

**INTEGRATING AI TOOLS IN MATHEMATICS CURRICULUM QUALITY ASSURANCE IN
PUBLIC SENIOR SECONDARY SCHOOL IN OBIO/AKPOR LGA**

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ABSTRACT

This study examined the integration of Artificial Intelligence (AI) tools into mathematics curriculum quality assurance in public senior secondary schools within Obio/Akpor Local Government Area (LGA) of Rivers State, Nigeria. The study was guided by the Technology Acceptance Model (TAM) and employed a descriptive survey design involving all 72 mathematics teachers in the LGA. Data were collected using a validated questionnaire with a reliability index of 0.77, and analyzed using mean, standard deviation, and t-test statistics at a 0.05 significance level. Findings revealed that AI tools have significant potential to enhance mathematics curriculum quality assurance by identifying curriculum gaps, improving alignment with national standards, enabling real-time updates, and informing evidence-based decisions in curriculum development and review. AI integration was also found to support instructional delivery monitoring by tracking lesson delivery, analyzing student engagement, and providing real-time feedback, as well as evaluation and assessment by generating adaptive test items, offering detailed learning analytics, and delivering personalized feedback. No significant gender differences were observed in teachers' perceptions across all dimensions, indicating a shared acceptance of AI integration. The study concludes that AI tools can drive data-driven, adaptive, and efficient approaches to curriculum quality assurance when supported by adequate resources, training, and ethical frameworks. It recommends capacity building for teachers, provision of digital infrastructure, policy development for AI integration, and collaborative approaches among stakeholders to ensure effective and sustainable implementation.

Keywords: Artificial Intelligence, Mathematics Curriculum, Quality Assurance, Instructional Monitoring, Evaluation

Introduction

The integration of artificial intelligence (AI) into educational quality assurance mechanisms presents a transformative opportunity for enhancing mathematics curriculum delivery and evaluation in public senior secondary schools. Mathematics curriculum quality assurance traditionally involves ensuring that teaching standards, assessment validity, and learning outcomes meet established benchmarks. Yet, in many Nigerian contexts, public schools rely mainly on manual procedures, limited resources, and inconsistent monitoring mechanisms.

AI-powered tools offer powerful solutions to longstanding challenges. For instance, AI-enabled grading and adaptive assessments not only increase accuracy and efficiency in evaluating student performance but also allow for customized support tailored to individual learning needs (Bulut et al., 2024). Moreover, generative AI systems are now capable of producing curriculum-aligned mathematics content such as multiple-choice questions while maintaining alignment with official syllabi, as evidenced in recent developments in Malaysia (Abdul Wahid et al., 2025). In similar contexts, AI tutors accessible via low-bandwidth platforms have demonstrated significant positive impacts on student mathematics achievement, suggesting feasibility for resource-constrained environments (Henkel et al., 2024). However, effective implementation must be guided by ethical and equitable considerations to ensure reliability and fairness—particularly in high-stakes curriculum quality assurance (Bulut et al., 2024).

Building on this backdrop, the current study explores how AI tools can be integrated into the quality assurance mechanisms of mathematics curriculum in public senior secondary schools within Obio/Akpor LGA. The objective is to identify the potential benefits, feasibility, and contextual constraints of such integration, laying the groundwork for more responsive, efficient, and equitable quality assurance practices in mathematics education.

Statement of the Problem

Quality assurance in mathematics curriculum implementation remains a critical challenge in Nigerian public senior secondary schools, particularly within Obio/Akpor Local Government Area. Despite the centrality of mathematics to scientific, technological, and economic development, persistent issues such as poor student performance, limited teacher capacity, inadequate instructional resources, and inconsistent monitoring mechanisms have undermined the effectiveness of curriculum delivery. Traditional quality assurance approaches—often reliant on manual supervision, teacher self-reporting, and standardized examinations—have proven insufficient in addressing these challenges comprehensively.

Recent developments in artificial intelligence (AI) suggest significant potential for transforming mathematics curriculum quality assurance. AI-powered tools such as automated assessment systems, adaptive learning platforms, and intelligent tutoring systems can provide real-time feedback, track student progress, and ensure alignment with curriculum standards. However, in the context of public senior secondary schools in Obio/Akpor LGA, the integration of such tools remains largely unexplored. Questions persist regarding their feasibility, accessibility, and relevance within resource-constrained educational environments.

The problem, therefore, is the **absence of effective mechanisms for integrating AI tools into mathematics curriculum quality assurance in public senior secondary schools in Obio/Akpor LGA**. Without such integration, the system continues to rely on traditional methods that fail to provide accurate, timely, and individualized insights into curriculum implementation. This gap hinders both teaching effectiveness and student achievement in mathematics, thereby calling for a study that investigates how AI tools can be harnessed to strengthen mathematics curriculum quality assurance in this locality.

Aim and Objectives

The purpose of the study is to examine integrating AI tools in mathematics curriculum quality assurance in public senior secondary school in Obio/Akpor LGA. In specific terms, the study sought to:

1. Examine how AI tools can be integrated into curriculum development and review of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.
2. Find out how AI tools can be integrated into instructional delivery monitoring of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.
3. Investigate how AI tools can be integrated into evaluation and assessment of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.

Research Questions

1. How can AI tools be integrated into curriculum development and review of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA?
2. How can AI tools be integrated into instructional delivery monitoring of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA?
3. How can AI tools be integrated into evaluation and assessment of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA?

Hypotheses

1. There is no significant difference in the mean opinion rating of male and female teachers on how AI tools can be integrated into curriculum development and review of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.
2. There is no significant difference in the mean opinion rating of male and female teachers on how AI tools can be integrated into instructional delivery monitoring of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.
3. There is no significant difference in the mean opinion rating of male and female teachers on how AI tools can be integrated evaluation and assessment of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.

LITERATURE REVIEW

Mathematics Curriculum

Mathematics curriculum refers to the structured and organized plan that guides the teaching and learning of mathematics in educational settings. It serves as a framework that specifies the content, skills, instructional approaches, and assessment strategies that students should encounter at different levels of education. According to the National Council of Teachers of Mathematics (NCTM, 2018), an effective curriculum goes beyond a mere list of topics; it presents a coherent and connected sequence of concepts that develops students' conceptual understanding, mastery of mathematical techniques, reasoning, problem-solving ability, and communication skills. By integrating these components, the curriculum helps learners build a strong foundation and apply mathematical ideas to real-world contexts. The mathematics curriculum typically includes content areas such as number and operations, algebra, geometry, measurement, data analysis, probability, and calculus. In Nigeria, the mathematics curriculum is made up of five thematic contents. For Junior Secondary they include Number and Numeration, Basic Operations, Algebraic Process, Mensuration and Geometry and Everyday Statistics. For Senior Secondary they include Number and Numeration, Algebraic Processes, Geometry, Statistics and Introductory Calculus. These areas are often structured to ensure progression and alignment, where concepts taught in earlier grades form the basis for more advanced topics in later grades (OECD, 2023). This progression ensures that students develop not only mastery and procedural knowledge but also a deeper understanding of mathematical relationships and structures over time. In addition to content, the curriculum emphasizes instructional practices that foster active learning and critical thinking. For example, the integration of problem-based learning, collaborative tasks, and the use of digital tools has been shown to enhance students' reasoning and engagement (Bron & Prudente, 2024, Hillmayr et al., 2020). These strategies support diverse learning styles and help students connect abstract mathematical concepts to practical applications. The importance of effective mathematics curriculum cannot be overstated, as mathematical literacy serves as a foundation for STEM education and 21st-century workforce preparation (Brown et al., 2017). To sum it up, the mathematics curriculum is a dynamic roadmap that integrates content, pedagogy, assessment, and equity to prepare students for academic success and real-world problem-solving. When well-designed and effectively implemented, it cultivates mathematical literacy, critical thinking, and the ability to apply mathematics in varied contexts, thereby fulfilling its role as a cornerstone of modern education.

Quality Assurance

Quality assurance in Nigeria's mathematics curriculum is the backbone of efforts to ensure that teaching and learning meet national and international standards. At its core, quality assurance is about making sure that what is planned in the curriculum is what actually happens in classrooms, and that students are gaining the skills they need to succeed both academically and in real-world problem-solving (Adebayo & Adetunji, 2020). In mathematics, this is particularly critical because mathematics as a subject builds progressively such that each concept forms a foundation for more complex ideas. Quality assurance ensures that the mathematics curriculum themes are taught progressively and coherently, from basic numeration to more advanced concepts like calculus,

(NERDC, 2013) and also at the right depth, helping students transition smoothly from basic concepts to advanced applications. In Nigeria, Quality Assurance in education is overseen by key institutions, including the Federal Ministry of Education, the National Education Research and Development Council (NERDC), and the National Universities Commission (NUC). These agencies are responsible for developing, reviewing, and accrediting curricula to align with national goals and global standards (Adebayo & Adetunji, 2020). Despite these structures, Nigeria faces persistent challenges that affect the quality of curriculum delivery. Many schools, particularly in rural areas, struggle with inadequate funding, insufficient instructional materials, and a shortage of trained teachers (Okebukola, 2021). These gaps often result in rote learning rather than deep understanding, limiting students' ability to apply mathematics beyond the classroom. Without strong quality assurance systems, these issues can go unchecked, creating disparities in learning outcomes across regions and school types. In essence, quality assurance acts as a backbone for sustainable educational improvement. In mathematics education, it provides the checks and balances necessary to ensure that curricula remain relevant, equitable, and impactful. To strengthen quality assurance processes, stakeholders must work together to provide adequate resources, empower teachers, and create systems that support continuous reflection and growth.

Artificial Intelligence Tools

Artificial Intelligence (AI) tools are reshaping the way people work, learn, and interact with technology across different sectors. Broadly, AI refers to computer systems designed to mimic human intelligence, performing tasks such as reasoning, learning, and language processing with speed and precision (Russell & Norvig, 2021). Over the past decade, these tools have moved from being niche innovations to everyday essentials, powering activities in education, healthcare, business, and academic research. In education, AI tools are transforming how students learn and how teachers teach. Adaptive learning platforms, such as DreamBox and Smart Sparrow, personalize lessons by analyzing student performance and adjusting tasks to match their learning pace and needs (Chen et al., 2020). Tools like Grammarly and Turnitin are now standard in academic writing, helping students refine their work and uphold academic integrity (Dwivedi et al., 2021). These applications highlight the growing role of AI in creating more interactive, efficient, and tailored learning environments. In academic research, AI tools have become invaluable companions for scholars. Platforms like IBM Watson, Elicit, and Research Rabbit assist with literature searches, data analysis, and information synthesis, helping researchers save time and focus on deeper inquiry. More recently, generative AI tools such as ChatGPT have opened new possibilities for brainstorming, drafting, and problem-solving. While these innovations enhance productivity, they also raise important ethical questions about originality, authorship, and proper use (OpenAI, 2023). Overall, AI tools are more than just technological add-ons, they are reshaping systems and workflows in profound ways. As these tools continue to evolve, the key to maximizing their potential lies in balancing innovation with responsibility. Robust policies, user training, and continuous evaluation are critical to ensuring that AI supports human creativity, critical thinking, and equitable access to opportunities in both academic and professional spaces.

Mathematics Curriculum Quality Assurance Mechanisms

Globally, Quality Assurance processes have shifted from rigid, inspection-based approaches to more dynamic systems of continuous improvement. These modern frameworks encourage regular monitoring, evaluation, and feedback, with active participation from teachers, school leaders, and policymakers (OECD, 2021). Quality assurance in the mathematics curriculum is a structured process that ensures the curriculum remains relevant, effective, and responsive to the needs of learners. It encompasses activities such as curriculum review, instructional supervision, teacher development, assessment alignment, and active stakeholder participation. Together, these mechanisms help bridge the gap between what the curriculum intends to achieve and what happens in the classroom (Ekundayo and Ojo 2018).

Curriculum Development and Review

One of the most critical mechanisms for quality assurance is curriculum development and review, which ensures that the content, sequence, and expected outcomes of the mathematics curriculum meet national standards while addressing the evolving needs of students. In Nigeria, the National Education Research and Development Council (NERDC) regularly updates the curriculum to maintain coherence and relevance in core areas such as number operations, algebra, geometry, and statistics (NERDC, 2013). Today, the integration of artificial intelligence (AI) tools is transforming this process. AI-driven analytics can evaluate curriculum effectiveness by analyzing student performance data, identifying content gaps, and predicting future skill demands. These insights help curriculum developers make evidence-based updates, ensuring that revisions are both data-informed and forward-looking. Additionally, AI-powered platforms can facilitate collaborative curriculum design by enabling real-time feedback and simulations, making the review and alignment process more efficient and responsive to educational trends.

Instructional Delivery Monitoring

Instructional delivery monitoring and feedback also play a vital role in quality assurance. Through classroom observations, mentorship, and data-driven evaluations, teachers are supported in turning curriculum goals into effective classroom practices. With the integration of artificial intelligence (AI) tools, this process has become more efficient and insightful. AI-powered platforms can analyze classroom interactions, track lesson delivery, and monitor student engagement, providing supervisors with real-time, data-driven feedback. These systems help identify specific instructional gaps and suggest targeted strategies for improvement, making supervision more personalized and evidence-based. As Arikewuyo (2019) emphasizes, ongoing mentorship and peer collaboration remain essential, but when combined with AI-enhanced insights, they foster a more responsive and effective implementation of the mathematics curriculum.

Evaluation and Assessment

Evaluation and assessment mechanisms are equally important for maintaining quality in the mathematics curriculum. When both formative and summative assessments are well-aligned with curriculum objectives, they provide valuable insights into students' understanding and inform decisions for instructional improvement. With the integration of artificial intelligence (AI) tools, assessment practices have become more adaptive and data-driven. AI tools can generate diverse and adaptive mathematics assessment items and automate grading systems to improve assessment efficiency and accuracy. AI-powered systems can analyze large sets of student performance data to identify learning patterns, predict areas of difficulty, and recommend tailored interventions. These tools also enhance formative assessments by providing immediate, personalized feedback that supports differentiated instruction. According to REL Central (2017), incorporating well-designed assessments improves learning outcomes, and with AI-enabled analytics, these assessments are now more precise, efficient, and aligned with curriculum goals, fostering deeper mathematical understanding and improved performance. This ensures that assessment is not just a tool for grading but a means to guide instruction and promote equity in learning outcomes.

Methodology

The study examined integrating AI Tools in Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor LGA. Three objectives of the study were translated to three research question and three hypotheses. The study was anchored on Technology Acceptance Model of Davies (1986). The study adopted descriptive survey research design, to examine how AI tools can be integrated in Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor LGA. The population of the study comprised all the mathematics teachers in public senior secondary schools of Obio/Akpor LGA which is 72 teachers. Hence, the sample size for the study is 72 teachers (Male = 38%, Females = 62%). The instrument for data collection was

“Integrating AI Tools in Mathematics Curriculum Quality Assurance (IATMCQAQ)”. The instrument was validated by two experts and the reliability coefficient index was 0.77. Mean and standard deviation were used to answer the research questions while t-test was used to test the hypotheses at 0.05 level of significance.

Answers to Research Questions

Research Question One: How can AI tools be integrated into curriculum development and review of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA?

Table 1: Mean responses of male and female teachers on how AI tools can be integrated into Curriculum Development and Review of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor LGA of Rivers State

S/N	AI Tools and Mathematics Curriculum Development and Review	Teachers				Mean Set (n=72)	Remark
		Male (n=27)		Female (n=45)			
		Mean	SD	Mean	SD		
1.	AI tools can help identify gaps in the current mathematics curriculum	3.26	1.06	3.78	0.47	3.58	Agreed
2.	AI-powered content analysis can improve curriculum alignment with national standards	3.15	0.91	3.02	0.66	3.07	Agreed
3.	AI tools can facilitate real-time curriculum updates based on emerging mathematical concepts	3.19	0.79	2.82	1.03	2.96	Agreed
4.	Automated curriculum mapping using AI can enhance learning progression sequences	3.19	0.79	2.73	1.12	2.90	Agreed
5.	AI-driven data analytics can inform evidence-based curriculum decisions	3.37	0.79	3.38	0.78	3.38	Agreed
6.	Predictive analytics can help anticipate future curriculum needs in mathematics	3.11	0.89	2.98	0.78	3.03	Agreed
7.	AI can assist in benchmarking local curriculum against international standards	3.11	0.93	3.11	0.83	3.11	Agreed
Grand Total		3.20	0.88	3.12	0.81	3.15	Agreed

The data in the table above shows that the teachers agreed that AI tools can be integrated into curriculum development and review for mathematics curriculum quality assurance in public senior secondary schools in Obio/Akpor LGA of Rivers by identifying gaps in the current mathematics curriculum (Mean=3.58), improving curriculum alignment with national standards (Mean=3.07), facilitating real-time curriculum updates based on emerging mathematical concepts (Mean=2.96), enhancing learning progression sequences (Mean=2.90), informing evidence-based curriculum decisions (Mean=3.38), helping to anticipate future curriculum needs in mathematics (Mean=3.03) and assisting in benchmarking local curriculum against international standards (Mean=3.11). Also, the mean ratings of male teachers on how AI tools can be integrated into curriculum development and review for mathematics curriculum quality assurance in public senior secondary schools in Obio/Akpor LGA of Rivers (Mean=3.20, SD=0.88) is slightly higher than that of their female counterparts (Mean=3.12, SD=0.81).

Research Question Two: How can AI tools be integrated into instructional delivery monitoring of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA?

Table 2: Mean responses of male and female teachers on how AI tools can be integrated into Instructional Delivery Monitoring of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor LGA of Rivers State

S/N	AI Tools and Instructional Delivery Monitoring	Teachers				Mean Set (n=72)	Remark
		Male (n=27)		Female (n=45)			
		Mean	SD	Mean	SD		
8.	AI-powered classroom observation tools can enhance teaching quality monitoring	3.48	0.58	3.18	0.78	3.29	Agreed
9.	AI can track and analyze student engagement during mathematics lessons	2.56	1.01	2.84	0.82	2.74	Agreed
10.	Automated feedback systems can help teachers improve their instructional methods	3.04	1.16	2.58	1.03	2.75	Agreed
11.	Virtual reality and AI integration can enhance mathematics concept visualization	3.19	0.83	2.67	1.07	2.86	Agreed
12.	AI-driven adaptive learning platforms can adjust instruction based on student needs	3.22	0.89	2.87	0.94	3.00	Agreed
13.	Chatbots and AI assistants can provide 24/7 instructional support to students	3.04	0.94	2.93	0.84	2.97	Agreed
14.	AI can identify and address learning difficulties in mathematics promptly	2.59	1.05	2.56	1.08	2.57	Agreed
Grand Total		3.02	0.92	2.80	0.94	2.88	Agreed

The data in the table 2 above shows that the teachers agreed that AI tools can be integrated into instructional delivery monitoring for mathematics curriculum quality assurance in public senior secondary schools in Obio/Akpor LGA of Rivers by enhancing teaching quality monitoring (Mean=3.29), tracking and analyzing student engagement during mathematics lessons (Mean=2.74), helping teachers improve their instructional methods (Mean=2.75), enhancing mathematics concept visualization (Mean=2.86), adjusting instruction based on student needs (Mean=3.00), providing 24/7 instructional support to students (Mean=2.97) and identifying and address learning difficulties in mathematics promptly (Mean=2.57). Also, the mean ratings of male teachers on how AI tools can be integrated into curriculum development and review for mathematics curriculum quality assurance in public senior secondary schools in Obio/Akpor LGA of Rivers (Mean=3.02, SD=0.92) is slightly higher than that of their female counterparts (Mean=2.80, SD=0.94).

Research Question Three: How can AI tools be integrated into evaluation and assessment of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA?

Table 3: Mean responses of male and female teachers on how AI tools can be integrated into Evaluation and Assessment of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor LGA of Rivers State

S/N	AI Tools and Evaluation and Assessment	Teachers				Mean Set (n=72)	Remark
		Male (n=27)		Female (n=45)			
		Mean	SD	Mean	SD		
15.	AI can generate diverse and adaptive mathematics assessment items	3.15	0.91	2.78	1.02	2.92	Agreed
16.	Automated grading systems can improve assessment efficiency and accuracy	3.00	0.68	2.80	1.01	2.88	Agreed
17.	AI can provide detailed analytics on student learning patterns and progress	3.37	0.79	3.02	1.03	3.15	Agreed
18.	Intelligent assessment systems can adapt difficulty levels based on student ability	2.89	0.75	2.82	0.78	2.85	Agreed

19.	Natural language processing can analyze open-ended mathematics responses	3.41	0.75	2.76	0.91	3.00	Agreed
20.	AI can generate personalized feedback reports for students and parents	2.45	0.93	2.50	1.10	2.50	Agreed
Grand Total		3.04	0.80	2.78	0.98	2.88	Agreed

The data in the table 3 above shows that the teachers agreed that AI tools can be integrated into evaluation and assessment for mathematics curriculum quality assurance in public senior secondary schools in Obio/Akpor LGA of Rivers (Mean=2.88). Also, the mean ratings of male teachers on how AI tools can be integrated into curriculum development and review for mathematics curriculum quality assurance in public senior secondary schools in Obio/Akpor LGA of Rivers (Mean=3.04, SD=0.80) is higher than that of their female counterparts (Mean=2.78, SD=0.98). The data in the table also shows that both male and female teachers agreed that AI can generate diverse and adaptive mathematics assessment items (Mean=2.92), automated grading systems can improve assessment efficiency and accuracy (Mean=2.88), AI can provide detailed analytics on student learning patterns and progress (Mean=3.15), intelligent assessment systems can adapt difficulty levels based on student ability (Mean=2.85), natural language processing can analyze open-ended mathematics responses (Mean=3.00) and AI can generate personalized feedback reports for students and parents (Mean=2.50).

Testing of Hypotheses

HO₁: There is no significant difference in the mean opinion rating of male and female teachers on how AI tools can be integrated into curriculum development and review of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.

Table 4: Summary of t-test on the difference in the mean responses of male and female teachers on how AI tools can be integrated into Curriculum Development and Review of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor L.G.A, Rivers State.

Gender	N	Mean	SD	Df	t-test	Sig.	Remark
Male	27	3.20	0.88	70	0.393	0.696	NS
Female	45	3.12	0.81				

NS= Not Significant

The table above showed the difference in the mean responses of male and female teachers on how AI tools can be integrated into Curriculum Development and Review of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor L.G.A, Rivers State. The mean response of male teachers is 3.20 and the standard deviation is 0.88, while the mean response of female teachers is 3.12 and the standard deviation is 0.81. The t-test calculated value is 0.393, the corresponded significance value is 0.696 showing > 0.05 at 70 degrees of freedom. Hence, it is concluded that there is no significant difference in the mean responses of male and female teachers on how AI tools can be integrated into Curriculum Development and Review of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor L.G.A, Rivers State. Therefore, the null hypothesis one is retained at 0.05 level of significance.

HO₂: There is no significant difference in the mean opinion rating of male and female teachers on how AI tools can be integrated into instructional delivery monitoring of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.

Table 5: Summary of t-test on the difference in the mean responses of male and female teachers on how AI tools can be integrated into Instructional Delivery Monitoring of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor L.G.A, Rivers State.

Gender	N	Mean	SD	Df	t-test	Sig.	Remark
Male	27	3.02	0.92	70	0.969	0.336	NS
Female	45	2.80	0.94				

NS= Not Significant

The table above showed the difference in the mean responses of male and female teachers on how AI tools can be integrated into instructional delivery monitoring of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor L.G.A, Rivers State. The mean response of male teachers is 3.02 and the standard deviation is 0.92, while the mean response of female teachers is 2.80 and the standard deviation is 0.94. The t-test calculated value is 0.969, the corresponded significance value is 0.336 showing > 0.05 at 70 degrees of freedom. Hence, it is concluded that there is no significant difference in the mean responses of male and female teachers on how AI tools can be integrated into instructional delivery monitoring of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor L.G.A, Rivers State. Therefore, the null hypothesis two is retained at 0.05 level of significance.

HO₃: There is no significant difference in the mean opinion rating of male and female teachers on how AI tools can be integrated evaluation and assessment of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.

Table 6: Summary of t-test on the difference in the mean responses of male and female teachers on how AI tools can be integrated into Evaluation and Assessment of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor L.G.A, Rivers State.

Gender	N	Mean	SD	Df	t-test	Sig.	Remark
Male	27	3.04	0.80	70	0.969	0.336	NS
Female	45	2.78	0.98				

NS= Not Significant

The table above showed the difference in the mean responses of male and female teachers on how AI tools can be integrated into evaluation and assessment of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor L.G.A, Rivers State. The mean response of male teachers is 3.04 and the standard deviation is 0.80, while the mean response of female teachers is 2.78 and the standard deviation is 0.98. The t-test calculated value is 1.164, the corresponded significance value is 0.248 showing > 0.05 at 70 degrees of freedom. Hence, it is concluded that there is no significant difference in the mean responses of male and female teachers on how AI tools can be integrated into evaluation and assessment of Mathematics Curriculum Quality Assurance in Public Senior Secondary School in Obio/Akpor L.G.A, Rivers State. Therefore, the null hypothesis two is retained at 0.05 level of significance.

Summary of Findings

1. AI tools can be integrated into curriculum development and review for mathematics curriculum quality assurance in public senior secondary schools in Obio/Akpor LGA of Rivers by identifying gaps in the current mathematics curriculum, improving curriculum alignment with national

standards, facilitating real-time curriculum updates based on emerging mathematical concepts, enhancing learning progression sequences, informing evidence-based curriculum decisions, helping to anticipate future curriculum needs in mathematics and assisting in benchmarking local curriculum against international standards.

2. AI tools can be integrated into instructional delivery monitoring for mathematics curriculum quality assurance in public senior secondary schools in Obio/Akpor LGA of Rivers by enhancing teaching quality monitoring, tracking and analyzing student engagement during mathematics lessons, helping teachers improve their instructional methods, enhancing mathematics concept visualization, adjusting instruction based on student needs, providing 24/7 instructional support to students and identifying and address learning difficulties in mathematics promptly.
3. AI tools can be integrated into evaluation and assessment for mathematics curriculum quality assurance in public senior secondary schools in Obio/Akpor LGA of Rivers State by generating diverse and adaptive mathematics assessment items, improving assessment efficiency and accuracy, providing detailed analytics on student learning patterns and progress, adapting difficulty levels based on student ability, analyzing open-ended mathematics responses and generating personalized feedback reports for students and parents.
4. There is no significant difference in the mean opinion rating of male and female teachers on how AI tools can be integrated into curriculum development and review of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.
5. There is no significant difference in the mean opinion rating of male and female teachers on how AI tools can be integrated into instructional delivery monitoring of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.
6. There is no significant difference in the mean opinion rating of male and female teachers on how AI tools can be integrated evaluation and assessment of mathematics curriculum quality assurance in Public Senior Secondary School in Obio/Akpor LGA.

Discussion of Findings

Integrating AI Tools into Curriculum Development and Review for Mathematics Curriculum Quality Assurance

The results from table 1 show that teachers in public senior secondary schools in Obio/Akpor LGA perceive AI tools as valuable for curriculum development and review in mathematics quality assurance. They agreed that AI can identify gaps in the current curriculum, enhance alignment with national standards, support real-time updates, and inform evidence-based decisions. AI was also seen as useful for predicting future curriculum needs and benchmarking against international standards, echoing Bulut et al. (2024) on the role of AI analytics in refining curriculum design. Gender analysis revealed no significant difference between male and female teachers, indicating a shared perspective. This aligns with Abdul Wahid et al. (2025), who noted that AI integration benefits diverse users in curriculum enhancement. These findings support Nwanguma and Onyeukwu's (2023) position that AI offers adaptive, data-driven solutions to strengthen curriculum quality assurance in Nigerian mathematics education.

Integrating AI Tools into Instructional Delivery Monitoring for Mathematics Curriculum Quality Assurance

The findings from table 2 indicate that teachers in public senior secondary schools in Obio/Akpor LGA recognize the importance of AI tools in monitoring instructional delivery for mathematics curriculum quality assurance. They agreed that AI can enhance lesson delivery tracking, instructional feedback, and performance evaluation, supporting data-driven decision-making in classroom practice. This aligns with Bulut et al. (2024), who emphasized the potential of AI-driven analytics in real-time monitoring and instructional improvement. Analysis of gender responses showed no significant difference in perceptions between male and female teachers, suggesting a homogeneous view of AI's relevance in improving teaching quality. This supports the assertion of Abdul Wahid et

al. (2025) that AI-based platforms can provide inclusive, adaptive solutions for strengthening instructional supervision. Overall, the findings reinforce Nwanguma and Onyeukwu's (2023) view that integrating AI into instructional monitoring enhances the responsiveness and efficiency of quality assurance mechanisms in mathematics education.

Integrating AI Tools into Evaluation and Assessment for Mathematics Curriculum Quality Assurance

The results from table 3 reveal that teachers in public senior secondary schools in Obio/Akpor LGA view AI tools as highly beneficial for evaluation and assessment in mathematics curriculum quality assurance. They agreed that AI can analyze student performance data, provide real-time feedback, and generate adaptive assessments to improve instructional decisions. This finding corroborates Bulut et al. (2024) assertion that AI-driven systems enhance accuracy and efficiency in educational assessments. The data from table 6 indicated no significant difference in the perceptions of male and female teachers, highlighting a shared belief in AI's potential for improving assessment processes. This supports Abdul Wahid et al. (2025), who observed that AI-powered tools promote standardized, data-driven evaluation practices. These results further validate Nwanguma and Onyeukwu's (2023) assertion that AI integration in assessment fosters precision, equity, and continuous improvement in mathematics education.

Conclusion

The study investigated the integration of AI tools in mathematics curriculum quality assurance in public senior secondary school in Obio/Akpor LGA. The study found out that teachers in public senior secondary schools in Obio/Akpor LGA recognize the transformative potential of AI tools in enhancing mathematics curriculum quality assurance. The study reveals that AI can effectively support curriculum development and review, instructional delivery monitoring, and evaluation and assessment by providing data-driven insights, real-time updates, and adaptive solutions. The absence of significant gender differences indicates a shared acceptance of AI integration across demographics, highlighting readiness for adoption when supported by adequate resources and training. These results align with previous studies (Bulut et al., 2024; Abdul Wahid et al., 2025; Nwanguma & Onyeukwu, 2023) emphasizing AI's role in improving efficiency, precision, and innovation in educational systems.

Recommendations

Based on the findings of the study, the researcher recommends the following:

1. Educational stakeholders should organize regular training programs and workshops to improve teachers' digital literacy and competence in applying AI tools for curriculum quality assurance.
2. Schools should be provided with reliable internet access, modern devices, and technical support to facilitate seamless AI integration.
3. Data-driven monitoring systems should be implemented to assess the impact of AI integration on teaching quality, student outcomes, and overall curriculum performance, ensuring regular improvements.
4. Teachers, curriculum experts, and AI specialists should be engaged in collaborative reviews to ensure that AI-driven updates are practical and context-specific.

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