according to Yuan et al. (2020) and Dawson et al. (2020). The analysis powered by AI assists teachers in understanding student learning patterns so they can change their teaching methods to deliver better learning results (Prieto et al., 2018). Onuh and Charles (2024) discovered that AI tools comprising smart content creation and AI-powered assessment systems prominently affected the teaching effectiveness of educators in Enugu State. These findings suggest that AI can serve as a valuable asset in augmenting traditional teaching methods. Although these new advantages have emerged, the perception of teachers concerning the viability of AI tools in improving instructional processes is a great concern that needs more research, especially within specific educational context

AI holds promising opportunities for educational institutions, but how these opportunities are adopted and applied differs from one geographical area to another. Obio/Akpor Local Government Area lacks research about the implementation of AI technologies in classroom teaching methods. Therefore research focusing on AI's role on instructional effectiveness needs to be specifically targeted at Obio/Akpor because current knowledge about the matter remains insufficient. Moreover, understanding the issues or problems which teachers encounter when



implementing the concept of artificial intelligence in the classroom setting is relevant in guaranteeing the successful implementation and use of these types of technologies in improving the effectiveness of instructions.

### **Statement of the Problem**

Artificial Intelligence (AI) has become a potential technological innovation that can enhance the process of instruction by providing personalized learning, automated evaluation, and feedback based on data. Globally, AI tools such as adaptive learning platforms, intelligent tutoring systems, and AI-powered assessment tools are transforming pedagogical approaches by enabling personalized learning experiences, real-time feedback, and data-driven instruction. Evidence from other parts of Nigeria suggests that AI can significantly bolster teachers' instructional delivery by facilitating smart content creation, enhancing assessment accuracy, evaluation and promoting efficient classroom management (Adigun & Okebukola, 2023; Oladapo, 2023).

Although several schools in Nigeria and Obio/Akpor Local Government Area have been identified as having these potentials, the use of AI technology in teaching practices is still under-utilized. Teachers might be not well informed, skilled or institutionalized to make effective use of AI technologies in the classroom. Moreover, there is minimal empirical research related to how far teachers use AI tools and their views on the efficiency of the specified technologies, as well as the barriers to their implementation. Therefore, this study investigates the role of artificial intelligence in enhancing teachers' instructional effectiveness in the area.

### **Literature Review**

#### **Artificial Intelligence (AI) in Education**

Education receives transformative effects from Artificial Intelligence (AI) which delivers modern solutions to boost educational operations and administrative functioning. The educational systems stand to undergo transformation through AI because it enables the deployment of advanced tools which benefit learning students while assisting teachers. The automated technique shows great promise through three major applications including personalized learning systems and intelligent tutoring systems along with automatic administration processes. Studies further indicate that AI-driven instructional strategies contribute significantly to improving classroom interaction and instructional effectiveness. Research has also found that AI-based instructional practices play an important role in



enhancing the classroom interaction and teaching effectiveness. As an example, Kehinde-Awoyele et al. (2024) found that AI-based educational procedures enhance the level of student engagement and generate better learning achievements in the context of the Nigerian teaching setting.

AI-powered personalized learning uses tailored educational material to meet the exclusive learning requirements of each student. Adaptive learning technologies together with real-time analytics enable students' performance tracking while monitoring their engagement. The effective analysis of extensive datasets by AI systems allows educators to discover learning deficiencies therefore, their proactive support leads to better academic results according to Holmes et al. (2021). Changing educational practices through machine learning and natural language processing allows students to receive instant comments and explanations in addition to adaptive assignments (Baker & Inventado, 2020). The technology supports learning comprehension through human tutor-like interactions which enable sustained education processes. In line with this viewpoint, Nna-Kue and Waghara (2024) stated that AI systems can be used to adjust the learning content to the varying student learning preferences, hence making the learning process more understandable and improving the learning overall.

Educational institutions benefit greatly from automated tasks enabled by AI because it reduces the workload experienced by instructors. AI-based tools achieve efficient administrative task management which includes assessing student work as well as managing class attendance and record organization. Educational systems with this feature enable teachers to spend their time on pedagogical practices together with student support activities according to Cukurova (2020). The routine automation in educational management functions to boost productivity and reduces human inaccuracies which results in improved management outcomes. In addition, Onuh and Charles (2024) highlighted that smart content creation and AI-powered assessment systems significantly enhance instructional effectiveness by enabling teachers to design interactive learning materials and evaluate student performance more efficiently.

AI education integration presents several hurdles for its implementation process. The main ethical dilemma arises from using AI technology. AI systems require careful oversight to resolve concerns about algorithmic bias together with data privacy and transparency matters in order to build trust within the technology solutions. The authors Siu and Leung (2020) emphasized the need to create ethical guidelines and frameworks that unite fairness with accountability standards for AI deployment. Regardless of these issues, Oladapo (2023) argued



that AI could be a valuable source of support among teachers and be carefully introduced into the Nigerian education system to enhance individual learning processes and enhance the delivery of instruction

Equitable access to AI-enhanced education faces a major obstacle because of the digital divide, which continues to persist as an important issue. The educational and socio-economic limitations of poorly funded institutions prevent them from achieving effective implementation of AI technology (Moorhouse, 2020). Educational opportunities, along with resulting outcomes, tend to expand further between advantaged and disadvantaged populations because of these inequalities. Adewale (2023) noted that lecturers as well as students had moderate mastery of AI-based tools, but their real exposure to the practical application of these technologies to teaching and learning processes was rather low, which reveals the gap between awareness and practical implementation of AI technology. Moreover, a number of infrastructural and institutional obstacles still present an impediment in the uptake of AI technologies in higher institutions in Nigeria. According to Adigun and Okebukola (2023), the presence of outdated equipment, the lack of proper network capacity, regular power outages, and similar factors are the obstacles to the successful implementation of the AI-based learning systems into the educational process in many universities.

Likewise, as Edinoh, Ogunbowale, and Onah (2025) pointed out, shortage of qualified professionals, overall digital illiteracy among teachers, and absence of digital infrastructure are more acute in the rural territories. They also observed that untrustworthy electricity supply, weak internet connection, and lack of digital equipment are significant obstacles to effective AI solution adoption in the learning institutions in Nigeria.

The development of AI requires continuous study regarding its future influence on educational opportunities for students and their educational achievements. Luckin et al. (2016) explain that understanding AI's operational dynamics enables educators, along with technologists and policy makers, to fully use AI advantages while controlling associated challenges. Thoughtful implementation alongside ethical measures will allow AI to become an effective driving force in educational transformation while supporting continuous learning.

### **Role of AI in Teaching and Learning**

The role of Artificial Intelligence (AI) in teaching and learning has gained urgent importance because it shows potential to change educational systems and teaching methods from primary levels to advanced education. AI-driven innovations transform teaching methods as well as



learning practices by developing educational spaces that deliver data-based, customized and effective learning. AI plays a major role in education through its capacity to generate personal learning experiences. AI technology uses data analysis to understand students' master learning speed and individual learning choices and develops their educational performance patterns. Educational content adjusts to suit individual learner needs thanks to machine learning based adaptive learning systems which utilize algorithms. Students facing difficulty with particular subjects will get specialized help that leads to their improved learning, while students demonstrating advanced knowledge receive advanced educational materials. The functionality of Intelligent Tutoring Systems (ITS) enables personalized instruction and immediate feedback in real-time, according to Baker and Inventado (2020) for maximizing student interest and academic results in diverse subjects.

The support AI provides extends beyond students to embrace an important function in educator assistance. The main benefit of AI lies in its ability to perform automated workloads for academic and administrative responsibilities. Through AI technology, educators gain the ability to automate their schoolwork including grading and attendance monitoring and class scheduling and this improves their availability for direct contact with students and educational strategy development. Steady student performance assessment through AI detection systems demonstrates learning gaps to educators who can provide prompt intervention. According to Mavridis et al. (2021), this real-time insight is essential in improving instructional effectiveness and student success rates.

Furthermore, AI contributes to content development by helping teachers design customized educational materials. Based on student data, AI can recommend relevant resources, generate quiz questions, or create interactive learning modules that align with learners' specific needs (Cukurova, 2020). In the context of higher education, these technologies are especially beneficial, as they support the creation of personalized learning paths and competency-based assessments. As noted by Siu and Leung (2020), such practices ensure that each student's academic journey is aligned with their abilities, interests, and career goals. Overall, AI in teaching and learning fosters a more inclusive, engaging, and adaptive educational environment. By enabling both learners and educators to work more efficiently and effectively, AI stands as a powerful tool in the ongoing evolution of modern education.



### **Theoretical Framework**

The study is hinged on the Technology Acceptance Model (TAM) and the Technological Pedagogical Content Knowledge (TPACK) Framework

### **Technology Acceptance Model (TAM)**

TAM, which Davis developed in 1986 functions as a theoretical model to anticipate how users behave in relation to information technology. The two essential elements Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) determine user attitudes about technology adoption and utilization. Users behave based on their behavioral intention which stands as the determiner of actual technology utilization. Because readers appreciate its straightforward nature and practical qualities, TAM gained broad acceptance for numerous technological applications including educational settings, as well as modern uses in teaching with artificial intelligence (AI).

Several important reasons highlight why TAM retains high level of importance in this context. Firstly, the integration of AI in education is not merely a technological transition but a transformative pedagogical shift. Successive AI tools in teaching require teachers to appreciate their value together with maintaining an intuitive grasp of their operation. The perceived usefulness along with ease of use standards in TAM analysis provide a comprehensive approach to understand behavioral factors that create teacher adoption of these tools.

The evaluation of AI's usefulness from a teacher's perspective involves their belief that these tools will boost their educational outcome either through better teaching delivery or individualized instruction, or workload management. The ease of understanding how to utilize AI applications forms the basis of Perceived Ease of Use evaluations by teaching professionals. The cognitive and behavioral tendencies of Obio/Akpor teachers toward AI adoption receive crucial interpretation through these constructs because digital literacy levels and infrastructure differences throughout the area affect their views. Research on the adoption of educational technologies suggests that the perceived usefulness and usability of educational technologies are a critical factor in determining the intent of teachers to embrace the elements of digital technologies like AI-based instruction systems in the classroom (Teo, 2011; Scherer, Siddiq and Tondeur, 2019).

Through its construct, the Technology Acceptance Model becomes suitable for conducting experiments with empirical data. The structure enables investigators to measure essential elements through operationalization which allows them to collect numerical data. The analysis



adopts this method to examine how teachers perceive their experience with AI adoption and its influence on their adoption behaviors. TAM's flexible nature allows researchers to combine it with contextual elements including organizational backing and training and system infrastructure that matter significantly in Obio/Akpor educational institutions. Researchers have claimed that TAM is one of the most utilized frameworks in information systems and educational technology studies owing to its good predictive success and flexibility in a variety of technological settings (Scherer et al., 2019).

TAM provides researchers with crucial explanatory abilities and predictive capabilities that make it necessary to use as a theoretical foundation. Through the implementation of TAM this research will both evaluate current adoption and forecast future utilization together with outlining AI implementation challenges. This is particularly important for policymakers and educational managers seeking to design targeted interventions that foster a technology-enabling environment for teachers.

#### **Technological Pedagogical Content Knowledge (TPACK) Framework**

The Technological Pedagogical Content Knowledge (TPACK) framework is an integrative model that captures the essential qualities required for effective teaching with technology. Mishra and Koehler (2006) developed TPACK as an expansion of PCK which integrates TK as a technological knowledge component, thus establishing a complete framework demonstrating technology's interactive relationship with teaching methods and academic content. The model builds conceptual structures to help teachers use technology effectively in meaningful teaching practices that matter especially for research about artificial intelligence (AI) applications in educational settings.

TPACK represents a model which combines seven different areas of knowledge including Pedagogical Knowledge (PK), Content Knowledge (CK), Technological Knowledge (TK), Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK) and the core concept Technological Pedagogical Content Knowledge (TPACK). The seven domains of TPACK form essential points where teachers need to integrate skills to apply modern educational technology successfully to their classroom practice. Content Knowledge features understanding of what teachers need to instruct their students, while Pedagogical Knowledge focuses on teaching approaches and educational practices and Technological Knowledge implies digital resource ownership. The intersections starting with TPACK stand for adaptive teaching methods which help teachers



create and implement technological instruction properly.

The implementation of AI teaching tools demands understanding beyond technical knowledge which makes the TPACK framework suitable for analyzing this situation. AI educational tools including adaptive learning platforms, intelligent tutoring systems, automated grading systems and natural language processing tools, need to merge pedagogical excellence with content appropriateness to make a genuine improvement in instructional effectiveness (*Chai, et al., 2013*).

The study investigates the role of AI technologies in enhancing teachers' instructional delivery practices in Obio/Akpor. The TPACK conceptual model enables researchers to analyze the way teachers manage each specific domain and especially the ability to connect various domains together. A teacher who demonstrates mastery of content knowledge alongside basic teaching approaches (CK and PK) can still implement AI incorrectly when they lack sufficient technological expertise (TK) and meaningful TPACK abilities for combining content and pedagogies with technology.



The justification for adopting the TPACK framework in this study is further strengthened by the increasing complexity of teaching in the digital age. As AI becomes more embedded in educational environments, the competencies required of teachers evolve. Through its TPACK framework, the model recognizes that complete integration requires teachers to apply tools effectively in instructional activities that serve educational purposes within specific learning contexts. This perspective moves past attributing universal benefit to technology because it advances toward recognizing the essential qualities of teacher autonomy combined with pedagogical intentions and contextual matching. Therefore, the TPACK model continues to be one of the most effective models on examining teacher competence in incorporating the emergent technologies in the educational context (Koehler, Mishra and Cain, 2013).

### **Aim and Objectives**

The primary aim of the study is to assess the role of artificial intelligence in enhancing teachers' instructional effectiveness in Obio/Akpor Local Government Area. Specifically, the objectives of the study are to:

- i. examine the extent to which teachers use Artificial Intelligence tools to enhance instructional effectiveness in Obio/Akpor Local Government Area.
- ii. examine the perceptions of teachers regarding the effectiveness of AI tools in enhancing instructional practices in Obio/Akpor Local Government Area



- iii. identify the challenges associated with the integration of artificial intelligence in enhancing teachers' instructional effectiveness in Obio/Akpor Local Government Area

### **Research Questions**

- i. To what extent do teachers use Artificial Intelligence tools to enhance instructional effectiveness in Obio/Akpor Local Government Area?
- ii. What are the perceptions of teachers regarding the effectiveness of AI tools in enhancing instructional practices in Obio/Akpor Local Government Area?
- iii. What are the challenges associated with integration of artificial intelligence in enhancing teachers' instructional effectiveness in Obio/Akpor Local Government Area?

### **Methodology**

The study adopted descriptive survey research design. The study was conducted in public senior secondary schools in Obio/Akpor Local Government Area of Rivers State. The population of the study consisted of Seven hundred and fifty-six (756) teachers in 28 senior secondary schools in Obio/Akpor Local Government Area. Taro Yamen was used to determine the sample size of 262 and simple random sample technique through balloting was employed to select 14 schools out of the 28 schools that made up the population of the study. An average of eighteen (18) respondents was selected from the fourteen (14) schools. The instrument used for data collection was a self-structured questionnaire titled: Role of AI Questionnaire (RAIQ). The questionnaire was patterned after a modified 4 points Likert scale. The questionnaire was used to collect data from respondents in relation to the objectives of the study. The questionnaire was divided into two sections namely; A and B, while A comprises of demographic data, section B comprises items relating to the objectives of the study. Validation of the instrument was duly certified while the Cronbach Alpha Method was used to ascertain the reliability of the instrument. The result yielded a reliability index of 0.82, thus adjudged reliable for the study. The instrument was administered to the respondents directly by the researchers with the help of two research assistants who were instructed on how to administer the instrument. To guarantee a high return rate, the researcher used the research assistants' services to immediately get the completed questionnaire from the respondents. A total number of 262 copies of the instrument were administered to the respondents and 259 were duly retrieved, giving a retrieval rate of 98.8%. The study's research questions were analyzed using



the mean and standard deviation. Items with a mean value > 2.50 was considered "agree"; items with a mean value < 2.50 was considered "disagree".

**Results**

**Research Question one:** To what extent do teachers use Artificial Intelligence tools to enhance instructional effectiveness in Obio/Akpor Local Government Area?

**Table 1: To what Extent do Teachers use Artificial Intelligence Tools to Enhance Instructional Effectiveness in Obio/Akpor Local Government Area**

| S/N                 | ITEMS   | Mean        | Std.d       | Remark   |
|---------------------|---|-------------|-------------|----------|
| 1                   | I regularly use AI-powered platforms to support students' learning.                           | 2.70        | .87         | Agree    |
| 2                   | I use AI tools to assess students' performance and adjust my teaching strategies accordingly. | 2.43        | 1.08        | Disagree |
| 3                   | I utilize AI-based educational applications in lesson delivery.                               | 2.34        | 1.16        | Disagree |
| 4                   | I use AI for lesson planning and resource generation.   | 2.51        | .98         | Agree    |
| <b>Average Mean</b> |   | <b>2.49</b> | <b>1.02</b> |          |



Table 1 showed the extent teachers use Artificial Intelligence tools to enhance instructional effectiveness in Obio/Akpor Local Government Area. The table revealed that teachers agreed that they regularly use AI-powered platforms to support students' learning and also use AI for lesson planning and resource generation. However, it as disagreed that they utilize AI-based educational applications in lesson delivery and use AI tools to assess students' performance and adjust teaching strategies accordingly. The average mean of 2.49 indicated that to a low extent, teachers use Artificial Intelligence tools to enhance instructional effectiveness in Obio/Akpor Local Government Area

**Research Question Two:** What are the perceptions of teachers regarding the effectiveness of AI tools in enhancing instructional practices in Obio/Akpor Local Government Area?

**Table 2: Perceptions of Tteachers Regarding the Effectiveness of AI Ttools in Enhancing Iinstructional Practices in Obio/Akpor Local Government Area**

| S/N               | ITEMS  | Mean        | Std.d      | Remark |
|-------------------|--|-------------|------------|--------|
| 1                 | AI tools improve the quality and clarity of instructional delivery.            | 3.04        | .69        | Agree  |
| 2                 | AI tools make teaching more efficient and less time-consuming                  | 3.11        | .62        | Agree  |
| 3                 | AI tools serves as reliable aids for lesson planning and classroom management. | 2.90        | .75        | Agree  |
| 4                 | AI can positively transform traditional teaching methods.                      | 3.08        | .67        | Agree  |
| <b>Grand Mean</b> |  | <b>3.03</b> | <b>.68</b> |        |



Table 2 above showed that perceptions of teachers regarding the effectiveness of AI tools in enhancing instructional practices in Obio/Akpor Local Government Area. From the table, all items had mean scores above the 2.50 criterion mean score. This indicated that teachers perceive that AI tools improve the quality and clarity of instructional delivery; AI tools make teaching more efficient and less time-consuming; AI tools serves as reliable aids for lesson planning and classroom management; and AI can positively transform traditional teaching methods.

**Research Question Three:** What are the challenges associated with integration of artificial intelligence in enhancing teachers’ instructional effectiveness in Obio/Akpor Local Government Area?

**Table 3: Challenges associated with integration of artificial intelligence in enhancing teachers’ instructional effectiveness in Obio/Akpor Local Government Area**

| S/N               | ITEMS   | Mean        | Std.d      | Remark |
|-------------------|---|-------------|------------|--------|
| 1                 | Inadequate training on how to effectively use AI tools in teaching                  | 2.81        | .79        | Agree  |
| 2                 | Insufficient access to AI-based teaching resources and infrastructure in my school. | 2.98        | .70        | Agree  |
| 3                 | Technical issues and lack of ICT support  | 3.07        | .68        | Agree  |
| 4                 | Insufficient institutional support for the use of AI in schools.                    | 2.55        | 1.02       | Agree  |
| <b>Grand Mean</b> |   | <b>2.85</b> | <b>.80</b> |        |

Table revealed the challenges associated with integration of artificial intelligence in enhancing teachers’ instructional effectiveness in Obio/Akpor Local Government Area. From the table, all items had mean scores above the 2.50 criterion mean score indicating that teachers agreed that inadequate training on how to effectively use AI tools in teaching; insufficient access to AI-based teaching resources and infrastructure in my school; technical issues and lack of ICT support; and insufficient institutional support for the use of AI in schools.

**Discussion of Findings**

Tables 1 show interesting statistical data regarding teacher integration of Artificial Intelligence (AI) tools in instructional practice within Obio/Akpor Local Government Area. Educational uses of AI technologies show expanding motivation and stepwise implementation although their applications vary based on different educational tasks. Most teachers demonstrated strong involvement in AI-assisted educational platforms which support student learning according to the mean score of 2.70. Artificial intelligence has become widely accepted by educational institutions as an additional resource which improves student connections and understanding



of educational content. Educational tools with AI capabilities play a moderate role in assisting teachers to create lessons and develop instructional materials (Mean = 2.51) since educators now realize how AI simplifies their preparation work and expands teaching material possibilities.

The application of AI Technology extends minimally to two areas of implementation: assessing students (Mean = 2.43) and delivering lessons through AI-driven educational applications (Mean = 2.34). To effectively utilize sophisticated Artificial Intelligence tools in education there is a pressing requirement for improved staff training programs regarding their applications in learning environments. Operational patterns pertaining to Nigeria's education system appear to match the identified trends. Onuh and Charles (2024) conducted research in Enugu State which demonstrated that Smart Content Creation and AI-Powered Assessment Systems from AI tools enhanced instructional effectiveness according to their findings. The researchers emphasized that educational institutions must maintain ongoing training programs for their faculty to develop abilities needed for proper AI technology implementation. Research conducted in Kwara State university by Adewale (2023) demonstrated that lecturers and students had moderate knowledge of AI tools but their practical usage remained low.

For the second finding, Teachers collectively agree on the positive effects of artificial intelligence (AI) tools based on their rating between 2.90 and 3.11 on a scale. The findings present important evidence showing AI enhances teaching quality and clarity through the participant agreement reaching a mean score of 3.04. Teachers recognize artificial intelligence technologies because they enable personalization of learning through content adaptation that matches student-specific needs and abilities and learning preferences. Customized approaches in instruction greatly boost both student interaction and understanding process thus leading to improved knowledge learning and memorization. AI tools are thought to increase teaching efficiency and reduce educator workload according to educators who rated this outcome at 3.11 which represents the highest mean score from these findings. The implementation of self-operating procedures creates more time for instructors to work on essential educational activities which leads to better overall instructional quality. These findings are consistent with previous scholarly work. The research by Kehinde-Awoyele et al. (2024) demonstrated that AI-based educational methods produce better student participation and learning results in Nigerian instructional environments. According to Nna-Kue and Waghara (2024) AI



effectively tailors learning materials to different student learning preferences through which instruction becomes clearer and learning outcomes improve.

Another important finding, with a mean score of 3.08 and a standard deviation of 0.67, indicates a strong agreement that AI has the potential to transform traditional teaching methodologies. This is corroborated by Oladapo (2023), who argues that AI serves as a reliable support system for teachers and encourages its integration into the Nigerian educational system to foster personalized learning experiences. In addition, Nna-Kue and Waghara (2024) underscore the role of AI in supporting data-driven decision-making in education. Their study highlights how AI technologies can assist teachers in identifying students' academic strengths and weaknesses, thereby informing targeted interventions. Overall, the findings of this study strongly support the adoption and integration of AI tools in educational settings, particularly for their potential to enhance instructional effectiveness and promote student-centered learning approaches.

The third major finding of the study highlighted different obstacles which obstruct AI implementation for teacher instructional effectiveness in Obio/Akpor Local Government Area. Teachers who took part in surveys shared multiple reservations about AI tools yet identified their insufficient training as their worst concern regarding effective AI usage for instruction. Most teachers lack understanding of both the operational mechanics and instructional applications of AI technologies because of which they experience barriers to effective classroom tool implementation. Most educational institutions within the area lack sufficient AI-based learning resources because they do not have proper educational infrastructure with smart devices and dependable internet connectivity combined with AI-enabled educational platforms. The combination of technical problems along with poor Information and Communication Technology (ICT) assistance creates an intensified issue. The teachers observed a lack of skilled specialists offering technical support that extends to resolving system issues when available digital tools exist. Educational authorities alongside school administrations did not receive enough institutional support because they lacked funding as well as policies and strategic frameworks for supporting AI implementation in instructional activities.

The research results validate those from Adigun and Okebukola (2023) who reported identical barriers in their studies of higher education institutions. The authors stressed that Nigerian universities suffer from outdated equipment problems combined with insufficient network capacity and recurring utility disruptions causing hindrances during AI adoption. The authors



documented budget constraints as a key factor that both restricts system development projects and prevents universities from deploying essential technological enhancements. Educational institutions face difficulties in building digital competencies among older teaching staff because there is an extensive skills gap that needs continuing sustained training. The successful AI integration into Nigerian education system encounters several implementation obstacles according to the study of Edinoh, Ogunbowale, and Onah (2025). They discovered that a lack of qualified professionals together with general teacher digital illiteracy and insufficient digital infrastructure occurs most commonly in rural locations. The implementation of AI solutions is hindered by unreliable electric power, poor internet connectivity and scarcity of digital equipment throughout Nigeria. The implementation and ongoing support of AI technologies proved to be a significant barrier due to high expenditure on hardware systems as well as software programs and system revisions.

### **Conclusion**

This study assessed the role of Artificial Intelligence (AI) in enhancing teachers' instructional effectiveness in Obio/Akpor Local Government Area. Findings from the research showed that teachers employ AI tools to some degree but their actual use remains low. Schools implement AI platforms for student education together with lesson design but AI applications remain scarce in delivering lessons and conducting performance evaluations. Teachers see AI tools positively even though they face difficulties in their implementation because these tools enhance both the quality and clarity of teaching instruction while creating improved teaching efficiency and better classroom organization. AI integration faces different obstacles because of insufficient training programs and limited resource availability together with technical difficulties and insufficient institutional backing. The current barriers emphasize why schools require extensive actions that will enable better AI implementation.

### **Recommendations**

Therefore, based on the findings and conclusion of the study, the following recommendations are made:

- i. The government should provide schools with better access to AI-based teaching resources and technological infrastructure.
- ii. Teachers should be encouraged to collaborate and share their experiences with AI tools.



- iii. Schools should have dedicated ICT support teams that can address technical issues promptly and provide teachers with adequate technical support to ensure that AI tools are used effectively and efficiently
- iv. Professional development initiatives should be tailored to address specific AI tools for lesson delivery, assessment, and classroom management.
- v. Schools should partner with tech companies and AI tool developers to enhance the relevance and practicality of AI tools in the classroom.

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