

IMPACT OF ARTIFICIAL INTELLIGENCE TOOLS ON TEACHING AND LEARNING ARABIC IN SECONDARY SCHOOLS IN ILORIN WEST LOCAL GOVERNMENT, KWARA STATE

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Abstract

This study examined how Artificial Intelligence (AI) tools influence the teaching and learning of Arabic in secondary schools in Ilorin West, Kwara State. The growing integration of technology into education prompted this investigation, as many schools continue to rely on traditional teaching methods that students often find uninspiring and less effective. A descriptive survey design was adopted for the study. The population of the study consisted of 2,511 students of Arabic and 206 teachers of Arabic. A sample of 250 students and teachers was randomly selected from various secondary schools across Ilorin West. Data were gathered using a structured questionnaire (EIAITTLASSIWLGKS) and analyzed using mean scores and chi-square tests. The findings revealed that AI tools have the potential to make Arabic learning more engaging and effective, particularly in improving pronunciation and vocabulary acquisition. However, several obstacles such as unreliable internet access, high costs, and insufficient teacher training limit their current use. The study concludes that AI holds considerable promise for enhancing Arabic education. It recommends that government and school authorities invest in AI technologies and provide regular training for teachers on how to integrate these tools into their classrooms.

Keywords: Artificial Intelligence Tools, Teaching Learning, Arabic.

Introduction

Artificial Intelligence refers to a branch of computer science focused on creating intelligent machines capable of performing tasks that typically require human cognition. These tasks include learning, reasoning, and language comprehension. Within educational settings, AI involves using software and programs to support instruction and learning, with the goal of making education more effective and engaging for students. The application of AI in education is expanding rapidly and now includes tools for personalized instruction, language practice, and automated assessment. According to Ahmed (2021), AI has the capacity to transform how subjects are delivered in schools by making learning faster and more enjoyable.

The Nigerian education system faces numerous challenges, including large class sizes, shortages of instructional materials, and low student achievement. These difficulties are especially pronounced in language subjects such as Arabic. Traditional Arabic instruction often depends heavily on rote memorization and repetitive drills, where teachers write on the board and students copy notes. This approach tends to be slow and fails to address the diverse needs of individual learners, leaving some students struggling to keep pace. This is where AI can offer meaningful support. AI-powered tools can provide customized lessons, deliver instant

feedback, and introduce interactive elements such as games and simulations. As Sani (2020) observed, AI technologies can offer students a more personalized learning experience, helping slower learners while keeping advanced students sufficiently challenged.

Arabic holds significant cultural and religious importance in Nigeria, particularly in Ilorin, a city known for its rich tradition of Islamic and Arabic scholarship. Many secondary schools in Ilorin West offer Arabic as a subject, as learning the language enables students to read the Quran and opens doors to further education and employment opportunities. Nevertheless, students often encounter difficulties with Arabic, especially its complex grammar and challenging pronunciation. Traditional instructional methods may not adequately address these struggles. AI can offer practical solutions. For instance, AI-driven applications can assist with pronunciation by listening to a student and providing corrective feedback, and they can teach vocabulary through interactive flashcards and games. Bello (2022) noted that AI-driven language tools can significantly enhance how students learn and retain new words.

In Ilorin West, secondary schools form a critical part of the educational landscape, serving a large number of students. Like many schools across Nigeria, they face considerable challenges in teaching Arabic effectively. These schools still depend largely on traditional chalk-and-talk methods and lack modern teaching aids. There is a clear need to update teaching approaches. Adopting AI technology could provide a way forward, helping schools improve both the instruction and learning of Arabic. However, the extent to which AI is currently used in these schools remains unclear, and this study sought to investigate that gap.

The potential value of AI in teaching and learning Arabic cannot be overstated. AI provides a pathway to more student-centered instruction. AI systems are patient and can repeat lessons as often as needed without becoming fatigued, which is especially important for mastering a complex language like Arabic. Furthermore, AI can support schools with limited teaching staff by offering additional assistance to students. By automating routine tasks like grading, AI allows teachers to devote more time to complex instructional duties, thereby improving overall school efficiency. AI-based tools can have a meaningful impact on educational outcomes by enabling more engaging and effective lessons. This is particularly important for a demanding subject like Arabic. Using AI can enhance student skills and make teachers' work more manageable. Consequently, evaluating AI use in Ilorin West schools is not simply a matter of technology adoption but a step toward improving education for the entire community.

Artificial Intelligence in education refers to the use of intelligent computer programs and algorithms designed to support teaching and learning processes. These tools can adapt to individual student needs, with the primary goal of improving learning outcomes while making education more accessible and engaging. AI applications vary widely and include intelligent tutoring systems, automated grading software, and personalized learning platforms. According to Yusuf and Adebayo (2020), AI is not a single technology but a collection of different technologies, including machine learning (which allows computers to learn from data) and natural language processing (which helps computers understand human language).

Machine learning is a commonly used type of AI in education. It is a method of data analysis that enables software to learn from and make predictions based on data. In educational contexts, machine learning can track a student's progress, identify areas of difficulty, and recommend specific lessons or exercises to address those gaps. For example, if a student repeatedly makes errors in Arabic grammar, the system can provide additional practice on that topic. Natural language processing (NLP) is another important AI technology for language learning. NLP helps computers understand, interpret, and generate human language. In Arabic learning, an NLP-powered application can listen to a student's pronunciation and provide immediate feedback for improvement.

The adoption of AI in education is growing worldwide. In developed countries, many schools use AI for various purposes, such as creating customized reading lists, instantly grading multiple-choice tests, and powering language learning applications like Duolingo. However, in developing countries such as Nigeria, the use of AI in schools remains very limited. Schools encounter numerous barriers, including high costs, lack of electricity, and limited internet access. A study conducted in Oyo State found that only a few private schools have begun using educational technology, while most public schools lag far behind (Adeola & Chukwuma, 2021).

Despite these challenges, the potential benefits of AI in education are substantial. AI can help address the problem of large class sizes by providing each student with individual attention. It can also support teachers by taking over repetitive tasks such as grading, allowing them to focus on more important activities like lesson planning and student interaction. AI can make learning more enjoyable through educational games and simulations. Okafor and Salami (2022) argued that AI can serve as a powerful tool for improving education in Nigeria and helping to bridge the quality gap between urban and rural schools. Language teaching involves helping students acquire a new language, including skills such as reading, writing, speaking, and listening. Traditional language instruction often relies on textbooks, repetition, and grammar drills. While these methods can be effective, they are often not very engaging for today's students. AI is changing how languages are taught and learned by making language learning interactive and personalized, offering practice tailored to each student's level.

AI-powered language applications have become very popular. Applications such as Duolingo, Babbel, and Rosetta Stone use AI to offer lessons in many languages, including Arabic. These apps use algorithms to determine which lesson to present next, tracking user performance and providing additional practice on specific points where errors occur. This approach is known as adaptive learning. According to a study by Hassan (2021), students who used language learning applications showed significant improvement in vocabulary and grammar and reported higher levels of motivation. For speaking and pronunciation, AI tools are especially useful. Tools that incorporate speech recognition can listen to students speaking Arabic, analyze their pronunciation, and tell them whether they are saying a word correctly. Some tools even provide a visual representation of the sound wave, helping students correct their mistakes instantly.

This offers an advantage over a teacher in a large class who may not have time to provide individual feedback to every student. A study in Egypt found that using AI for pronunciation practice helped students speak more clearly and confidently (Ismail, 2020).

In Nigeria, Arabic instruction in schools remains largely traditional, with a strong emphasis on memorization and grammar rules and limited use of technology. This makes it difficult for students to develop practical communication skills. AI can fill this gap by providing a platform for students to practice speaking and listening in a low-pressure environment. However, the use of such tools in Nigerian schools, particularly in Ilorin West, is not common. Challenges include a lack of devices for students and teachers' unfamiliarity with the technology. Implementing AI in Nigerian schools is not straightforward, as several challenges exist. The first is cost. AI software and the devices needed to run it can be expensive. Schools often operate with limited budgets and may not have funds for computers, tablets, software licenses, or internet subscriptions. For public schools in Ilorin West, funding is a major constraint, as the government may not provide adequate resources for technology.

The second challenge is infrastructure. AI tools require a reliable power supply and internet connection to function properly. In many parts of Nigeria, electricity is unstable and power outages are common. Internet connectivity can be slow and expensive, and in some rural areas, internet access may be unavailable altogether. This makes it very difficult to use online AI tools in classrooms. A report by the Ministry of Education (2022) noted that less than 20% of public secondary schools in Kwara State have functional computer laboratories. Another significant challenge is teacher capacity. Many teachers have not been trained to use technology in their teaching and may not know how to operate AI tools. Some teachers resist change, fearing that technology might replace them or believing that AI is too complicated to learn. This resistance can slow the adoption of AI. A study by Fatima (2023) found that lack of training is the biggest barrier to technology use in classrooms. Teachers need professional development opportunities to feel confident using new tools.

Curriculum and policy issues also pose challenges. The national curriculum may not include the use of AI or technology, and examinations remain mostly paper-based. There is little incentive for schools to use AI when it is not part of the curriculum or examination system. Without support from the government and education authorities, individual schools find it difficult to invest in AI. Finally, data privacy and security present concerns. AI tools often collect data on student performance, raising questions about data ownership, storage, and use. Without clear policies, parents and schools may be hesitant to use AI tools that collect student data. This study was guided by the Constructivist Learning Theory, developed by thinkers such as Jean Piaget and Lev Vygotsky. This theory suggests that people learn best by actively constructing their own knowledge rather than simply receiving information from a teacher. Learning involves exploring, experimenting, and making sense of things independently. The teacher's role is to serve as a guide, providing resources and support for learning.

In the context of this study, Constructivist Theory helps explain why AI tools can be effective. AI tools are often interactive and student-centered, allowing learners to progress at their own pace and explore the Arabic language through games and simulations. For example, a student using an AI application to build Arabic sentences receives immediate feedback, which helps the student construct an understanding of grammar rules through practice rather than through memorization alone. This theory is relevant because it focuses on the learner's experience. The success of AI in teaching Arabic depends on how well these tools engage students in active learning. By applying this theory, this study aimed to determine whether AI tools help students construct their knowledge of Arabic.

Statement of the Problem

Secondary schools in Ilorin West, Kwara State, face persistent difficulties in teaching and learning Arabic effectively, largely because they continue to rely on outdated, teacher-centered instructional methods. This reliance creates considerable inefficiencies, as teachers are often overwhelmed by large class sizes and a lack of modern teaching resources, which significantly slows student comprehension and progress in mastering the language. As a result, students struggle to achieve fluency, proper pronunciation, and a solid grasp of Arabic grammar, leading to poor academic performance and diminished interest in the subject (Ahmed, 2021). These problems are worsened by several major barriers, including insufficient funding for technological tools, a critical shortage of teachers trained in modern pedagogical techniques, and fragmented or nonexistent digital infrastructure. Additionally, resistance to change among some educators often stemming from limited awareness of AI's benefits or fears that the technology is too complex further hinders progress. This has created a considerable gap between the current reality in Arabic classrooms and the ideal scenario in which AI could be used to provide personalized learning, offer real-time pronunciation feedback, make lessons interactive, and empower teachers with digital aids. This study was therefore necessary to assess the current level of AI tool utilization, identify the various barriers, and propose a practical way forward to bridge this gap and modernize Arabic instruction.

Objectives of the Study

The main objective of this study was to evaluate the impact of Artificial Intelligence tools on the teaching and learning of Arabic in secondary schools in Ilorin West, Kwara State and the objectives were to:

1. examine the extent to which AI tools are used in the teaching and learning of Arabic in secondary schools in Ilorin West.
2. identify the challenges hindering the effective use of AI tools for teaching and learning Arabic in these schools.
3. assess the impact of AI-based tools on students' proficiency and interest in the Arabic language.

Research Questions

The following research questions guided the study:

1. To what extent are AI tools used in the teaching and learning of Arabic in secondary schools in Ilorin West?
2. What are the challenges hindering the effective use of AI tools for teaching and learning Arabic in these schools?
3. How do AI-based tools impact students' proficiency and interest in the Arabic language?

Hypotheses

The following hypotheses were tested at the 0.05 level of significance:

H₀₁: There is no significant relationship between the availability of AI tools and their use in teaching Arabic in secondary schools in Ilorin West.

H₀₂: There is no significant relationship between the challenges identified and the implementation of AI in Arabic classes in secondary schools in Ilorin West.

H₀₃: There is no significant relationship between the use of AI-based tools and students' proficiency in Arabic in secondary schools in Ilorin West.

Methodology

This study employed a descriptive survey research design, which is suitable for describing the characteristics of a population and understanding current situations regarding AI use in schools. The population of the study consisted of 2,511 teachers of Arabic and 206 teachers of Arabic in public secondary schools in Ilorin West, Kwara State. The sample size was 250 respondents, selected from 15 different schools within the local government area using a random sampling technique. This means every student and teacher in the selected schools had an equal chance of being chosen, helping to ensure that the sample represented the larger population.

The instrument for data collection was a structured questionnaire titled "Questionnaire on Artificial Intelligence in Arabic Teaching and Learning (QAIATL)." The questionnaire had two sections. Section A collected demographic information, including age, gender, class or position, and years of experience. Section B contained 15 items based on the research objectives, measuring the extent of AI use, the challenges faced, and the perceived impact.

The questionnaire used a four-point Likert scale with the options Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). This scale is straightforward for respondents to understand and allows for quantitative analysis of opinions. The instrument was validated by experts in education and language studies, who checked the questions for clarity and relevance. A pilot study was conducted with 30 students and teachers from a different local government to test the questionnaire's reliability, yielding a reliability coefficient of 0.85, which is considered acceptable for such studies. Data collection took place over four weeks. The researcher visited schools and distributed the questionnaires. Some respondents completed the questionnaires on the spot, while others took them and returned them later. Follow-up reminders were sent to ensure a good response rate. The collected data were analyzed using mean scores to determine average responses for each item, with a mean score of 2.50 and above considered as agreement and below 2.50 as disagreement. Chi-square tests were used to test the hypotheses at the 0.05 significance level.

Results

Research Question One: To what extent are AI tools used in the teaching and learning of Arabic in secondary schools in Ilorin West?

Table 1: Mean Scores Showing the Extent of AI Use in Arabic Teaching and Learning

S/N	Items	SA (4)	A (3)	D (2)	SD (1)	Total	$\bar{x}$
1	AI apps are used to learn Arabic vocabulary in my school.	30	45	100	75	530	2.12
2	Software for practicing Arabic pronunciation is available.	20	25	95	110	455	1.82
3	Teachers use AI tools to teach Arabic grammar.	40	50	80	80	550	2.20
4	The school has computers for students to use AI programs.	25	30	70	125	455	1.82
5	We receive training on how to use AI for learning Arabic.	15	20	85	130	420	1.68

Table 1 shows that all mean scores are below the 2.50 benchmark, indicating that respondents generally disagreed that AI tools are used in their schools. Item 3 had the highest mean (2.20), which remains low. Items 1, 2, 4, and 5 had mean scores below 2.20, with item 5 (training) being the lowest at 1.68. These results confirm that AI is not widely used for teaching and learning Arabic in Ilorin West schools. The use of applications for vocabulary and pronunciation is minimal, access to computers is very poor, and training for both students and teachers is virtually nonexistent.

Research Question Two: What are the challenges hindering the effective use of AI tools for teaching and learning Arabic in these schools?

Table 2: Mean Scores Showing Challenges Hindering AI Use

S/N	Items	SA (4)	A (3)	D (2)	SD (1)	Total	$\bar{x}$
6	High cost of AI technology hinders its adoption.	180	50	10	10	900	3.60
7	Lack of technical expertise affects the use of AI.	160	60	20	10	870	3.48
8	Poor electricity and internet limits the use of AI.	190	40	15	5	925	3.70
9	Resistance from teachers is a barrier to using AI.	140	70	25	15	825	3.30
10	Inadequate funding from the government is a challenge.	200	35	10	5	945	3.78

Table 2 reveals that all listed challenges have mean scores well above 2.50, meaning respondents strongly agreed that these are significant barriers. The most formidable challenge was inadequate government funding (mean = 3.78), followed closely by poor electricity and internet infrastructure (3.70) and high technology costs (3.60). Lack of technical expertise (3.48) and teacher resistance (3.30) were also confirmed as substantial obstacles. These findings indicate that a combination of financial, infrastructural, and human resource challenges prevent AI adoption in these schools.

Research Question Three: How do AI-based tools impact students' proficiency and interest in the Arabic language?

Table 3: Mean Scores Showing the Perceived Impact of AI on Arabic Learning

S/N	Items	SA (4)	A (3)	D (2)	SD (1)	Total	$\bar{x}$
11	AI tools can make learning Arabic more interesting.	170	55	15	10	885	3.54
12	AI can help improve my Arabic pronunciation.	165	60	15	10	880	3.52
13	Using AI can help me learn Arabic vocabulary faster.	160	65	15	10	875	3.50
14	AI tools can make it easier to understand Arabic grammar.	155	70	15	10	870	3.48
15	Using AI would increase my overall interest in Arabic.	175	50	15	10	885	3.54

Table 3 shows high mean scores for all items, all above 3.48, indicating strong agreement among respondents. They believe AI has considerable potential to improve how Arabic is learned. The highest potential was seen in making learning more interesting and increasing overall interest (both at 3.54). Respondents also strongly believed AI can improve pronunciation (3.52), accelerate vocabulary acquisition (3.50), and make grammar easier to understand (3.48). Despite not currently using AI, students and teachers in Ilorin West recognized its significant potential benefits for enhancing proficiency and engagement.

Hypothesis One (H_{01}): There is no significant relationship between the availability of AI tools and their use in teaching Arabic.

Table 4: Chi-Square Test for Hypothesis One

Cells	f_o	f_e	Df	χ^2 cal	χ^2 crit	Decision
5	10	42.5	12	58.45	16.92	H_{01} Rejected

The calculated chi-square value (58.45) exceeded the critical value (16.92), leading to rejection of the null hypothesis. This indicates a significant relationship between the availability of AI tools and their use in teaching Arabic. In other words, if AI tools were available, they would likely be used more in these schools.

Hypothesis Two (H_{02}): There is no significant relationship between the challenges identified and the implementation of AI in Arabic classes.

Table 5: Chi-Square Test for Hypothesis Two

Cells	f_o	f_e	Df	χ^2 cal	χ^2 crit	Decision
5	12	35.2	12	44.12	16.92	H_{02} Rejected

The calculated value (44.12) was higher than the critical value (16.92), so the null hypothesis was rejected. This confirms that the challenges (cost, infrastructure, expertise, and others) are indeed significant barriers to implementing AI in Arabic classes.

Hypothesis Three (H_{03}): There is no significant relationship between the use of AI-based tools and students' proficiency in Arabic.

Table 6: Chi-Square Test for Hypothesis Three

Cells	f_o	f_e	Df	χ^2 cal	χ^2 crit	Decision
5	8	18.5	12	350.75	16.92	H_{03} Rejected

The calculated chi-square value (350.75) was substantially larger than the critical value (16.92), leading to rejection of the null hypothesis. This shows a strong significant relationship, indicating that students and teachers believe AI-based tools would greatly improve students' proficiency in Arabic.

Discussion of Findings

The findings of this study reveal several important points. First, the use of AI in secondary schools in Ilorin West is almost nonexistent. Students and teachers reported that AI tools are not available and are not used for learning vocabulary or practicing pronunciation. Teachers do not use them to teach grammar. This finding is consistent with other studies. For example, Lawal and Ibrahim (2020) found similar results in schools in Northern Nigeria, noting that most schools lack basic computer facilities, making it impossible to use advanced tools such as AI.

The second major finding concerns the challenges. The study identified several key barriers, with inadequate government funding being the most significant. Education in Nigeria is underfunded, and schools often struggle to buy even basic textbooks, let alone computers. The high cost of AI systems is another major hurdle. This finding supports the work of Fatima (2023), who also found that cost is the biggest obstacle to using technology in Nigerian classrooms. Other challenges include poor electricity and internet connectivity, lack of technical expertise, and resistance from some teachers who are not comfortable with technology.

The third finding relates to the perceived impact of AI. Despite the current lack of use, students and teachers see great value in AI. They believe it can make learning Arabic more interesting and improve pronunciation, vocabulary, and grammar. This positive attitude suggests that if the challenges were addressed, schools would be willing to use AI. This finding aligns with a study by Okon and Eze (2021), who found that students in Lagos were very excited about using educational technology and felt it would make learning more enjoyable.

The hypothesis tests all showed significant results, adding strength to the findings. The rejection of the first hypothesis shows that availability is key to use if tools are not present, they cannot be used. The rejection of the second hypothesis confirms that the challenges are real and impactful. The rejection of the third hypothesis underscores the strong belief in AI's benefits for learning Arabic. Together, these results paint a clear picture: AI is not being used in Ilorin West schools due to major barriers, but if those barriers are removed, AI could have a very positive impact on Arabic education.

Conclusion

This study evaluated the impact of AI tools on teaching and learning Arabic in Ilorin West. It found that AI is not currently being used. The main reasons are high costs, lack of funding, poor infrastructure, and insufficient technical skills. However, students and teachers in these schools understand the potential benefits of AI and believe it can make learning Arabic more effective and enjoyable, improving language skills and increasing interest. Therefore, there is a need to address the barriers to AI adoption, which will require a concerted effort from school authorities, government, and other stakeholders.

Recommendations

1. The Ministry of Education and school administrators should immediately integrate AI tools into the Arabic language curriculum by mandating their adoption across all secondary schools in Ilorin West. Schools should prioritize acquiring basic AI-powered applications for vocabulary and pronunciation practice, as these were identified as the most needed yet least available resources.
2. The Kwara State Government should allocate a specific budget line for educational technology, particularly AI tools for language instruction, in annual education spending. School-based management committees should also collaborate with local businesses and Islamic organizations to raise supplementary funds for purchasing AI devices and software licenses.
3. School authorities should install solar-powered systems and offline AI solutions that do not require continuous internet access to bypass unreliable electricity and connectivity. Partnerships with telecommunication companies can provide subsidized internet data plans specifically for educational purposes in public schools.
4. The Teachers' Service Commission should organize mandatory, hands-on professional development workshops every term to train Arabic teachers on how to effectively use AI tools in classroom settings. Teacher training colleges should also revise their curriculum to include a compulsory course on AI applications for language teaching before graduation.

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