Published by The College of Science & Information Technology (COSIT), TASUED, Vol. 19, No. 1, pp. 211-223.

COSIT, TASUED
Journal of Science and Information Technology (JOSIT)

Artificial Intelligence Tools on Computer Applications Instructional Delivery and Learning in Junior Secondary School in Ibeju Lekki, Lagos State

Kehinde, E. O.; Abimbola, O. G.; Adeyemi, T. S.; Iposu, N. O.

Department of Computer Science Education, College of Information and Technology Education, Lagos State University of Education, Otto-Ijanikin, Lagos State, Nigeria.

Corresponding Author: kehindeeo@lasued.edu.ng
Other Authors: abimbolaog@lasued.edu.ng; adeyemits@lasued.edu.ng; iposuno@lasued.edu.ng

Abstract

The integration of Artificial Intelligence (AI) tools in education has revolutionized teaching and learning processes by enhancing instructional delivery, student engagement and academic performance. This study investigates the influence of Artificial Intelligence (AI) tools on the instructional delivery and learning outcomes on computer applications among junior secondary school students in Ibeju-Lekki, Lagos State. Utilizing a mixed-methods approach, data were collected from 100 students and 40 computer studies teachers from selected secondary schools. A Cronbach's Alpha value of 0.75 was considered acceptable for the scale to be deemed reliable for this study. Computer Applications System (CAS) was developed to gather information from the participants through structured questionnaires, with four Likert scales items was used, interviews and classroom observations was also adopted and the results were analyzed. 40 teachers were surveyed with 75% scores reportedly using AI tools regularly in their teaching process with significant improvement in their instructional delivery while 25% teachers shows concerns about using this new innovation. Among 100 students' sampled in this study 80% participants showed an increase rate of academic performance with CAS engagement while only 15% scored low in their test with low academic performance. This study reveals that AI-driven instructional tools significantly improved students' understanding of CAS, fostering personalized learning and engagement, provide real-time feedback, adaptive learning experiences, and improve retention of concepts, based on the test conducted during this research study. The study also revealed CAS as an helpful tools to teachers in the development of their lesson plan and instructional delivery of their academic activities. This study concludes that AI tools will play a transformative role in junior secondary education in lbeju-Lekki, Lagos State if incorporated into the schools activities by improving learning efficiency, instructional effectiveness and digital literacy. It also recommends targeted teacher training, investment in providing technological infrastructures in schools, ensuring reliable internet access and adequate hardware to support AI tools, and AI policy frameworks to maximize AI's potential in Ibeju-Lekki, schools in Lagos State.

Keywords: Artificial Intelligence,Instructional delivery and Learning, Mixed method, Secondary education

INTRODUCTION

In this 21st century, technology is developing at an ever-increasing rate. This rapid development necessitates that people possess specific abilities in order to meet the demands of daily life. This is as a result of the significant impact that technology has had on our thoughts, emotions, behaviours, thinking and interpersonal interactions. One of these newest technologies is Artificial Intelligence (AI). AI can be defined as the ideas that include "artificial" and "intelligence." Artificial

Cite as:

Kehinde, E. O.; Abimbola, O. G.; Adeyemi, T. S.; IPOSU, N. O.. (2025). Artificial Intelligence Tools on Computer Applications Instructional Delivery and Learning in Junior Secondary School in Ibeju Lekki, Lagos State. *Journal of Science and Information Technology (JOSIT)*, Vol. 19, No. 1, pp. 211-223.

intelligence (AI) is "used to describe artificial performance tools or robots that are linked to the data ocean and mimic human intellect (Pabubung, 2021). It is the study of how to make computers perform tasks that people can currently perform more efficiently, which includes researching human thought processes and developing machine translations. AI uses a variety of methods, including neural networks, deep learning, and machine learning, to accomplish this goal. Artificial Intelligence (AI) has numerous applications, including robots, image identification, and natural language processing. AI has the potential to boost production and efficiency in a variety of sectors, including education, manufacturing, transportation, and healthcare. Artificial intelligence (AI) technology is pervasive and encourages resource-based, intelligent development across a wide range of businesses (Huang, 2021).

Artificial Intelligence (AI) tools are increasingly being integrated into educational systems worldwide to enhance teaching effectiveness, student engagement, and learning outcomes. The role of AI in education, especially in subjects like Computer Applications Systems (CAS), is gaining recognition for its potential to revolutionize both instruction and learning experiences.

The integration of Artificial Intelligence (AI) into educational frameworks has garnered significant attention globally, with a growing body of research exploring its potential to enhance teaching methodologies and learning outcomes. In Nigeria, the educational sector is increasingly recognizing the transformative potential of AI, particularly in the context of secondary education. Recent studies have highlighted the role of AI in improving science education, suggesting that AI technologies can enhance the quality and effectiveness of instruction, leading to better learning outcomes for students (Baillifard, et, al., 2023).

The Nigerian government has also acknowledged the importance of AI in education. As of January 2025, initiatives have been launched to incorporate AI into the learning process, aiming to improve instructional methods while maintaining human oversight (Impact of AI in Curriculum Development in Nigerian Tertiary Institutions (2024). This move underscores a national commitment to leveraging AI for educational advancement.

Despite these developments, the application of AI in specific regions such as Ibeju Lekki in Lagos-State, remain under explored. Understanding the impact of AI tools on computer applications, system instructions and learning processes in junior secondary schools within this locality is crucial. Such insights can inform targeted strategies to effectively integrate AI into the curriculum, thereby enhancing educational outcomes and preparing students for a technologically driven future.

This study aims to fill this gap by examining the effects of AI tools integration in junior secondary schools in Ibeju-Lekki. By assessing how AI influences computer applications and system instructions, the research seeks to provide evidence-based recommendations for educators and policy makers. The goal is to optimize the use of AI in educational settings, enduring that its implementation aligns with the specific needs and contexts of schools in Ibeju-Lekki, area of Lagos-State.

The adoption of AI tools in education has been transformative, offering personalized learning experiences, efficient feedback mechanisms, and interactive learning environments. In the field of Computer Application Systems, AI tools are designed to enhance students' understanding of complex concepts and improve teachers' instructional methods, this will invariably help the understanding of each concepts to the students and make their learning more easy and interesting. This study is design to investigate how AI tools can be utilize in junior secondary schools in Ibeju-Lekki, focusing on their impact on both teaching and learning processes, and also access the impact of AI tools on CAS instruction and learning, focusing on their influence on teaching methods, student engagement, and learning outcomes, and provide empirical insights into how AI tools can shape education in Ibeju-Lekki, Lagos State.

This study also holds significant value in the following areas:

1. Advance AI in Education: This research study will contribute to a deeper understanding of how Artificial Intelligence (AI) can be effectively integrated into the educational system, particularly at the junior secondary school level in Ibeju-Lekki, Lagos-State. By examining the impact of AI tools on teaching methods and student

learning outcomes, it will provide insights into how AI can enhance classroom productivity, student engagement, and personalized learning experiences.

2. Supporting Teachers and Students: The findings from this study will also help both teachers and students better understand the potential benefits and challenges of using AI tools in the classroom. It will serve as a resource for educators seeking to incorporate technology into their teaching practices and for students to benefit from innovative, AI-powered learning approaches.
3. Guiding Educational Stakeholders: The study will offer valuable recommendations for educational stakeholders, including school administrators, policymakers, and educators, on the best AI tools and practices to adopt. It will help identify key areas where AI integration can address specific educational challenges, such as individualized instruction, fostering creativity, and improving academic performance.
4. Broader Societal Impact: Although focused on education, the insights from this study will be relevant to other sectors, including health, finance, and technology, where AI is increasingly being utilized. By highlighting the potential benefits and drawbacks of AI in various domains, this research will inform broader conversations on AI adoption and its role in societal advancement.

Therefore, this study will not only enhance the understanding of AI's role in education but also provide a framework for responsible and effective AI implementation across various sectors of learning.

The integration of Artificial Intelligent (AI) tools in education has gained significant attention globally, with potential benefits for both teachers and students. AI tools offer personalized learning experiences, automate administrative tasks and provide real-time feedback, which can enhance students' comprehension of computer applications. However, in junior secondary schools in Ibeju-Lekki, Lagos State, the adoption and effectiveness of AI in computer applications instruction and learning remain uncertain due to several challenges.

One of the major concerns is the digital divide, which continues to hinder the effective implementation of AI-based education. Many schools in the region lack the necessary infrastructure, including reliable internet access, modern computers systems, and an uninterrupted power supply. Studies have shown that inadequate technological infrastructures significantly limit students' exposures to digital learning tools, reducing the effectiveness of AI-driven education (Ajadi and Salau, 2023). Without these foundational resources, the effective implementation of AI-driven is severely hindered.

Additionally, many teachers are not adequately trained to integrate AI into their instructional methods, leading to inefficiency in adopting these technologies. Research suggested that teachers' digital proficiency play a crucial role in determined the success of AI-enhanced learning (Okonkwo and Adepoju, 2024). Furthermore, financial constraints prevents schools from acquiring AI tools, subscribing to necessary software, and training educators, limiting the wide spread adoption of AI powered learning solution Eze and Oladipupo, 2024). Addressing these challenges is crucial for maximizing the benefits of AI in education. Therefore, this study aims to access the impact of AI tools on computer Application instructions in Ibeju-Lekki, junior secondary schools, evaluate the effectiveness of AI tools in improving the teaching of Computer Applications Systems in junior secondary schools in Ibeju-Lekki, Lagos-State, identify existing barriers to implementation and proposed effective strategies for enhancing AI-driven in the region and to analyze the impact of AI tools on student engagement and performance in CAS.

Research Questions

1. What is the impact of AI tools on student learning in Computer Applications Systems (CAS) in junior secondary schools in Ibeju-Lekki, Lagos State?
2. How do AI tools influence student engagement and interest in CAS?
3. To what extent do AI tools improve students' understanding and performance in CAS?

4. How frequently do teachers integrate AI tools into their teaching methods for CAS?

Research Hypotheses

The following null hypotheses will be tested in this study:

$H_0$1: There is no significant effect of AI tools on students' achievement in computer applications.

$H_0$2: AI-driven system instructions do not significantly enhance students' understanding of computer studies concepts.

$H_0$3: AI tools have no significant impact on students' engagement and retention in computer learning.

$H_0$4: There is no significant relationship between AI tools implementation and the challenges faced in junior secondary school computer education.

RELATED WORKS

AI in Education: Tools and Applications

Artificial Intelligence (AI) has become a transformative force in education, providing innovative tools that enhance teaching, learning, and administration. The application of AI in educational settings can significantly improve efficiency, personalize learning experiences, and support both students and educators.

Artificial Intelligence (AI) tools are increasingly being integrated into educational systems worldwide to enhance teaching effectiveness, student engagement, and learning outcomes. The role of AI in education, especially in subjects like Computer Applications Systems (CAS), is gaining recognition for its potential to revolutionize both instruction and learning experiences. This literature review explores the impact of AI tools on education, focusing on their applications in teaching CAS and their influence on student performance

Impacts of AI tools on teaching Effectiveness

Virtual Mentors

AI-powered virtual mentors support online learning by enabling seamless communication between students and teachers. These tools facilitate real-time feedback, resource sharing, and personalized guidance, helping students engage more effectively with course content. (Hilir, 2021), emphasized that AIs give students feedback on practice questions and learning activities in addition to subject contents given by their teachers in the class. For example, Blackboard enables educators to distribute materials, assignments, and quizzes, while allowing students to ask questions and receive feedback. He stressed further that AI is widely used in American and European institutions while about 169 professors and lecturers use this AI platform frequently to publish class notes, homework, quizzes, and examinations.

Figure 1. Virtual mentoring tools (Hilir, 2021).

Voice Assistants (Vas)

AI tools like Voice Assistants (e.g., Siri, Google Assistant) allow students to interact with learning materials in a dynamic and engaging way. Students can use voice commands to search for relevant resources, ask questions, and clarify concepts they may not fully understand (Hilir, 2021). AI can also help students find academic resources, listen to content, and enhance study sessions, particularly for those with visual impairments or language barriers. Converting text into speech, VAs support auditory learners and provide information in an accessible format. Hilir, 2021 opined that, voice assistant can help students on keyword-based or spoken searches for material, including books, articles, and reference queries, it will enable students to access clear and reliable information. Students can study freely without worrying about being confused in this way, even if they are not with an instructor or tutor, as all material, including knowledge that is not fully understood, can be delivered just through audio. This tool

expedites students' quest for more resources in the classroom.

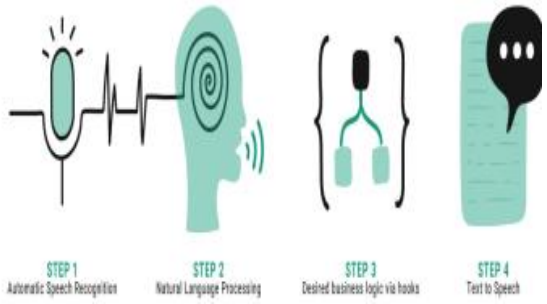

Figure 2. Voice Assistants (Vas) (Hilir, 2021).

AI for Personalized Learning

AI tools can significantly enhance student engagement by providing interactive and personalized learning experiences. According to research by (Al Ali & Ward at, (2024)), AI tools help increase student motivation and involvement by offering real-time feedback, tracking progress, and encouraging independent learning.

AI tools can also be used to tailor learning experiences by adapting content to match individual student needs. AI tools can analyze students' learning styles, abilities, and progress, offering personalized lessons and feedback. This adaptive learning approach ensures that each student receives the support they require, improving overall academic outcomes (Al Ali & Ward at (2024).

Figure 3. AI-Assisted tool

Enhanced Resource Compilation

AI tools can quickly scan and retrieve the most recent and relevant academic texts and materials from database which will facilitate deeper understanding of the subject matter.

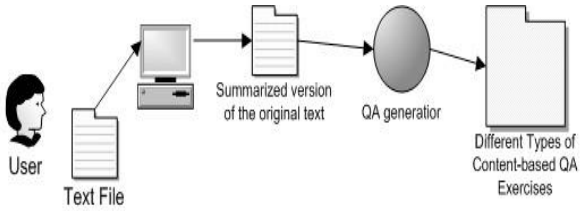

Figure 4. ……..

Collaboration & Sharing among Educators

AI-assisted tools can facilitate the sharing of lesson plans and resources among educators, fostering a collaborative environment where best practices can be exchanged (Al Ali, and Ward at (2024).

Continuous Improvement

AI-assisted Lesson development help in providing feedback and improvement by analyzing students' performance and provide insights into which areas of the lesson plan are most effective and which need improvement (Al Alir and Ward at (2024).

AI and Student Engagement

ITS offer personalized tutoring without human intervention by adjusting the difficulty level of tasks based on student performance. These systems provide immediate feedback and help students progress at their own pace, making them a valuable tool for subjects such as mathematics, law, and language (Abu Ghali et al., 2018). ITS systems have been shown to enhance learner outcomes by providing tailored instruction and support.

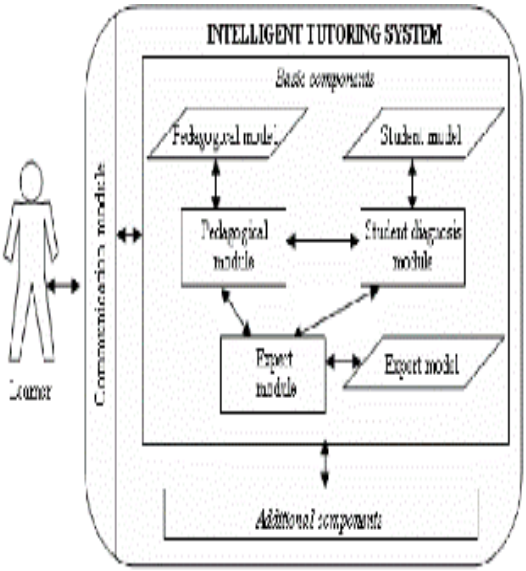

Figure 5. …….. (Huang, 2022)

QNA Maker Content

Tools like Microsoft's QNA Maker allow educators to create 24/7 question-and-answer bots from existing course content. This feature supports independent learning, enabling students to explore topics and get answers outside of regular class hours. Such tools foster critical thinking and self-directed learning by providing instant assistance on academic queries.

A study by Huang (2022) found that AI-driven platforms like QNA Maker have a significant impact on student learning by enabling them to access answers to questions and explore topics independently. This fosters critical thinking and self-directed learning, particularly important in subjects like CAS, where students often need to troubleshoot problems and experiment with software applications, Huang (2022).

Improved Learning outcomes through AI

AI tools have been shown to positively impact student learning outcomes by providing a more personalized approach to education. In the case of Computer Applications Systems, where students must learn technical skills, AI tools can provide tailored instruction, practice exercises, and simulations. The ability to offer instant feedback allows students to identify areas for improvement and take corrective action before moving on to more advanced topics.

Research by Fahimirad (2018) demonstrates that AI-driven systems improve learning retention by allowing students to revisit challenging concepts and practice at their own pace. Additionally, AI tools facilitate formative assessment by continuously tracking student performance and providing data-driven insights. This ongoing assessment helps identify gaps in knowledge and ensures that students receive the support they need to succeed (Abu Ghali et al., 2018)). In the context of Computer Applications Systems, where practical application and hands-on learning are crucial, AI tools help students practice and apply skills in a real-time, interactive environment.

Challenges in implementing AI Tools in Education

Despite the potential benefits, the integration of AI tools in education faces several challenges. One of the primary barriers is limited access to technology, in many developing regions, including parts of Lagos State, specifically Ibeju-Lekki schools face significant challenges related to infrastructure, such as inadequate access to computers, reliable internet connections, and electricity. These issues hinder the widespread use of AI tools in classrooms (Hilir, 2021).

Another challenge is the lack of sufficient teacher training. While AI tools can enhance teaching effectiveness, teachers must be adequately trained to use them effectively. Research by Abu Ghali et al. (2018), highlights that many educators are not fully equipped to integrate AI into their teaching practices, which can lead to underutilization of these tools. Teachers need professional development programs that focus on the use of AI in the classroom, as well as guidance on how to interpret data and provide personalized feedback.

Additionally, there is resistance to change in some educational settings. Some educators may be hesitant to adopt AI due to a lack of understanding of its potential or fear of the technology replacing their roles. Overcoming this resistance requires providing clear evidence of the benefits of AI tools and fostering a culture of innovation in schools (Al Ali & Wardat, 2024).

The integration of AI tools in education has the potential to transform the teaching and learning of Computer Applications Systems in junior secondary schools. AI tools improve teaching effectiveness by offering personalized instruction, real-time feedback, and adaptive learning pathways. These tools also enhance student engagement and learning outcomes, as

evidenced by the increased motivation and performance observed in students who interact with AI-driven platforms.

However, the successful implementation of AI in education requires addressing challenges such as limited access to technology, inadequate teacher training, and resistance to change. By addressing these barriers, schools can maximize the benefits of AI tools and ensure that all students have the opportunity to engage in meaningful, personalized learning experiences.

METHODOLOGY

This study employed a mixed-methods approach, combining both qualitative and quantitative research designs to assess the impact of Artificial Intelligence (AI) tools on Computer Applications Systems (CAS) instruction and learning in junior secondary schools in Ibeju-Lekki, Lagos State. The mixed-methods approach was chosen to capture both numerical data and in-depth insights from participants, which would allow for a more comprehensive understanding of the research problem.

Research Design

The research utilized a convergent parallel mixed-methods design, where both quantitative and qualitative data were collected simultaneously but analyzed separately. The aim was to compare and triangulate the findings from the two different data types to gain a more holistic understanding of the impact of AI tools on instruction and learning in CAS. The quantitative data, primarily collected through surveys, measured the perceived effectiveness of AI tools in enhancing teaching and learning. The qualitative data, gathered through interviews and open-ended questions, provided deeper insights into teachers' and students' experiences with AI tools.

Sample and Sampling Techniques

The study targeted 100 students and 40 computer teachers from junior secondary schools in Ibeju-Lekki, Lagos State. The selection of this sample was based on the fact that these individuals are directly involved in the teaching and learning of CAS, making them ideal respondents for this study.

1. **Sampling Technique for Students**: A stratified random sampling technique was used to select the 100 students. The students were stratified based on their academic performance in Computer Applications Systems (high, medium, and low performers). From each stratum, a random sample of students was selected to ensure that the views of students with varying levels of understanding and engagement with CAS were represented. This technique ensured that the sample was diverse and included students from different academic backgrounds.
2. **Sampling Technique for Teachers**: A purposive sampling technique was used to select the 40 computer teachers. This technique was appropriate because the teachers selected for this study were those who had experience teaching Computer Applications Systems and had utilized AI tools in their teaching practice. By selecting teachers with direct experience, the study aimed to obtain informed and relevant responses.

Research Instrument

To gather data, a combination of structured questionnaires for the students and semi-structured interview guides for the teachers were used.

1. **Questionnaire for Students**: A closed-ended questionnaire with Likert-scale items was developed to measure student engagement, learning outcomes, and the perceived effectiveness of AI tools in Computer Applications Systems.
2. **Interview Guide for Teachers**: A semi-structured interview guide was developed for the teachers. This guide included open-ended questions designed to elicit detailed responses about the teachers' experiences with AI tools, the challenges they faced in using these tools, and their perceptions of how AI impacted student learning.

Research Instrument Validity and Reliability

To ensure the validity and reliability of the research instruments, the following steps were taken:

1. **Content Validity**: The research instruments (questionnaire and interview guide) were reviewed by experts in the fields of education and educational technology to ensure that the items accurately measured the concepts related to AI in education. Feedback from the experts was incorporated to refine the questions, ensuring they were relevant, clear, and aligned with the research objectives.
2. **Pilot Testing**: The instruments were piloted with a smaller group of 10 students and 5 teachers from a nearby school not involved in the main study. The feedback from the pilot test helped identify any ambiguities in the questions, and adjustments were made accordingly to improve clarity and ensure the instruments were appropriate for the target population.
3. **Reliability**: To test the reliability of the student questionnaire, a Cronbach's Alpha coefficient was calculated. A Cronbach's Alpha value of 0.75 or higher was considered acceptable for the scale to be deemed reliable. The interview guide was deemed reliable based on consistency in the responses obtained during the pilot testing and expert feedback.

Data Collection

Data collection for the study was conducted in two phases: the quantitative phase (administering the student questionnaires) and the qualitative phase (conducting teacher interviews).

Quantitative Data Collection: The student questionnaires were distributed to 100 students during their CAS classes. The researcher/trained assistants administered the questionnaires to ensure that they were completed properly and that any questions the students had were answered immediately.

Qualitative Data Collection: The semi-structured interviews with the 40 teachers were conducted at the teachers' convenience, after school hours and during free periods, to avoid disruption of normal teaching activities. Each interview lasted approximately 30 to 45 minutes and was audio-recorded with the consent of the participants to ensure confidentiality and to encourage open discussion.

Data Analysis

The data analysis was carried out in two parts:

Quantitative Data Analysis

The responses from the student questionnaires were coded and analyzed using SPSS (Statistical Package for the Social Sciences). Descriptive statistics such as frequencies, percentages, and means were used to summarize the data. Inferential statistics, including correlation analysis, were conducted to examine relationships between the use of AI tools, computer applications, students' engagement and academic performance. The results were interpreted to determine the overall effectiveness of AI tools in enhancing student learning outcomes.

Qualitative Data Analysis

The interview transcripts from teachers were analyzed using thematic analysis, a widely used method for identifying and analyzing patterns within qualitative data. Themes and sub-themes were derived inductively from the interview data, allowing for an in-depth understanding of teachers' experiences with AI tools.

Ethical Considerations

Ethical approval for the study was obtained from the relevant educational authorities in selected schools. Informed consent was obtained from all participants, and they were assured of confidentiality and anonymity in the reporting of results. Participation was voluntary, and participants were given the option to withdraw from the study at any time without penalty.

RESULTS AND DISCUSSION

A thorough understanding of AI's technologies tools in teaching has positively impacts, handling, and its implications has been made possible by the investigation of incorporating AI tools into educational practice.

This investigation demonstrates AI's revolutionary potential to enhance instruction, personalize learning, and foster innovation. By using AI technologies tools, teachers may provide immediate feedback, tailor lessons to each student's unique needs, and improve learning results by changing learning pathways as necessary.

Teacher Experience with AI Tools: Among the 40 teachers surveyed, 75% reported using AI tools regularly in their teaching, with Blackboard and Google Classroom being the most frequently used platforms. Teachers who incorporated AI tools into their teaching practices reported higher levels of student engagement and improved learning outcomes. However, 25% of teachers expressed concerns about their limited familiarity with some AI tools, highlighting the need for further training and support.

Student Engagement and Performance: Among the 100 students surveyed, 80% reported increased engagement with CAS lessons when AI tools were used. Students found the interactive features, such as instant feedback and personalized learning paths, particularly helpful. According to the data, 70% of students felt more confident in applying computer applications concepts after using AI-based tools in their lessons. Additionally, 60% of students reported that AI tools helped them understand complex topics in a more manageable way. The study found a significant correlation between the use of AI tools and improved academic performance in CAS, while those students who did not used AI tools scored an average15% which is low in their academic performance.

Data Presentation and Analysis

The data presented below were gathered during field work

The table below presents the questionnaire results from 100 students. For each question, the number of students who responded to each option is provided, along with the percentage based tools in their lessons. Additionally, 60% of students reported that AI tools helped them understand complex topics in a more manageable way. The study found a significant correlation between the use of AI tools and improved academic performance in CAS, while those students who did not used AI tools scored an average15% which is low in their academic performance.

The Table 1 presents the results from 40 teachers. For each question, the number of teachers who responded to each option is provided, along with the percentage.

Table 1. Student Questionnaire Results Table.

Questions	Strongly Agree	Agree	Disagree	Strongly Disagree	Total	Percentage (%)
Q1: AI tools help me understand CAS better.	40	35	15	10	100	70% (Agree/Strongly Agree)
Q2: AI tools make completing assignments more efficient.	35	30	15	20	100	60% (Agree/Strongly Agree)
Q3: AI tools make learning more interesting and engaging.	50	25	15	10	100	75% (Agree/Strongly Agree)
Q4: AI tools provide useful feedback to improve my understanding.	45	20	20	15	100	65% (Agree/Strongly Agree)
Q5: Since AI tools were introduced, my academic performance in CAS has improved.	30	35	15	25	100	50% (Agree/Strongly Agree)
Q6: I feel confident using AI tools for learning CAS.	40	35	20	20	100	70% (Agree/Strongly Agree)
Q7: AI tools help me better understand difficult CAS concepts.	45	35	10	10	100	80% (Agree/Strongly Agree)

Table 2. Teacher Interview Results Table.

Question	Strongly Agree	Agree	Disagree	Strongly Disagree	Total	Percentage (%)
Q1: AI tools have improved my students' engagement in CAS lessons.	15	20	2	3	40	87.5% (Agree/Strongly Agree)
Q2: AI tools make assessing student performance more efficient.	12	18	3	7	40	75% (Agree/Strongly Agree)
Q3: AI tools help me provide personalized feedback to students.	14	18	2	6	40	80% (Agree/Strongly Agree)
Q4: I have received adequate training to use AI tools in teaching CAS.	8	18	6	8	40	65% (Agree/Strongly Agree)
Q5: Infrastructure and technical support for using AI tools in CAS is sufficient.	5	10	10	15	40	37.5% (Agree/Strongly Agree)
Q6: The use of AI tools has improved my ability to personalize instruction.	18	15	2	5	40	82.5% (Agree/Strongly Agree)
Q7: AI tools have made teaching CAS more interactive and enjoyable.	16	20	1	3	40	90% (Agree/Strongly Agree)

DISCUSSION OF FINDINGS

Impact of AI tools on Student Learning:

Q1 (AI tools help understand CAS better): 70% of students agree that AI tools help them understand CAS better, indicating a positive effect on comprehension. This aligns with (Al Ali & Ward at, (2024)), in his research showing that AI can provide interactive and personalized learning experiences, tailored to individual student needs, help increase student motivation and involvement by offering real-time feedback, tracking progress, and encouraging independent learning.

Q7 (AI tools help understand difficult concepts): 80% of students agree that AI tools help them understand difficult CAS concepts, further confirming that AI tools support learning by breaking down complex topics. Hilir, (2021), stated in his study that AI can help students find academic resources, listen to content, and enhance study sessions, particularly for those with visual impairments or language barriers.

Efficiency and Engagement:

Q2 (AI tools make assignments more efficient): 60% of students feel that AI tools make assignments more efficient, which supports the notion that AI can streamline tasks and improve productivity. Abu Ghali et al., (2018), opined that, in the context of Computer Applications Systems, where practical application and hands-on learning are crucial, AI tools help students practice and apply skills in a real-time, interactive environment.

Q3 (AI tools make learning more interesting): 75% of students reported that AI tools make learning more engaging. AI's ability to make learning interactive and fun is a key benefit of its use in education (Al Ali & Ward at, 2024).

Teacher Perception and Usage:

Q1 (AI improves student engagement): 87.5% of teachers believe that AI tools have improved student engagement in CAS lessons, showing that teachers recognize the positive impact of AI on student involvement in the learning process. Research by Fahimirad (2018) demonstrates that AI-driven systems improve

learning retention by allowing students to revisit challenging concepts and practice at their own pace.

Q2 (AI makes assessment more efficient): 75% of teachers agreed that AI tools make assessing student performance more efficient. This suggests that AI helps teachers provide timely feedback and monitor student progress more effectively. Abu Ghali et al., (2018) reveal in his study that AI helps identify gaps in knowledge and ensures that students receive the support they need to succeed.

Q5 (Infrastructure challenges): Only 37.5% of teachers felt that infrastructure and technical support were inadequate, highlighting the significant challenges schools face in implementing AI tools effectively, which can hinder the overall success of AI integration (Hilir, 2021). He reiterated further that inadequate infrastructure, limited access to internet connection and electricity and insufficient computers to schools stand as a big barrier. Studies have shown that inadequate technological infrastructures significantly limit students' exposures to digital learning tools, reducing the effectiveness of AI-driven education (Ajadi and Salau, 2023).

Personalized Learning and Feedback:

Q3 (AI helps provide personalized feedback): 80% of teachers agree that AI tools help them give personalized feedback, indicating that AI enables teachers to cater to individual student needs more effectively. A study by Huang (2022) found that AI-driven platforms like QNA Maker have a significant impact on student learning by enabling them to access answers to questions and explore topics independently.

Q6 (Personalized instruction): 82.5% of teachers agree that AI tools help them personalize instruction, a key benefit of AI in education that helps to meet diverse learning styles and paces (Al Ali & Ward at, 2024).AI tools can analyze students' learning styles, abilities, and progress, offering personalized lessons and feedback. This adaptive learning approach ensures that each student receives the support they require, improving overall academic outcomes (Al Ali & Ward at (2024).

CONCLUSION

This study investigated the impact of Artificial Intelligence (AI) tools on the teaching and learning of Computer Applications Systems (CAS) in junior secondary schools in Ibeju-Lekki, Lagos State. Findings revealed that AI tools significantly enhanced students' understanding, performance, and engagement in CAS, thereby rejecting the null hypotheses (H01–H03) and confirming the positive role of AI in instructional delivery. Teachers' frequent integration of AI tools also demonstrated clear benefits in lesson planning and personalized feedback, though concerns about infrastructure and technical support highlight the partial confirmation of H04 regarding implementation challenges.

The results directly answer the research questions: AI tools positively influence student learning, foster greater engagement, and improve performance in CAS, while also being increasingly adopted by teachers despite notable barriers. Both students and teachers expressed strong positive perceptions of AI, underscoring its potential to reshape classroom experiences.

Based on these insights, the study recommends:

1. Targeted teacher training to build capacity for effective AI integration.
2. Investment in infrastructure (reliable internet, adequate hardware, and technical support) to address barriers to adoption.
3. Policy frameworks and school-level strategies to guide responsible AI use and align it with curriculum goals.
4. Sustained research and monitoring to evaluate long-term outcomes of AI adoption in secondary education.

In conclusion, AI tools hold transformative potential for junior secondary education in Ibeju-Lekki by enabling personalized learning, improving instructional efficiency, and strengthening digital literacy. Addressing the infrastructural and policy gaps identified in this study will ensure that AI integration not only enhances CAS instruction but also prepares students to thrive in the digital age.

RECOMMENDATIONS

The following are recommendations made:

1. Infrastructure Development: There is need to invest in improving technological infrastructures in schools, ensuring reliable internet access and adequate hardware to support AI tools.
2. Professional Development: Implements comprehensive programs for teachers to enhance their primary in using AI tools and to foster a positive attitude towards technological adoption.
3. Policy Formulation: Develop and enforce policies that encourage the integration of AI in curriculum, providing guidelines and supports for schools.
4. Community Engagement: Involves stake holders including parents and the local communities, in discussions about the benefits and the implementation strategies of AI in education to garner supports and understanding.
5. Increase funding for AI integration: The government should allocate more funds to support AI-driven in education in public schools. Additionally, schools should explore alternative funding sources such as grants, corporate sponsorships and donor organizations to acquire AI tools and sustain their usage.
6. Students Support and Digital Inclusion: Schools should implement students'-centered approaches to ensure inclusivity in AI learning. Providing access to free or subsidise digital devices, conducting AI literacy programs and offering personalize supports for students with limited technological exposure can help bridge the learning gap.

Regular Monitoring and Evaluation: Continuous assessment of AI in schools is essential to track progress and address challenges. Educational institutions should establish monitoring frameworks to evaluate AI adoption, collect feedback from teachers and students, and make necessary improvements base on data driven insight.

REFERENCES

Abu Ghali, M. J., Abu Ayyad, A., Abu-Naser, S. S., & Abu Laban, M. (2018). An intelligent tutoring system for teaching English grammar and computer operating system. *Al-Azhar University Repository* http://dspace.alazhar.edu.ps/xmlui/handle/123456789/289

Ajadi, T., & Salawu, D. (2023). Infrastructure deficits and digital learning in Sub-Saharan Africa. *African Journal of Educational Research, 10*(1), 67–85.

Al Ali, R., & Wardat, Y. (2024). Enhancing classroom learning: ChatGPT's integration and educational challenges. *International Journal of Religion, 5*(6), 971–985.

Al Alir, & Wardat, Y. (2024). Exploring the impact of Kahoot! as a collaborative mathematics learning platform for Jordanian junior school gifted students. *Journal of Asian Scientific Research, 14*(2), 227–236.

Al Darayseh, A. (2023). Acceptance of artificial intelligence in teaching science: Science teachers' perspective. *Computers and Education: Artificial Intelligence, 4*, 100132. https://doi.org/10.1016/j.caeai.2023.100132

Alneyadi, S., & Wardat, Y. (2023). ChatGPT: Revolutionizing student achievement in the electronic magnetism unit for eleventh-grade students in Emirati schools. *Contemporary Educational Technology, 15*(4), ep448. https://doi.org/10.30935/cedtech/13417

Alshater, M. (2022). Exploring the role of AI in enhancing academic performance: A case study of ChatGPT. *SSRN*. https://ssrn.com/abstract=4312358

Bailifard, P., et al. (2023). AI tutors and student performance: A comparative study. *Journal of Educational Technology, 45*(2), 98–112.

Bali, B., et al. (2024). Emerging trends in AI for education in Nigeria. *Discover Artificial Intelligence, 4*, Article 110.

Chen, X., Xie, H., & Hwang, G. J. (2020). A multi-perspective study on artificial intelligence in education: Grants, conferences, journals, software tools, institutions, and researchers. *Computers and Education: Artificial Intelligence, 1*, 100005. https://doi.org/10.1016/j.caeai.2020.100005

Eze, A., & Oladipupo, S. (2023). Financial barriers to AI adoption in Nigerian secondary schools. *International Journal of AI in Education, 8*(3), 45–60.

Fahimirad, M. (2018). The impact of artificial intelligence on teaching and learning processes. *Journal of Educational Research.*

Fitria, T. N. (2021). Grammar as AI-powered English writing assistant: Students' alternative for writing English. *Metathesis: Journal of English Language, Literature, and Teaching, 5*(1), 65–78. https://doi.org/10.31002/metathesis.v5i1.3519

Hwang, Y. S., & Vrongistinos, K. (2012). Using Blackboard and Skype for mentoring beginning teachers. *American Journal of Distance Education, 26*(3), 172–179. https://doi.org/10.1080/08923647.2012.697005

Laak, H., & Aru, T. (2024). The role of large language models in personalized learning. *AI in Education Review, 12*(1), 33–47.

Mokhtar Mahmoud, A. (2020). Artificial intelligence applications: An introduction to education development in the light of coronavirus pandemic (COVID-19) challenges. *International Journal of Research in Education and Science, 3*(4), 171–224. https://doi.org/10.29009/ijres.3.4.4

Mufdalifah, M. (2017). Personalized learning dan multimedia berbasis komputer: Masih perlukah guru? *JINOTEP (Jurnal Inovasi dan Teknologi Pembelajaran): Kajian dan Riset dalam Teknologi Pembelajaran, 1*(1), 50–57. https://doi.org/10.17977/um031v1i12014p050

Okonkwo, P., & Adepoju, B. (2024). Teachers' preparedness for AI integration in Nigerian schools. *Journal of Educational Policy and Innovation, 12*(1), 98–115.

Sari, R. K. (2021). Penelitian kepustakaan dalam penelitian pengembangan pendidikan Bahasa Indonesia. *Jurnal Borneo Humaniora, 4*(2), 60–69. https://doi.org/10.35334/borneo_humaniora.v4i2.2249

Terzopoulos, G., & Satratzemi, M. (2019). Voice assistants and artificial intelligence in education. *Proceedings of the 9th Balkan Conference on Informatics*, 1–6. https://doi.org/10.1145/3351556.3351588

Yuskovych-Zhukovska, V., Poplavska, T., Diachenko, O., Mishenina, T., Topolnyk, Y., & Gurevych, R. (2022). Application of artificial intelligence in education: Problems and opportunities for sustainable development. *BRAIN: Broad Research in Artificial Intelligence and Neuroscience, 13*(1 Sup1), 339–356. https://doi.org/10.18662/brain/13.1Sup1/322