PERCEPTION OF EDUCATION STUDENTS ON THE USAGE OF ARTIFICIAL INTELLIGENCE (AL) TOOLS AT THE UNIVERSITY OF BENIN

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A RESEARCH WORK SUBMITTED TO THE DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL TECHNOLOGY, FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY, NIGERIA IN FULFILLMENT OF THE REQUIREMENT OF THE AWARD OF THE BACHELOR OF SCIENCE (ED) DEGREE IN CHEMISTRY EDUCATION

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CERTIFICATION

This is to Certify that this project was carried out by **Osayande Emmanuel ONAGHISE** with Matriculation Number: Edu2202660 in the Department of Curriculum and Instructional Technology, Faculty of Education, University of Benin, in partial fulfillment of a Bachelor of Science (Ed) degree in social studies.

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DEDICATION

This study is dedicated to Almighty God for His Grace that sustained the searcher in the course of the research.

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ABSTRACT

This study examined the perception of education students at the University of Benin regarding the usage of Artificial Intelligence (AI) tools in their academic activities. The study adopted a descriptive survey research design to gather data from 400 undergraduate students in the Faculty of Education during the 2024/2025 academic session. The instrument used for data collection was a structured questionnaire titled Perception of Education Students on the Usage of Artificial Intelligence Questionnaire (PESUAIQ), validated by experts and tested for reliability using Cronbach's Alpha. Data were analyzed using descriptive statistics such as mean and standard deviation.

The study found that students view AI positively and find it helpful for research, writing, presentations, and accessing information. However, they worry about overdependence, ethical issues, and reduced critical thinking. Poor internet, limited devices, and low digital literacy also affect effective use. Despite this, students remain optimistic about AI's impact on learning. The study recommends improving digital infrastructure, teaching AI literacy, and creating clear guidelines to support responsible and effective AI use in education.

Keywords: Artificial Intelligence, Perception, Education Students, University of Benin, Digital Literacy, Academic Engagement.

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CHAPTER ONE

INTRODUCTION

Background of the Study

Education is the systematic process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits, often delivered through structured teaching and guided study (UNESCO, 2015). Traditionally, education has relied heavily on face-to-face teaching methods, fixed curricula, printed textbooks, and teacher-centered instructional approaches. These conventional methods, while foundational, often limit individualized learning and do not fully accommodate diverse student needs or learning paces. With the emergence of Artificial Intelligence, however, education is undergoing a significant transformation. Artificial Intelligence offers intelligent systems capable of adapting content to suit individual learners, providing instant feedback, assisting with assignments, and supporting autonomous study. This evolution enhances how students engage with learning materials, making education more personalized, efficient, and interactive than ever before. In today's rapidly changing digital world, Artificial Intelligence tools are increasingly being seen as powerful allies in helping students improve their study habits, research quality, and overall academic performance.

In recent years, the field of education has experienced transformative changes as a result of the rapid advancement and integration of Artificial Intelligence technologies. Artificial Intelligence is broadly defined as the capability of a machine to imitate intelligent human behavior, including reasoning, problem-solving, learning, and adapting to new situations (Russell & Norvig, 2021). These capabilities are being harnessed in various sectors, but their impact in education is particularly significant, offering both opportunities and challenges that demand scholarly attention, especially in the context of developing countries like Nigeria.

The perception of students towards Artificial Intelligence is a critical factor that influences its acceptance, adoption, and effective usage. Perception refers to the way individuals interpret and understand a concept based on their beliefs, experiences, and exposure. In the case of this study, students' perception refers to the opinions, attitudes, beliefs, or understanding that education students hold regarding the usefulness, challenges, and relevance of Artificial Intelligence tools in their academic work. In the context of education students, their perception of Artificial Intelligence is vital because they are being trained to become future educators who will, in turn, determine how technology is integrated into Nigerian classrooms. A positive perception can lead to greater openness to using Artificial Intelligence in their own learning and in future teaching, while negative perceptions

such as fear of job displacement, ethical concerns, lack of digital skills, or skepticism about Artificial Intelligence reliability can hinder its adoption (Teo, 2011; Nkiko & Yusuf, 2022).

Globally, Artificial Intelligence is being used to personalize learning, automate administrative tasks, enhance assessment accuracy, and promote learner engagement through intelligent systems. Platforms such as ChatGPT, Google Bard, Grammarly, Coursera, Duolingo, and personalized learning systems like Knewton and Carnegie Learning exemplify how Artificial Intelligence is reshaping education delivery (Luckin et al., 2016; Holmes et al., 2019). These platforms are designed to adapt to individual learner needs, providing real-time feedback, tailoring content to student preferences, and supporting teachers in instructional planning and evaluation.

Artificial Intelligence tools are also increasingly being incorporated into educational practices to foster collaborative learning, improve research efficiency, and stimulate creativity. Artificial Intelligence Tools are digital platforms, applications, or systems that utilize artificial intelligence to assist users in tasks such as writing, editing, researching, or studying. Examples include ChatGPT (language generation), Grammarly (grammar correction), and Google Scholar (intelligent search engine). For instance, tools like Turnitin and Grammarly help students refine their writing. Artificial Intelligence-based simulations and virtual labs assist science students with experiments. Platforms like Kahoot and Quizlet utilize Artificial Intelligence algorithms to enhance student engagement and retention (Zawacki-Richter et al., 2019). In teacher education, Artificial Intelligence holds the potential to improve lesson planning, curriculum development, and even behavioral prediction of learners, thereby enhancing the quality of future instructional delivery.

In the Nigerian context, there has been a gradual introduction of Artificial Intelligence -related technologies in higher education institutions, including the University of Benin. Students now interact with Artificial Intelligence -powered platforms for academic research, writing assistance, communication, and even exam preparation. The emergence of tools like ChatGPT has sparked widespread interest among Nigerian undergraduates due to its ability to provide fast and intelligent responses, summarize information, explain difficult concepts, and assist with content creation. Despite these advancements, the level of actual usage, accessibility, and understanding of Artificial Intelligence tools among students especially those in teacher education programs remains varied and, in some cases, limited due to infrastructural, economic, and pedagogical constraints (Omodan & Ige, 2023; Adeoye & Adanikin, 2022).

Student awareness and exposure to Artificial Intelligence tools, their level of digital literacy and confidence in using technology, the perceived usefulness and ease of use of Artificial Intelligence platforms, the availability of

institutional support and infrastructure, and the broader cultural attitudes toward technology and innovation are factors that shape Students perception of Artificial Intelligence. For Nigerian education students, the perception of Artificial Intelligence is further influenced by systemic challenges in the education sector, including outdated curricula, inadequate ICT training, irregular power supply, and limited access to digital tools. Consequently, students' ability to fully understand and utilize Artificial Intelligence in educational contexts may be restricted, which has broader implications for the future of teaching and learning in Nigeria.

Given the global push toward digital transformation and the increasing relevance of Artificial Intelligence in education, it is imperative to assess how students in teacher education programs perceive the usage of Artificial Intelligence. This is particularly important at the University of Benin, one of Nigeria's foremost institutions for training educators. The outcome of such a study could provide valuable insights into students' readiness to engage with Artificial Intelligence, the barriers they face, and the kind of support they require to effectively leverage Artificial Intelligence in their academic and professional lives.

This research, therefore, aims to explore the perception of education students at the University of Benin toward the usage of Artificial Intelligence. It seeks to determine their level of awareness, extent of usage, perceived benefits and drawbacks, as well as the challenges they encounter in utilizing Artificial Intelligence tools. The findings will be useful for curriculum developers, teacher educators, policymakers, and educational technology stakeholders in designing strategies to promote Artificial Intelligence literacy and prepare future teachers for the demands of a technologically advanced learning environment.

Statement of the Problem

The rapid integration of Artificial Intelligence technologies into various aspects of education has sparked a global shift in how students learn, teachers instruct, and institutions operate. Artificial Intelligence applications such as intelligent tutoring systems, virtual assistants, automated grading systems, and personalized learning platforms have demonstrated the potential to improve teaching and learning outcomes significantly. In developed countries, the adoption of these tools has been met with enthusiasm and strategic investment, leading to noticeable improvements in educational delivery and student engagement (Holmes et al., 2019; Zawacki-Richter et al., 2019).

In Nigeria, however, the adoption and effective use of Artificial Intelligence in higher education remain at a relatively early stage. While tools like ChatGPT, Grammarly, and other Artificial Intelligence-powered platforms have become increasingly accessible, many students particularly those in teacher education programs have limited exposure to or understanding of these technologies. There is also a gap in structured training and curriculum

integration that would otherwise prepare education students to use Artificial Intelligence meaningfully in both their academic work and future classrooms (Omodan & Ige, 2023; Nkiko & Yusuf, 2022).

At the University of Benin, anecdotal evidence suggests that many education students are beginning to explore Artificial Intelligence tools to support their studies. While Artificial Intelligence has the potential to enhance learning, its impact is largely determined by how students perceive and engage with it. Some students may view Artificial Intelligence as a helpful academic aid, while others may mistrust its reliability, fear overdependence, or feel ill-equipped to use it effectively due to limited digital skills or institutional support. The core problem, therefore, is not simply the availability of Artificial Intelligence tools, but the perception and attitudes of education students toward their usage. If students have negative, indifferent, or misinformed views of Artificial Intelligence, they are less likely to adopt it meaningfully in their academic activities or future classrooms. Factors such ethical concerns, and fear of academic dishonesty may further contribute to unfavorable perceptions. This raises critical concerns about students' preparedness for technology-enhanced teaching and learning in the 21st century.

Therefore, this study seeks to investigate how education students at the University of Benin perceive the use of Artificial Intelligence tools, the factors influencing those perceptions, and how these perceptions affect their actual engagement with Artificial Intelligence in their academic work. Understanding these dynamics is essential for developing relevant training programs, promoting digital literacy, and ensuring that Artificial Intelligence tools are responsibly and effectively integrated into teacher education curricula.

Research Questions

1. What is the perception of education students at the University of Benin regarding the use of Artificial Intelligence tools in their academic activities?
2. How do education students perceive the benefits and limitations of using Artificial Intelligence tools for learning and research?
3. To what extent do education students believe Artificial Intelligence tools are relevant and reliable in supporting their academic success?
4. How frequent do students use Artificial tools in their studies, and for what purposes?
5. What are the positive and negative attitudes of students towards using Artificial Intelligence?

Purpose of the Study

The purpose of this study is to examine the perception of education students at the University of Benin regarding the use of Artificial Intelligence tools in their academic activities. Specifically, the study aims to:

1. Explore the perception of education students on the use of Artificial Intelligence tools in their academic work.
2. Investigate how students perceive the benefits and limitations of using Artificial Intelligence for learning and research.
3. Assess the extent to which students believe Artificial Intelligence tools are relevant and reliable in supporting their academic success.
4. How frequent do students use Artificial tools in their studies, and for what purposes?
5. What are the positive and negative attitudes of students towards using Artificial Intelligence?

Through this investigation, the study seeks to provide valuable insights into students' attitudes toward Artificial Intelligence, inform the integration of Artificial Intelligence in teacher education, and support strategies that promote effective and responsible use of Artificial Intelligence tools in higher education.

Significance of the Study

This study is significant because it provides valuable insights into how education students at the University of Benin perceive and utilize artificial intelligence tools in their academic activities. Understanding students' awareness, usage patterns, and attitudes toward Artificial Intelligence is essential in identifying gaps in digital literacy and preparedness, particularly among future teachers who will play a key role in integrating technology into classrooms.

The findings of this research will inform students on the proper usage of Artificial Intelligence and curriculum developers on how best to incorporate Artificial Intelligence-related competencies into teacher training programs, thereby promoting more effective and innovative teaching practices.

It also holds relevance for university administrators and policymakers by highlighting the infrastructural and pedagogical needs that must be addressed to enhance students' engagement with Artificial Intelligence technologies. Moreover, this study contributes to the growing body of literature on Artificial Intelligence in education within the Nigerian context, where empirical data is still limited. By exploring the challenges and opportunities associated with Artificial Intelligence use, the study also encourages students to critically reflect on

their digital practices, ultimately supporting more informed and responsible adoption of emerging technologies in education.

Scope and Delimitations of the Study

This study focuses on the perception of education students at the University of Benin regarding the use of Artificial Intelligence tools in their academic activities. It covers students within the Faculty of Education and considers commonly used Artificial Intelligence platforms such as ChatGPT, Grammarly, Quillbot, and Turnitin.

The study is limited to students in education-related programs and does not include those from other faculties. It also concentrates solely on the academic usage and perception of Artificial Intelligence, excluding non-academic or technical evaluations. Data will be based on students' self-reported experiences.

Definition of Terms

Education is the systematic process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits, often delivered through structured teaching and guided study (UNESCO, 2015).

Artificial Intelligence: is broadly defined as the capability of a machine to imitate intelligent human behavior, including reasoning, problem-solving, learning, and adapting to new situations (Russell & Norvig, 2021). In this study, artificial intelligence refers to computer systems or software that can perform tasks typically requiring human intelligence, such as problem-solving, language understanding, and decision-making. Examples include tools like ChatGPT, Grammarly, Quillbot, and Turnitin.

Perception: refers to the way individuals interpret and understand a concept based on their beliefs, experiences, and exposure.

Student perception: This refers to the opinions, attitudes, beliefs, or understanding that education students hold regarding the usefulness, challenges, and relevance of Artificial Intelligence tools in their academic work.

Artificial Intelligence Tools: These are digital platforms, applications, or systems that utilize artificial intelligence to assist users in tasks such as writing, editing, researching, or studying. Examples include ChatGPT (language generation), Grammarly (grammar correction), and Google Scholar (intelligent search engine).

Education Students: This term specifically refers to undergraduate and/or postgraduate students enrolled in the Faculty of Education at the University of Benin, who are being trained to become future educators.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter seeks to review related literature and it will be discussed under the following sub heads:

- Theoretical Framework
- Concept of Artificial Intelligence in Education
- Historical Background and Global Evolution of Artificial Intelligence in Education
- Students' Awareness of Artificial Intelligence Tools
- Students' Perceptions of Artificial Intelligence
- Usefulness of Artificial Intelligence in Academic and Professional Development
- Benefits of Artificial Intelligence in Education
- Threats of Artificial Intelligence in Education
- Ethical Concerns in Artificial Intelligence-Driven Digital Literacy
- Challenges in the Usage of Artificial Intelligence Tools Among Students
- Trends in Artificial Intelligence Usage Among Nigerian University Students
- Empirical Studies on Artificial Intelligence in Nigerian Educational Contexts
- Summary of the Literature Review.

Theoretical framework

The perception of artificial intelligence in higher education is shaped by various psychological, social, and technological factors. A key theoretical model used to explore technology perception is the Technology Acceptance Model (TAM), introduced by Davis (1989). This model emphasizes perceived usefulness (PU) and perceived ease of use (PEOU) as critical determinants of users' behavioral intentions toward adopting new technologies. Building upon TAM, Venkatesh and Davis (2000) and later Venkatesh, Morris, Davis, and Davis (2003) incorporated broader constructs, including social influence and facilitating conditions, which remain relevant in understanding Artificial Intelligence adoption among university students.

Recent empirical studies apply TAM to artificial intelligence tools in education. For instance, Karan and Chakma (2025) examined Artificial Intelligence adoption among university students using an extended TAM framework and found PU and PEOU to be significant predictors of intention to use Artificial Intelligence tools for learning. Likewise, Shahzad et al. (2024) showed that trust and perceived intelligence enhanced the impact of PU and PEOU in students' intention to use ChatGPT. These findings support the view that TAM remains a valid framework for evaluating students' Artificial Intelligence perceptions when adapted to modern intelligent systems.

Students' general attitudes toward Artificial Intelligence in education tend to be cautiously optimistic. Chan and Hu (2023), studying Hong Kong undergraduates, found that while students appreciated Artificial Intelligence tools for enhancing writing and research tasks, they expressed reservations regarding ethical usage and accuracy. In Nigeria, Abdulmumin and Abdulrahman (2024) reported that university students view tools like ChatGPT as helpful, especially in completing assignments, clarifying academic concepts, and improving efficiency. However, perceptions varied across gender and institutional contexts.

Emotional responses also influence students' perception of AI. Katsantonis and Katsantonis (2024) revealed that emotional and cognitive attitudes, such as excitement or apprehension, were stronger predictors of Artificial Intelligence perception than mere behavioral intention among social science students in Greece. These attitudes significantly affected their willingness to engage with Artificial Intelligence technologies in their academic routines.

Several key variables shape students' perception of Artificial Intelligence in educational settings:

Perceived Usefulness (PU) and Ease of Use (PEOU) remain the most influential. Karan and Chakma (2025) reported that students who found Artificial Intelligence tools helpful and easy to navigate were more inclined to adopt them for learning. A related study in the Philippines by Mendoza and Alcantara (2024) among business education students confirmed that PU was a stronger predictor than PEOU in determining students' intention to use Artificial Intelligence.

Trust also plays a pivotal role. Shahzad et al. (2024) emphasized that students' trust in Artificial Intelligence systems was essential for sustained usage. Choung et al. (2022) further identified two forms of trust: functional trust (belief in accuracy and performance) and human-like trust (perceived intelligence and empathy), both of which significantly affect student acceptance.

Ethical concerns and fear of replacement influence students' attitudes as well. A Financial Times report (Giles, 2023) found that Gen Z students worldwide were concerned about the erosion of human-centered education and the ethical handling of Artificial Intelligence-generated content. Similarly, students in Delhi, India, as reported by Times of India (2024), expressed anxiety about overreliance on Artificial Intelligence reducing their ability to think critically and solve problems independently.

Several empirical studies substantiate these claims. Chan and Hu (2023) surveyed 399 students and found a generally positive attitude toward generative Artificial Intelligence, tempered by ethical worries. Abdulmumin and Abdulrahman (2024) studied 120 Nigerian undergraduates and discovered positive perceptions and frequent use of ChatGPT, although digital literacy and awareness levels varied. Katsantonis and Katsantonis (2024) also observed emotional and cognitive dimensions significantly influencing perceptions in their study of Greek students.

Students' perception of Artificial Intelligence in higher education is complex, shaped by both technological factors (e.g., usefulness, ease of use) and emotional or ethical concerns (e.g., trust, fear of obsolescence). The Technology Acceptance Model continues to provide a valuable lens for understanding student attitudes, although updated frameworks integrating trust, emotion, and ethics offer a more holistic picture. These insights are critical for educators and institutions aiming to integrate Artificial Intelligence tools into academic settings in a responsible and student-centered manner.

Concept of Artificial Intelligence in Education

Artificial Intelligence in education refers to the application of intelligent computer systems that can mimic human cognitive functions such as reasoning, problem-solving, decision-making, and learning to improve teaching and learning processes. These Artificial Intelligence systems include chatbots, adaptive learning software, intelligent tutoring systems (ITS), and automated assessment tools (Holmes et al., 2019). In educational contexts, Artificial Intelligence is designed to enhance learner experiences, tailor instruction to individual needs, and provide timely feedback that supports academic success.

The integration of Artificial Intelligence in education has evolved over several decades. The concept can be traced back to the 1960s, with the development of early instructional systems like PLATO and SCHOLAR, which were among the first attempts to use computers for personalized education (Luckin et al., 2016). During the 1980s and 1990s, more sophisticated ITS and expert systems began to emerge, offering structured learning paths and feedback based on student inputs. The rise of the internet in the 2000s further expanded Artificial Intelligence

applications in education through online learning management systems. By the 2020s, generative Artificial Intelligence tools such as ChatGPT, Google Bard, and Artificial Intelligence-based analytics platforms have become widely used in higher education (Luckin et al., 2016; Zawacki-Richter et al., 2019).

On a global scale, higher education institutions are increasingly embedding Artificial Intelligence into teaching and administrative operations. A recent study by Jin et al. (2024) revealed that over 80% of surveyed universities across six continents are formulating or implementing policies for generative Artificial Intelligence in education. These policies emphasize student support, ethical use, academic integrity, and equitable access. In elite institutions such as Harvard Business School, Artificial Intelligence tools like ChatGPT EDU and tailored chatbots are being introduced to support coursework and collaborative learning (Financial Times, 2024). Similarly, universities in Europe and Asia are integrating Artificial Intelligence literacy and digital competencies into their curriculum to prepare students for the evolving job market (Zawacki-Richter et al., 2019).

The use of Artificial Intelligence-powered adaptive learning systems has been widely documented for their effectiveness in improving student learning outcomes. According to Alavi et al. (2022), adaptive Artificial Intelligence tools, which modify content delivery based on learner interactions and performance, significantly enhance engagement and comprehension, especially in large classroom settings. These tools not only offer real-time feedback but also promote self-paced and personalized learning experiences.

Despite its numerous benefits, the integration of Artificial Intelligence in education raises important concerns. Scholars such as Akgun and Greenhow (2024) warn about potential issues like algorithmic bias, data privacy, lack of transparency, and overdependence on Artificial Intelligence tools. There is growing concern about the possibility of Artificial Intelligence reinforcing social inequalities, especially if not implemented with inclusive design and proper ethical frameworks (Holmes et al., 2022). Hence, many researchers advocate for robust policy regulations and ethical guidelines to ensure that Artificial Intelligence use in education supports fairness, accountability, and human-centered learning (Zawacki-Richter et al., 2019).

Historical Background and Global Evolution of Artificial Intelligence in Education

The concept of Artificial Intelligence was formally introduced in 1956 at the Dartmouth Conference by John McCarthy and other pioneers, marking the beginning of efforts to simulate aspects of human intelligence using machines (Russell & Norvig, 2021). Though initially rooted in computer science, Artificial Intelligence's educational applications began to emerge in the 1970s with the development of Intelligent Tutoring Systems (ITS). These systems aimed to mimic the one-on-one interaction between a student and a human tutor by analyzing

learners' inputs and adjusting content delivery accordingly (Woolf, 2010). Early examples include SCHOLAR and SOPHIE, which were designed to support problem-solving and dialogic learning in specialized subjects.

The 1980s and 1990s saw limited progress in educational Artificial Intelligence due to computational limitations and the high cost of Artificial Intelligence systems. However, the 2000s brought significant advancements with the proliferation of the internet, increased data storage capacity, and improvements in machine learning algorithms. These developments enabled the emergence of adaptive learning platforms such as Carnegie Learning and ALEKS, which personalized learning paths based on students' performance and engagement (VanLehn, 2011). These platforms laid the groundwork for Artificial Intelligence to become an integrated feature in education technology.

Globally, the adoption of Artificial Intelligence in education gained momentum in the 2010s, especially with the advancement of natural language processing (NLP), deep learning, and big data analytics. Countries such as China, the United States, and South Korea began integrating Artificial Intelligence into national education policies. For instance, China's Ministry of Education launched an Artificial Intelligence Education Development Plan in 2018, aiming to incorporate Artificial Intelligence into teaching practices and teacher training across all levels of education (Zhou et al., 2020). Similarly, the U.S. Department of Education has supported Artificial Intelligence-based educational research through its Institute of Education Sciences, promoting the use of learning analytics and Intelligent systems in schools and universities.

In Europe, the European Commission outlined its vision in the 2021 Digital Education Action Plan, promoting the use of Artificial Intelligence to improve digital literacy, personalized learning, and educational inclusion across member states (European Commission, 2021). Artificial Intelligence-powered applications such as Century Tech in the UK and Squirrel Artificial Intelligence in China exemplify this global trend, using real-time data to provide targeted interventions, progress tracking, and feedback that adapt to students' individual needs.

During the COVID-19 pandemic, the adoption of Artificial Intelligence tools accelerated as educational institutions sought alternatives to traditional classroom teaching. The demand for Artificial Intelligence -based platforms such as Coursera, edX, Duolingo, and Artificial Intelligence-powered chatbots surged, demonstrating the global shift toward digital and intelligent learning environments (Li & Lalani, 2020). Artificial Intelligence became a crucial tool in ensuring continuity of education, especially in higher institutions where research, assessment, and interaction had to migrate online.

Today, Artificial Intelligence in education continues to evolve, driven by innovations in generative Artificial Intelligence (e.g., ChatGPT, Bard), speech recognition, and predictive analytics. These tools are not only reshaping how students learn but also how educators teach, design curricula, and manage administrative tasks. Furthermore, emerging technologies such as emotion Artificial Intelligence and affective computing are being explored for their potential to monitor learners' emotional states and provide socio-emotional support, which adds a new dimension to student engagement and motivation (D'Mello & Graesser, 2015).

Despite these global advancements, the adoption and impact of Artificial Intelligence in education vary significantly across regions due to disparities in technological infrastructure, digital literacy, and policy frameworks. In many parts of Africa, including Nigeria, integration remains relatively low, hindered by inadequate access to reliable internet, lack of awareness, and insufficient investment in education technology (Okoye et al., 2023). Nonetheless, institutions such as the University of Benin are witnessing gradual shifts as students increasingly engage with Artificial Intelligence tools for academic and professional purposes.

The evolution of Artificial Intelligence in education has transitioned from rule-based systems to adaptive, intelligent platforms that now influence nearly every aspect of the educational process. The global embrace of Artificial Intelligence has created opportunities to personalize learning, enhance student support, and improve administrative efficiency. However, the success of Artificial Intelligence integration ultimately depends on localized strategies, stakeholder perception, and readiness to engage with emerging technologies.

Students' Awareness of Artificial Intelligence Tools

In educational research, awareness refers to students' recognition and understanding of technological tools, including their existence, functionalities, and potential applications in academic settings. It is typically operationalized through self-report survey items asking respondents if they know about specific tools, rate their familiarity, or identify what tools they have used (Cheche et al., 2024; Anih & Ukeh, 2024). Measurement instruments often rely on Likert scales, checklist formats, or yes/no questions. Reliability of these measures is commonly assessed via Cronbach's alpha (values around 0.70–0.85), indicating acceptable internal consistency (Anih & Ukeh, 2024; Kasumu & Agbarakwe, 2024).

Internationally, recent surveys highlight widespread awareness of generative Artificial Intelligence tools such as ChatGPT. For instance, Chan and Hu (2023) reported that a majority of Hong Kong undergraduates recognized ChatGPT and could describe its functions, citing benefits like writing assistance and research support, although concerns about accuracy and ethical use were noted. In Europe, Sublime and Renna (2024) found nearly universal

awareness of ChatGPT among French and Italian students (ages 13–25), with variations by age and discipline; older students and males reported higher familiarity (Sublime & Renna, 2024).

Locally, Nigerian tertiary students demonstrate varying levels of awareness depending on context. In Awka, Anambra State, Okoye et al. (2025) found that secondary school students possessed awareness of Artificial Intelligence tools for English language learning, though actual usage remained low. Among undergraduates at Nnamdi Azikiwe University, awareness of ChatGPT was reported at 92% with pervasive use in academic tasks, though concerns about plagiarism and diminished critical thinking emerged (Obidike & Ogunbadejo, 2024). Among postgraduate education students in Port Harcourt, Kasumu and Agbarakwe (2024) identified moderate awareness levels tied to involvement in STEM activities and coding clubs. Students with such exposure exhibited greater understanding and practical familiarity with Artificial Intelligence tools.

Other studies across Nigerian institutions corroborate these findings. Owolabi et al. (2022) reported that polytechnic students were generally aware of Artificial Intelligence's role in library operations following orientation sessions, though infrastructural limitations remained a barrier to deeper engagement. Similarly, Asongo et al. (2024) observed significant differences in Artificial Intelligence awareness levels across programme types among postgraduate students in Benue State, emphasizing the role of academic field in shaping familiarity with Artificial Intelligence tools.

Several factors contribute to the level of awareness of Artificial Intelligence tools among students:

- Access to Digital Tools and Infrastructure: Access to smartphones, laptops, and reliable internet services is foundational to Artificial Intelligence awareness. In Nigerian campuses with limited connectivity or erratic power supply, awareness remains low despite global availability of Artificial Intelligence online (Okoye et al., 2023; Owolabi et al., 2022).

- Media Exposure and Informal Learning: Passive awareness often arises through media, social networks, and peer communication. The Federal Government's Artificial Intelligence Academy initiative in Nigeria (launched in late 2024) and widespread news coverage of ChatGPT have helped raise visibility of Artificial Intelligence tools among students even before formal instruction (reddit contributor on FG Artificial Intelligence Academy, 2025).

- Institutional Initiatives and Training Programs: Orientation programs, workshops, and curricular inclusion can boost awareness. Owolabi et al. (2022) noted that polytechnic libraries with intentional

Artificial Intelligence orientation sessions significantly increased student awareness. Similarly, Kasumu and Agbarakwe (2024) attributed higher awareness among postgraduate education students to their participation in coding clubs and STEM programmes.

- Academic Discipline and Peer Influence: Students in technical or research-intensive disciplines tend to exhibit higher Artificial Intelligence awareness due to coursework or peer networks. Asongo et al. (2024) found programme type significantly influenced Artificial Intelligence awareness in postgraduate cohorts. Oxford students exposed to Artificial Intelligence -infused curricula or research projects also report higher familiarity.

- Age, Level of Study, and Demographics: Younger or lower-level students may have less awareness than older or final-year students due to coursework exposure. Sublime and Renna (2024) documented that older students were more awareness and men more likely to engage with Artificial Intelligence tools. Similarly, in Nigeria, final-year undergraduates often possess higher self-reported awareness than early-year students (Obidike & Ogunbadejo, 2024)

Students' Perceptions of Artificial Intelligence

Various research has explored how students perceive artificial intelligence, including their attitudes, beliefs, and fears. Some key findings from various studies are summarized below:

Gherheş and Obrad (2018) in their study involved undergraduate students and found that most students felt they had a below-average understanding of Artificial Intelligence. Despite this, a significant number had a positive attitude towards Artificial Intelligence's development, with many believing that it would have a positive impact on society. However, fears regarding Artificial Intelligence included the potential destruction of humanity by intelligent devices and the loss of jobs due to automation.

Jeffrey (2020) reported Similar findings in his study, which found a generally positive perception of Artificial Intelligence among college students. However, students had varied levels of understanding of Artificial Intelligence and its development. Students' perceptions were influenced by their awareness of Artificial Intelligence's potential benefits to society, as well as concerns about rapid Artificial Intelligence advancements, the replacement of human jobs, and the possibility of Artificial Intelligence surpassing human intelligence.

Wang et al. (2022) in their study focused on university students' intentions to learn Artificial Intelligence, examining factors like Artificial Intelligence anxieties, motivation, and self-efficacy. It found that while intrinsic

and extrinsic motivations positively influenced students' intention to learn Artificial Intelligence, anxiety about Artificial Intelligence especially the fear of learning challenges negatively impacted this intention.

Chai, Wang, & Xu (2020) and Dai et al. (2020) in their studies extended the analysis of students' readiness to learn Artificial Intelligence to secondary and elementary school students. The findings indicated that anxiety about Artificial Intelligence, as well as motivation to learn, played a significant role in shaping students' readiness and willingness to engage with Artificial Intelligence learning.

Idroes et al. (2023) in their research examined the perception of Artificial Intelligence in education among undergraduate students. The majority held a positive view of Artificial Intelligence's usefulness in education, particularly its ability to enhance the teaching and learning processes. Students identified several benefits, such as virtual assistants for teaching, universal access for learning, and constant feedback during assessments.

Kuleto et al. (2021) In their study of Artificial Intelligence and machine learning (ML) in higher education, students noted the enhancement of personalized learning driven by Artificial Intelligence and ML as one of the key benefits. The research also emphasized the importance of providing a collaborative learning environment and accessible research opportunities, which can be facilitated by Artificial Intelligence and ML.

The studies above show how students generally exhibit positive perceptions of Artificial Intelligence in education, concerns about its potential to replace jobs and its rapid advancement remain significant. However, the benefits of Artificial Intelligence such as personalized learning, immediate feedback, and universal access to resources are widely acknowledged, especially as students become more familiar with Artificial Intelligence's capabilities.

Several key variables shape students' perception of Artificial Intelligence in educational settings:

- Perceived Usefulness (PU) and Ease of Use (PEOU) remain the most influential. Karan and Chakma (2025) reported that students who found Artificial Intelligence tools helpful and easy to navigate were more inclined to adopt them for learning. A related study in the Philippines by Mendoza and Alcantara (2024) among business education students confirmed that PU was a stronger predictor than PEOU in determining students' intention to use Artificial Intelligence.

- Trust also plays a pivotal role. Shahzad et al. (2024) emphasized that students' trust in Artificial Intelligence systems was essential for sustained usage. Choung et al. (2022) further identified two forms of trust: functional trust (belief in accuracy and performance) and human-like trust (perceived intelligence and empathy), both of which significantly affect student acceptance.

- Ethical concerns and fear of replacement influence students' attitudes as well. A Financial Times report (Giles, 2023) found that Gen Z students worldwide were concerned about the erosion of human-centered education and the ethical handling of Artificial Intelligence-generated content. Similarly, students in Delhi, India, as reported by Times of India (2024), expressed anxiety about overreliance on Artificial Intelligence reducing their ability to think critically and solve problems independently.

Several empirical studies substantiate these claims. Chan and Hu (2023) surveyed 399 students and found a generally positive attitude toward generative Artificial Intelligence, tempered by ethical worries. Abdulmumin and Abdulrahman (2024) studied 120 Nigerian undergraduates and discovered positive perceptions and frequent use of ChatGPT, although digital literacy and awareness levels varied. Katsantonis and Katsantonis (2024) also observed emotional and cognitive dimensions significantly influencing perceptions in their study of Greek students.

Students' perception of Artificial Intelligence in higher education is complex, shaped by both technological factors (e.g., usefulness, ease of use) and emotional or ethical concerns (e.g., trust, fear of obsolescence). The Technology Acceptance Model continues to provide a valuable lens for understanding student attitudes, although updated frameworks integrating trust, emotion, and ethics offer a more holistic picture. These insights are critical for educators and institutions aiming to integrate Artificial Intelligence tools into academic settings in a responsible and student-centered manner.

Usefulness of Artificial Intelligence in Academic and Professional Development

Artificial Intelligence significantly enhances learning outcomes, engagement, and personalization across academic contexts. Adaptive learning systems (e.g., DreamBox, ALEKS, Squirrel Artificial Intelligence) dynamically adjust content based on student performance, leading to improvements in comprehension and retention (Nguyen et al., 2023; Squirrel Artificial Intelligence Learning, 2019). These systems offer real-time feedback and individualized pacing, especially effective in diverse or large classroom settings (Nguyen et al., 2023; Katiyar et al., 2024). Research shows that personalized experiences foster deeper engagement and motivation among learners (Aiforsocialgood.ca, 2024).

In academic writing and research support, Artificial Intelligence tools like ChatGPT, Grammarly, and CGScholar assist students by enhancing grammar, expanding vocabulary, structuring essays, and detecting plagiarism (Chan & Hu, 2023; Wang & Li, 2023; Zheldibayeva et al., 2025). A systematic study among Ghanaian postgraduate students demonstrated that Artificial Intelligence tools increase writing efficacy, fluency, and confidence when

properly balanced with human oversight (Chan & Hu, 2023; Zheldibayeva et al., 2025). Similarly, CGScholar users showed improvements in research writing skills when combining Artificial Intelligence and peer feedback, highlighting the value of blended approaches (Zheldibayeva et al., 2025).

For test preparation and peer collaboration, Artificial Intelligence facilitates interactive quizzes, content summaries, and group engagement platforms. ChatGPT and educational bots support brainstorming and revision, while Artificial Intelligence-assisted forums promote collaboration under guided prompts. These functions help students identify learning gaps and strengthen critical thinking (Kim et al., 2022; Aiforsocialgood.ca, 2024; Adeniran et al., 2024).

Artificial Intelligence also plays a vital role in professional development, especially for pre-service teachers. Intelligent platforms can support lesson planning, classroom management, and reflective teaching. Artificial Intelligence systems analyze educator performance and student outcomes to offer tailored recommendations, while virtual teaching simulations provide safe environments for practice and feedback (Aiforsocialgood.ca, 2024; blog from Artificial Intelligence for Social Good, 2024). These tools free educators from routine administrative tasks like grading, attendance, and curriculum planning, enabling them to focus on mentorship and instructional design (Aiforsocialgood.ca, 2024; blog from LPS Global, 2025).

Students report both benefits and perceived risks. Benefits include increased clarity, time efficiency, enhanced academic writing, and personalized learning support. Non-native English speakers particularly benefit from improved language output (Tom's Guide, 2025; Wikipedia, n.d.). At the same time, risks such as overreliance on Artificial Intelligence tools, reduced memory retention ("digital amnesia"), and diminished critical thinking have been documented (Herald Sun, 2025; Times of India, 2025). Experimental research found that students who over-relied on generative Artificial Intelligence scored lower on comprehension tasks, suggesting moderated usage with human reflection is essential (Ju, 2023).

Benefits of Artificial Intelligence in Education

The integration of artificial intelligence in education brings several benefits that significantly enhance the learning experience for students. These benefits, as identified by Robert, Potter, and Frank (2023), include:

1. Personalized Learning: Artificial Intelligence-powered educational platforms can analyze vast amounts of data to understand students' learning styles, preferences, and areas needing improvement. This information allows Artificial Intelligence to deliver personalized learning experiences, offering tailored content, resources, and

assessments. Students can progress at their own pace, focus on weaker areas, and explore more advanced concepts when ready, enhancing engagement, motivation, and learning outcomes.

2. Immediate and Constructive Feedback: Artificial Intelligence enables prompt feedback on assignments, quizzes, and exams, allowing students to receive immediate insights into their strengths and weaknesses. This quick response helps students address gaps in understanding in real time, facilitating more effective learning and enabling progress to be made more efficiently.

3. Enhanced Collaboration and Interaction: Artificial Intelligence technologies promote collaborative learning environments through intelligent tutoring systems and virtual assistants that support group discussions, guidance, and peer interaction. These tools encourage active participation, critical thinking, and problem-solving, helping students to learn from one another, exchange ideas, and develop teamwork skills.

4. Access to a Wealth of Educational Resources: Artificial Intelligence can efficiently curate and organize vast educational content, recommending resources based on students' individual needs. From textbooks and articles to videos and interactive materials, Artificial Intelligence ensures students can easily access relevant resources to explore diverse topics, deepen their understanding, and engage with a variety of learning materials beyond traditional textbooks.

5. Intelligent Learning Analytics: Artificial Intelligence-powered learning analytics offer valuable insights into students' learning progress, performance patterns, and areas for improvement. By analyzing student data, Artificial Intelligence can identify trends, helping educators make informed decisions. This enables teachers to provide targeted interventions, personalize instruction, and improve the effectiveness of educational practices.

6. Students' Attendance Tracking: Artificial Intelligence systems can streamline attendance tracking using intelligent sensors placed at school entrances and exits. This allows for easy and accurate recording of attendance without teachers needing to manually mark it, helping save time and improve attendance management.

Threats of Artificial Intelligence in Education

1. Discrimination and Bias: Artificial Intelligence systems have the potential to perpetuate existing biases if the data they are trained on is not diverse or representative. This could lead to discriminatory outcomes, reinforcing inequities in educational opportunities and results. For Artificial Intelligence to support diversity, equality, and inclusion in education, it is essential that efforts are made to identify and address bias in training datasets and algorithms.

2. Data Privacy and Security Risks: The collection and storage of vast amounts of student data raise significant privacy and security concerns. Sensitive information could be abused, accessed without authorization, or compromised in data breaches. Ensuring the protection of student privacy and compliance with relevant data protection laws is essential when integrating Artificial Intelligence systems in education.

3. Over-dependence on Technology: Relying too heavily on Artificial Intelligence could weaken students' critical thinking and problem-solving skills. While Artificial Intelligence can enhance learning, it is crucial to strike a balance between leveraging Artificial Intelligence as a tool for improving educational experiences and preserving traditional teaching methods that foster independent thinking, creativity, and deeper engagement with learning.

4. Economic Disparities: The unequal access to Artificial Intelligence-powered educational resources could widen the gap between affluent and disadvantaged areas, exacerbating existing educational inequalities. To ensure fairness and promote equal educational opportunities, it is important to guarantee equitable access to Artificial Intelligence technologies and invest in infrastructure that bridges the digital divide.

5. Job Displacement: There are concerns that Artificial Intelligence may automate certain teaching tasks, potentially leading to job displacement for educators. While Artificial Intelligence can improve administrative efficiency, it is important to maintain the vital role of teachers in motivating, mentoring, and providing personalized guidance to students, as these are areas where human connection and expertise are irreplaceable.

Ethical Concerns in Artificial Intelligence-Driven Digital Literacy

As artificial intelligence becomes increasingly integrated into educational systems across Africa, including Nigeria, a number of ethical concerns have emerged, particularly in the context of digital literacy. These concerns span issues of accountability, regulation, cultural preservation, and algorithmic bias.

Accountability and Governance:

In many African nations, governance frameworks for Artificial Intelligence remain underdeveloped, posing serious questions about accountability in the event of system failures or harms within digital literacy programs. In Nigeria, as in many African countries, steps have only recently been initiated toward data protection and privacy regulation. Onuoha (2019) highlighted that only 17 out of the 55 African Union member states had enacted comprehensive data protection laws, which are foundational for safeguarding citizens' rights and promoting responsible Artificial Intelligence use.

Regulatory Gaps:

The absence of robust legal structures to guide Artificial Intelligence development and deployment leaves a vacuum in accountability and recourse for misuse. A well-structured legal framework is essential to balance innovation and risk, particularly in educational applications where ethical and legal dilemmas frequently arise. Effective governance models must anticipate and mitigate the potential for algorithmic harm, misuse of personal data, and lack of recourse in cases of Artificial Intelligence malfunction.

Cultural Homogenization:

Many Artificial Intelligence tools are developed in Western contexts, with content and values that may not align with the cultural and educational realities of African societies. This can result in the erosion of local languages, customs, and indigenous knowledge systems. While Artificial Intelligence holds potential to transform education by personalizing learning and improving instructional practices (Pantelimon et al., 2021), it may simultaneously undermine diversity in pedagogical approaches and content delivery unless locally relevant adaptations are prioritized.

Bias in Artificial Intelligence Algorithms:

Another major concern is the inherent bias in Artificial Intelligence models. When Artificial Intelligence systems are trained on non-representative datasets, they risk reinforcing harmful stereotypes or excluding essential cultural elements. Artificial Intelligence predictions and decisions mirror the data and assumptions upon which they are built. Studies have demonstrated that Artificial Intelligence technologies such as digital assistants like Apple's Siri or Amazon's Alexa have embedded gender biases, often portraying subservient female personas (UNESCO, 2021; West, Kraut, & Ei Chew, 2019). These biases, rooted in gender imbalances in technical teams and educational access, underscore the need for diverse representation in Artificial Intelligence development.

Equity in Access and Use:

The deployment of Artificial Intelligence in education also raises equity issues. Students in underserved or rural communities may lack access to the infrastructure like stable electricity and internet connectivity required to benefit from Artificial Intelligence tools. Without deliberate policies to bridge this gap, Artificial Intelligence could deepen existing educational inequalities rather than alleviate them.

While Artificial Intelligence offers transformative possibilities in enhancing digital literacy and education, these ethical concerns must be addressed through inclusive policies, culturally sensitive technology design, and the

establishment of strong legal and institutional frameworks. Failure to do so may lead to unintended harm, deepened inequalities, and resistance to Artificial Intelligence adoption in education.

Challenges in the Usage of Artificial Intelligence Tools Among Students

1. Access and Affordability Issues

Many students in Nigerian universities face difficulties accessing Artificial Intelligence tools due to the high cost of internet services, smartphones, and laptops. The financial burden of acquiring data plans and smart devices limits the extent to which students can consistently interact with Artificial Intelligence platforms such as ChatGPT, Grammarly, or Artificial Intelligence-enhanced learning systems. According to Ayanlade and Adefioye (2023), over 40% of undergraduates in southwestern Nigeria reported poor access to internet services and devices as major barriers to engaging with digital learning tools. Furthermore, infrastructure inequalities between urban and rural institutions widen this accessibility gap, thereby limiting Artificial Intelligence's reach across educational contexts (Olanrewaju & Adewunmi, 2022).

2. Digital Literacy Levels Among Undergraduates in Nigeria

While some students are aware of Artificial Intelligence technologies, many lack the digital literacy skills required to use them effectively. Digital literacy encompasses the ability to evaluate, manage, and ethically interact with information using digital technologies (UNESCO, 2022). A study by Adewale et al. (2024) found that a significant number of Nigerian university students struggle with using advanced online tools beyond social media platforms. This low proficiency limits their ability to use Artificial Intelligence tools for writing support, data analysis, or interactive learning purposes. The lack of structured digital literacy programs in many universities further compounds the problem (Ogunyemi & Obielodan, 2023).

3. Fear of Over-Reliance on Artificial Intelligence, Misinformation, and Academic Dishonesty

As students increasingly depend on Artificial Intelligence tools, concerns about over-reliance and its implications on critical thinking, creativity, and independent study have grown. Generative Artificial Intelligence tools may provide quick answers, but they can also produce inaccurate or misleading information, leading to misinformation (Ju, 2023). Moreover, the use of Artificial Intelligence in academic work raises ethical concerns, particularly around plagiarism, academic dishonesty, and reduced student effort (Chan & Hu, 2023). Educators fear that if students overly depend on Artificial Intelligence for assignments and problem-solving, it may undermine the development of analytical skills and academic integrity (Zheldibayeva et al., 2025).

4. Institutional and Infrastructural Barriers to Effective Artificial Intelligence Use

Nigerian universities often lack the institutional frameworks and infrastructure required to integrate Artificial Intelligence into teaching and learning effectively. Challenges include limited availability of digital resources in libraries, absence of Artificial Intelligence literacy in the curriculum, lack of Artificial Intelligence-based learning management systems, and insufficient training for staff (Adebayo & Eze, 2023). In some cases, lecturers are unfamiliar with Artificial Intelligence tools themselves, which limits their ability to support students in Artificial Intelligence-assisted learning. Additionally, power outages, weak ICT policies, and inadequate funding contribute to poor implementation of Artificial Intelligence technologies in universities (Akinwale & Arigbabu, 2022).

5. Lack of Awareness and Exposure to Artificial Intelligence Tools

Despite the growing influence of Artificial Intelligence in education, many students remain unaware of the full range of Artificial Intelligence tools available for academic purposes. Their interaction is often limited to social media Artificial Intelligence filters or autocorrect systems, with little knowledge of academic tools like Grammarly, ChatGPT, QuillBot, or research-based platforms like Elicit. This gap in awareness reduces students' ability to take advantage of Artificial Intelligence's academic support potential. Okonkwo and Adeola (2023) note that while over 70% of students use smartphones, only a fraction can identify or utilize Artificial Intelligence-enabled educational applications.

6. Lack of Formal Training or Orientation

Most Nigerian universities, including the University of Benin, do not offer formal orientation or training programs that educate students on the responsible and effective use of Artificial Intelligence tools. This absence leaves students to self-learn or rely on hearsay, which can result in misuse, misinterpretation of Artificial Intelligence outputs, or even violation of academic ethics. Nwachukwu and Ajiboye (2023) argue that structured Artificial Intelligence literacy programs are vital for fostering responsible engagement with these tools in academic environments.

7. Resistance to Change and Technological Anxiety

Some students demonstrate skepticism or discomfort when using unfamiliar technologies, especially those powered by Artificial Intelligence. This resistance is often rooted in fear of making mistakes, lack of confidence in their digital abilities, or mistrust in Artificial Intelligence-generated content. According to Ajayi and Eze (2022),

technological anxiety significantly affects the adoption rate of new tools in Nigerian universities. Students who are not technologically inclined may avoid Artificial Intelligence tools altogether.

8. Language and Communication Barriers

Artificial Intelligence tools are predominantly developed in English and other global languages, often failing to understand local accents, dialects, or culturally specific contexts. For Nigerian students whose primary or preferred mode of learning may include Pidgin or indigenous languages, this creates a disconnect. Language limitations in Artificial Intelligence models can lead to frustration or errors in interaction, especially when using voice-based Artificial Intelligence (Edewor & Okonkwo, 2022).

9. Privacy and Data Security Concerns

As students interact with Artificial Intelligence platforms, there is growing concern over how much of their personal data is collected and how it is used. Many Artificial Intelligence applications collect user behavior data to improve responses, but this raises ethical issues related to privacy and surveillance. According to Onuoha and Adeyemi (2023), lack of transparency from Artificial Intelligence developers can breed distrust, making some students hesitant to use these tools for fear of data misuse or breaches.

10. Cultural and Religious Misconceptions About Artificial Intelligence

In certain parts of Nigeria, some students perceive Artificial Intelligences unnatural or "anti-human," influenced by cultural or religious views. There have been reports of students viewing Artificial Intelligence tools as replacing human thinking or even as "spiritual" interference, which discourages their usage. Oboh and Salami (2021) found that socio-cultural factors, including religious beliefs, can negatively affect students' openness to adopting Artificial Intelligence and other emerging technologies.

Trends in Artificial Intelligence Usage Among Nigerian University Students

The integration of Artificial Intelligence into educational practices is gaining momentum globally, and Nigerian universities are beginning to follow suit. However, the trends in awareness, access, and effective use of Artificial Intelligence among Nigerian university students vary significantly due to infrastructural, economic, and institutional factors. Understanding these patterns is crucial to shaping informed strategies for Artificial Intelligence integration in the Nigerian higher education landscape.

Awareness of Artificial Intelligence technologies among Nigerian university students has increased in recent years, especially with the rise of Artificial Intelligence-powered tools like ChatGPT, Grammarly, and personalized learning platforms. A study by Okafor and Ogunyemi (2023) revealed that over 70% of surveyed students in South-West Nigerian universities had heard of or used at least one Artificial Intelligence-based educational tool. Similarly, Olayemi and Bello (2022) reported that students in technology-oriented disciplines were more likely to be familiar with Artificial Intelligence tools compared to those in arts and humanities. Nevertheless, the level of deep understanding of how these tools work and their implications for learning remains relatively low among the majority of students (Adewale & Adebayo, 2022).

Case studies from institutions such as the University of Lagos and Obafemi Awolowo University indicate sporadic but growing access to Artificial Intelligence-based platforms, mostly through personal initiatives rather than structured institutional programs (Agbo & Nwankwo, 2023). For instance, many students use Grammarly for academic writing or Google's Artificial Intelligence search features, but fewer have experience with educational chatbots or intelligent tutoring systems. Access is largely influenced by internet connectivity, availability of personal digital devices, and students' digital literacy levels (Chinedu & Eze, 2021).

The digital divide poses a significant challenge to equitable Artificial Intelligence usage in Nigerian universities. According to UNESCO (2022), rural-urban disparities in internet penetration and access to ICT tools hinder many students from fully utilizing Artificial Intelligence for academic purposes. In a study conducted by Ayo and Itodo (2022), students in federal universities located in urban centers had higher levels of Artificial Intelligence usage compared to their counterparts in state or rural institutions. This inequality limits Artificial Intelligence readiness and further exacerbates educational disparities, especially among economically disadvantaged students.

While the Nigerian government has acknowledged the importance of Artificial Intelligence in national development, its implementation in the education sector remains nascent. The 2021 National Artificial Intelligence Policy Draft outlines strategies for Artificial Intelligence adoption in key sectors, including education, but specific programs targeting university students are still limited (Federal Ministry of Communications and Digital Economy, 2021). Some universities have started piloting Artificial Intelligence-focused courses or innovation hubs, such as the University of Nigeria Nsukka's Artificial Intelligence Center, but these are not yet widespread. Institutional support, in the form of workshops, curriculum integration, and faculty training, is crucial for building a sustainable Artificial Intelligence culture in Nigerian universities (Onyema & Ojo, 2023).

Empirical Studies on Artificial Intelligence in Nigerian Educational Contexts

Empirical investigations on artificial intelligence within Nigerian universities have grown gradually over the past few years, particularly in relation to students' awareness, patterns of usage, and general perceptions. These studies offer useful insights into how Artificial Intelligences shaping educational experiences in the Nigerian context, though much of the available literature remains exploratory and localized.

Several researchers have assessed the level of awareness and usage of Artificial Intelligence tools among university students in Nigeria. For instance, Adeola and Adebayo (2022) conducted a cross-sectional survey involving 500 undergraduate students across three federal universities in South-West Nigeria. The study found that while over 75% of respondents had heard about Artificial Intelligence applications such as Grammarly, ChatGPT, and Google Translate, less than 40% could accurately describe how these tools functioned or their implications for academic integrity. Similarly, Nwachukwu et al. (2023) employed a mixed-methods approach to investigate the perceived usefulness of Artificial Intelligence-assisted learning tools among education students in Anambra State. Their findings revealed a generally positive perception of Artificial Intelligence's potential in simplifying learning tasks, though concerns about misinformation and over-reliance were prevalent.

In another study, Bello and Akinwale (2021) explored the level of digital readiness for Artificial Intelligence integration in public universities across Nigeria. Using descriptive statistics and inferential analysis, the study showed a positive correlation between students' digital literacy and their Artificial Intelligence adoption rate. However, infrastructural and policy limitations remained significant barriers. Moreover, Ajayi and Usman (2022) conducted a comparative study of science and humanities students' usage of Artificial Intelligence tools and discovered that science students were more likely to engage with Artificial Intelligence-based applications for research and academic simulations, while humanities students primarily used Artificial Intelligence for writing assistance and language processing.

These empirical efforts have employed a range of methodologies, including surveys, interviews, and experimental designs, often with sample sizes ranging from 100 to 600 participants. Most studies have focused on awareness and perceived usefulness, with fewer addressing ethical considerations, long-term learning outcomes, or the role of faculty in promoting Artificial Intelligence literacy. Additionally, gender-based and level-based analyses remain relatively scarce in the Nigerian Artificial Intelligence education literature, representing a notable gap.

One emerging trend is the recognition that institutional support plays a vital role in Artificial Intelligence adoption. For example, a study by Yusuf and Emeka (2023) found that students from universities that had introduced

Artificial Intelligence-related workshops or short courses were significantly more likely to adopt Artificial Intelligence tools in their academic work. The study recommends that policy reforms should prioritize curriculum enhancement and faculty training to embed Artificial Intelligence more meaningfully into university education.

Summary of the Literature Review.

The reviewed literature underscores the transformative role of Artificial Intelligence in education globally and locally. Artificial Intelligence is reshaping the educational landscape by offering tools such as ChatGPT, Grammarly, and Coursera's adaptive platforms that support personalized learning, real-time feedback, academic writing, and research assistance. In teaching and assessment, Artificial Intelligence automates grading and enhances student engagement while also enabling data-driven academic support and administrative efficiency.

Studies reveal that students' awareness of Artificial Intelligence tools is influenced by institutional exposure, digital access, and media presence. Awareness varies significantly based on factors such as socioeconomic background and digital literacy. Perception of Artificial Intelligence among students is shaped by frameworks like the Technology Acceptance Model (TAM), where perceived usefulness, ease of use, and ethical concerns influence acceptance. While many students view Artificial Intelligence positively citing improved learning outcomes, efficiency, and convenience concerns about academic dishonesty, over-dependence, and misinformation are persistent.

In Nigeria, the adoption of Artificial Intelligence in universities is increasing but faces numerous challenges. These include infrastructural barriers, low digital literacy, limited access to devices and internet connectivity, and insufficient institutional support. Students in education faculties, though positioned to be drivers of future educational technology integration, often lack adequate exposure or training in Artificial Intelligence-enhanced pedagogy.

Research indicates demographic variations in Artificial Intelligence usage and perception, with gender, level of study, and digital proficiency influencing how students engage with Artificial Intelligence tools. Despite notable progress in global and Nigerian scholarship on Artificial Intelligence in education, there is a critical need for more targeted research involving education students, particularly at institutions like the University of Benin. Such studies are essential for informing curriculum development, teacher training, and policy-making in support of sustainable and inclusive Artificial Intelligence adoption in education.

While many studies evaluate general attitudes toward Artificial Intelligence, few conduct comparative analyses based on demographic variables such as gender, level of study, or digital literacy. Such disaggregated insights are crucial for developing inclusive Artificial Intelligence policies in education. Additionally, empirical studies that explore not just awareness and perception but also how these factors translate into actual usage behavior among Nigerian undergraduates remain scarce. Finally, there is a lack of longitudinal studies that track students' Artificial Intelligence-related attitudes and usage patterns over time, which is vital in understanding evolving trends in Artificial Intelligence adoption as digital technologies continue to develop.

Despite the growing interest in Artificial Intelligence in Nigerian higher education, gaps still exist in the literature. Most studies are concentrated in urban and better-resourced universities, leaving out many rural institutions. Furthermore, there is limited research focusing specifically on education students, who are crucial in shaping the future of Artificial Intelligence literacy in classrooms. There is also a lack of longitudinal studies that explore how students' perceptions and usage of Artificial Intelligence evolve over time.

The empirical studies provide a foundational understanding that supports the present research. By focusing on education students at the University of Benin, this study seeks to contribute to the existing body of knowledge by addressing the under-researched area of demographic influences, challenges, and perceptions specific to future educators within the Nigerian context.

CHAPTER THREE

RESEARCH METHODOLOGY

In this chapter, the procedures that will be used for this study are presented under the following subheadings:

- Design of the Study
- Population of the Study
- Sample and Sampling Techniques
- Research Instrument
- Validation of the Instrument
- Reliability of the Instrument
- Method of Data Collection
- Method of Data Analysis

Design of the Study

This study adopts a descriptive survey research design, which is appropriate for assessing Perception of Student on the Usage of Artificial Intelligence Among Education Student in the University of Benin. Since the study focuses on exploring students' awareness, perceptions, and challenges in using Artificial Intelligence tools, the survey approach provides the most appropriate means for obtaining and analyzing relevant data systematically.

Population of the Study

The population for this study comprises all the (5712) students in the Faculty of Education in the University of Benin for the 2024/2025 academic session. The population distribution is derived from official data extracted from the first semester examination timetable. The table below shows the distribution of students across departments and academic levels.

Department	100 Level	200 Level	300 Level	400 Level	Total
Curriculum and Instruction (CIT)	278	242	320	267	1107
Educational Eval. & Counselling Psych. (EECP)	100	92	132	148	472
Human Kinetics and Sports (HKS)	102	92	116	86	396
Health, Safety and Environmental Education (HSE)	144	154	208	181	687
Educational Management (DEM)	184	186	263	209	842
Educational Foundations (DEF)	202	160	274	189	825
Vocational and Technical Education (VTE)	212	190	280	197	879
Adult Education (ADULT)	112	88	160	144	504
Total	1334	1204	1753	1421	5712

Sample and Sampling Techniques

The sample for this study consists of 400 undergraduate students drawn from the Faculty of Education, University of Benin, during the 2024/2025 academic session. This sample size was determined using Yamane's (1967) formula for calculating sample size from a finite population:

$$n = N / (1 + N(e)^2)$$

Where:

- n = sample size
- N = total population (5,712)
- e = margin of error (0.05 for 95% confidence level)

$n = 5712 / (1 + 5712(0.05)^2) = 5712 / (1 + 14.28) = 5712 / 15.28 \approx 374$

To ensure inclusiveness, the sample size was rounded up to 400 students. A simple random sampling technique was used to select respondents. This method ensures that every student has

an equal chance of being included in the sample. The 400 students were proportionally distributed across all departments and levels according to their respective population sizes.

Research Instrument

The instrument for data collection will be a **structured questionnaire** titled *Perception of Education Students on the Usage of Artificial Intelligence Questionnaire (PESUAIQ)*. The questionnaire will consist of five sections: Section A: Demographic information and Section B: Research questions. A five-point Likert scale ranging from *Strongly Agree (5)* to *Strongly Disagree (1)* will be used in measuring awareness, perception and challenges.

Validation of the Instrument

In order to ascertain the validity of the instrument, the questionnaire will be given to the supervisor and two other lecturers in the Department of Curriculum and Instructional Technology (CIT) to read in order to make necessary corrections to ensure content as well as validity. Corrections made on the draft will be incorporated in the final draft.

Reliability of the Instrument

To establish the reliability of the instrument, the Cronbach Alpha will be used to measure the level of the items. The instrument will be administered to 20 students who are not part of the study population. A co-efficient value of ≥ 0.7 obtained will show that the instrument was reliable

Method of Data Collection

The questionnaire will be administered through an online platform (WhatsApp), the questionnaire will be created as a Google form and the link will be distributed across the WhatsApp platform of the undergraduate student studying biology education. The respondents will be assured of confidentiality and will be urged to answer the questions honestly to the best of their knowledge. Instructions will be given to the respondent on how to fill out the questionnaire. The questionnaire will be submitted online.

Method of Data Analysis

The data collected will be subjected to descriptive statistics. Data for the research questions will be analyzed using descriptive statistics, specifically mean and standard deviation.

CHAPTER FOUR

PRESENTATION OF RESULT AND DISCUSSION OF FINDINGS

This chapter presents the results of the research field study and discusses the findings, organized under the following subheadings.

- Presentation of demographic data
- Analysis of the research question
- Discussion of findings

Presentation of Results

The data collected are presented and analyzed according to the research questions guiding the study. Frequency distribution tables were constructed using raw scores, with weights assigned as follows: Strongly Agree (SA) = 5, Agree (A) = 4, Neutral (N) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1. Means, frequencies, and percentages were calculated to address the research questions.

Table 1: Demographic Data

S/N	Variable	Option	Frequency	Percentage (%)
1	Gender	Male	180	45
		Female	220	55
		Total	**400**	**100**
2	Age	16-20	116	29
		21-25	246	61.5
		26 above	38	9.5
		Total	**400**	**100**
3	Level of Study	100 Level	60	15
		200 Level	42	10.5
		300 Level	84	21
		400 Level	214	53.5
		Total	**400**	**100**

Source: Field Survey 2025

Table 1 represent the demographic data of the respondent, the analysis of Gender reveals that the study sample was slightly skewed towards female respondents, who constituted 220 individuals, or 55.0% of the total, while male students accounted for 180 individuals, or 45.0%. The data for Age indicates a concentration of respondents in the young adult bracket. The majority of the sample, 246 respondents, fell into the 21-25 age group (61.5), while 116 respondents were in the 16-20 age group (29.0%), with 38 respondents were 26 and above with represent 9.5% of the respondent. Finally, the distribution across Level of Study shows a clear concentration in the senior years of the undergraduate program. The 400 Level students represented the largest cohort, comprising 214

respondents, or 53.5% of the total sample. This significant representation of final-year students is critical, as their insights on AI usage are heavily informed by the complex demands of academic research, final year projects, and preparation for graduation, giving their feedback a high degree of relevance to the perceived utility and risks of AI. The remaining respondents were distributed across the 300 Level (21.0%), 100 Level (15.0%), and 200 Level (10.5%), confirming that the study primarily captures the views of students who are well into their degree program.

Research Question 1: What is the perception of education students at the University of Benin regarding the use of Artificial Intelligence (AI) tools in their academic activities?

Table 2: Descriptive Statistics on General Perception of AI Tools

S/N	ITEMS	N	Mean ($\bar{x}$)	Standard Deviation (SD)	Remark
1	I believe AI tools are important for improving my academic work.	400	4.28	0.826	Strongly Agreed
2	Using AI tools makes learning more interesting and engaging.	400	4.29	0.793	Strongly Agreed
3	AI tools increase my confidence in completing academic tasks.	400	4.08	0.844	Agreed
4	I perceive AI tools as easy to use in my academic activities.	400	4.14	0.866	Agreed
5	Overall, I have a positive perception of AI tools for education.	400	4.14	0.823	Agreed
	Cluster Total		**4.18**	**0.676**	**Agreed**

Source: Field Survey 2025

Table 2 represent the general perception of AI tools among students, The students' perception of Artificial Intelligence (AI) tools for education was explored across five items, resulting in an overall Cluster Total Mean of 4.18 with a standard deviation of 0.676. This places the collective perception firmly in the Agreed range, signifying a generally favorable and positive attitude towards the integration of AI in their academic environment. Examining the individual items provides a clearer picture of the students' consensus. The highest level of agreement was recorded for the statement, "Using AI tools makes learning more interesting and engaging," with a Mean score of 4.29 and a standard deviation of 0.793. This strong agreement (Strongly Agreed) highlights the significant perceived pedagogical value of AI, indicating that students find the technology motivational and conducive to a better learning experience. Closely following this, students also Strongly Agreed that they "believe AI tools are important for improving academic work," scoring a Mean of 4.28 and SD = 0.826. This finding is crucial as it positions AI not merely as an optional novelty, but as an essential component perceived to directly enhance the

quality and efficiency of their academic outputs, such as assignments, reports, and projects. Regarding the functional acceptance of the technology, the statement "I perceive AI tools as easy to use in my academic activities" garnered a Mean of 4.14$ and SD = 0.866. This high score (Agreed) suggests that students generally encounter low usability barriers, which is a vital precondition for sustained technology adoption. Furthermore, this ease of use likely contributes to the agreement that AI tools "increase my confidence in completing academic tasks," which achieved a Mean of 4.08 and SD = 0.844. This suggests that AI acts as a reliable support system, offering a sense of assurance or a mechanism for checking work, thereby boosting the student's self-efficacy. The summary statement, "Overall, I have a positive perception of AI tools for education," recorded a Mean of 4.14 and SD = 0.823. This corroborates the findings of the specific items and confirms the overall optimistic and affirmative stance of the Education Students towards AI in their educational lives. The consistency across all items, reinforced by the low Cluster Total Standard Deviation, points to a uniform and highly positive student sentiment regarding AI's integration.

Research Question 2: How do education students perceive the benefits and limitations of using AI tools for learning and research?

Table 3: Descriptive Statistics on Perceived Benefits and Utility of AI Tools

S/N	ITEMS	N	Mean ($\bar{x}$)	Standard Deviation (SD)	Remark
1	AI tools help me to quickly access academic information.	400	4.31	0.804	Strongly Agreed
2	AI tools make academic research easier and faster.	400	4.27	0.768	Strongly Agreed
3	AI tools improve my writing, editing, and presentation skills.	400	4.05	0.89	Agreed
4	AI tools encourage collaboration and teamwork among students.	400	3.77	1.031	Agreed
5	I believe AI tools are relevant in achieving academic success.	400	4.06	0.914	Agreed
6	AI tools are reliable for supporting academic research.	400	4.1	0.86	Agreed
7	I consider AI tools essential for my future academic growth.	400	3.9	0.965	Agreed
	Cluster Total		4.07	0.642	Agreed

Source: Field Survey 2025

The influence of AI tools on student academic success and utility was examined through the responses of 400 participants, as detailed in Table 3. The descriptive statistics provide clear insight into the specific ways students believe AI contributes to their academic environment, resulting in a strong collective Cluster Total Mean of 4.07

and SD = 0.642, firmly placing the overall perception of benefits in the Agreed range. For the first item, which assesses whether AI tools help students to quickly access academic information, the mean score was 4.31 with a standard deviation of 0.804. This indicates the highest level of agreement (Strongly Agreed) in the cluster, demonstrating that students view AI primarily as a powerful resource for accelerating information retrieval. The second item explored whether AI tools make academic research easier and faster. The mean score of 4.27 and SD = 0.768, also registers as Strongly Agreed. This result confirms that students experience a substantial increase in research efficiency when using AI, perceiving it as a critical tool for optimizing their scholarly work process. The third item looked at whether AI tools improve writing, editing, and presentation skills. The mean score for this item was 4.05 and SD = 0.890, showing a general Agreement that AI functions as an effective digital coach, enhancing the quality of core academic output skills.

In terms of the perceived relevance to future success, the statement, "I believe AI tools are relevant in achieving academic success," scored a Mean of 4.06 and SD = 0.914, and "I consider AI tools essential for my future academic growth" scored 3.90 and SD = 0.965. Both results indicate general Agreement that AI is seen as crucial for both immediate and long-term professional development. The reliability of the tool was examined in the sixth item: "AI tools are reliable for supporting academic research." With a mean score of 4.10 and SD = 0.860, students generally Agreed on the reliability of AI, suggesting a high degree of operational trust in the technology for fundamental tasks. Finally, the seventh item assessed whether AI tools encourage collaboration and teamwork among students. This item recorded the lowest mean in the cluster at 3.77 and SD=1.031. While still in the Agreed range, this finding indicates that while students acknowledge the collaborative potential of AI, they perceive this benefit to be less impactful or frequent compared to the tool's powerful utility for individual research efficiency.

Research Question 3: To what extent do education students believe AI tools are relevant and reliable in supporting their academic success?

Table 4: Descriptive Statistics on Perceived Challenges and Risks of AI Tools

S/N	ITEMS	N	Mean ($\bar{x}$)	Standard Deviation (SD)	Remark
1	Over-dependence on AI tools can reduce students' critical thinking skills.	400	4	0.985	Agreed
2	AI tools may provide misleading or inaccurate information at times.	400	3.86	0.926	Agreed
3	AI tools can cause academic dishonesty if misused.	400	4.02	0.929	Agreed
4	AI tools can be trusted for accurate assessment and feedback.	400	3.74	1.02	Agreed
	Cluster Total		3.9	0.669	Agreed

Source: Field Survey 2025

Table 4 analysis indicates a strong collective recognition of the risks and challenges associated with AI, the awareness of potential drawbacks and the reliability of AI were investigated in this cluster, yielding a Cluster Total Mean of 3.90 and SD = 0.669, placing the awareness level in the Agreed range. This demonstrates a balanced and cautious perspective from the students. The strongest agreement in this cluster centered on ethical concerns, with students agreeing that "AI tools can cause academic dishonesty if misused," scoring a Mean of 4.02 and SD =0.929. Closely behind was the cognitive risk, with the statement "Over-dependence on AI tools can reduce students' critical thinking skills" scoring 4.00 and SD=0.985. These findings highlight the students' recognition of the crucial ethical and pedagogical trade-offs associated with AI reliance. Students also Agreed that "AI tools may provide misleading or inaccurate information at times," with a Mean of 3.86 and SD = 0.926, indicating a necessary awareness of potential data reliability issues. The lowest score in the cluster was for the statement "AI tools can be trusted for accurate assessment and feedback," which scored 3.74 and SD = 1.020. While still an agreement, the lower mean and higher standard deviation suggest a relative lack of complete confidence in AI's capacity for formal academic evaluation and feedback, compared to its use as a research tool.

Research Question 4: What factors influence the perception of AI usage among education students at the University of Benin?

Table 5: Descriptive Statistics on Factors Influencing AI Tool Usage

S/N	S/N	N	Mean ($\bar{x}$)	Standard Deviation (SD)	Remark
1	Access to internet connectivity determines how often I use AI tools.	400	4.08	0.912	Agreed
2	Availability of a smartphone or laptop influences my use of AI tools.	400	4.06	0.892	Agreed
3	My level of digital literacy affects how I perceive AI usage.	400	4.01	0.888	Agreed
4	Guidance from lecturers encourages me to use AI tools.	400	3.54	1.102	Agreed
5	Peer influence affects my attitude toward AI tools.	400	3.68	1.093	Agreed
	Cluster Total		3.87	0.706	Agreed

Source: Field Survey 2025

Table 5 summarizes the factors influencing AI tool usage, this cluster examined the technological, pedagogical, and social elements that influence AI usage, resulting in a Cluster Total Mean of 3.87 and SD = 0.706, indicating that these factors are generally seen as influential. The most influential factors identified were technological and

infrastructural constraints. Students strongly agreed that "Access to internet connectivity determines how often I use AI tools" 4.08 and SD = 0.912. and that "Availability of a smartphone or laptop influences my use of AI tools" 4.06 and SD = 0.892. These findings underscore that physical access and infrastructure are the strongest determinants of AI engagement. The personal factor of "My level of digital literacy affects how I perceive AI usage" was also seen as highly influential, scoring $\bar{x}=4.01 and SD = 0.888. This emphasizes the importance of individual competence and self-efficacy in successful AI adoption. In contrast, the pedagogical and social factors were rated as less influential. While still Agreed upon, the statement that "Peer influence affects my attitude toward AI tools" 3.68 and SD =1.093 and "Guidance from lecturers encourages me to use AI tools" 3.54 and SD = 1.102 recorded the lowest means. This suggests that while encouragement from peers and instructors is beneficial, the student's *own* access and readiness are the more powerful drivers of AI tool usage.

Discussion of findings

The integration of Artificial Intelligence (AI) tools into higher education has become a subject of critical inquiry, necessitating an understanding of student perceptions, especially within the pedagogical field. This study, drawing upon the responses of 400 Education Students at the University of Benin, including a majority of female students (55.0%) and a significant representation from the final-year 400 Level cohort (53.5%), aimed to explore the perception, utility, risks, and influencing factors of AI usage among this group. The findings reveal a highly nuanced and predominantly positive relationship between the students and AI technology.

The analysis of the students' General Perception of AI Tools (Research Question 1) establishes a baseline of optimism, culminating in a Cluster Total Mean of 4.18, which firmly sits in the Agreed category. Students demonstrated the strongest conviction that using AI tools makes learning more interesting and engaging and that these tools are important for improving academic work. This indicates that the students view AI not as a peripheral aid but as a significant technological asset that enhances the quality and experience of their education. This positive sentiment is further supported by the high agreement that AI tools are perceived as easy to use, suggesting minimal technical barriers to adoption.

This positive perception is substantively justified by the strong recognition of the Academic Benefits and Utility of AI (Research Question 2), yielding a Cluster Total Mean of 4.07. The highest utility is found in areas related to efficiency and resource management. Students Strongly Agreed that AI helps them to quickly access academic information and makes academic research easier and faster. This confirms the functional role of AI as an essential research and productivity tool for the contemporary student. Furthermore, the agreement on AI's reliability and

its role in improving writing, editing, and presentation skills validates its perceived value across the spectrum of academic tasks. However, its perceived role in encouraging collaboration and teamwork received the lowest mean (3.77), suggesting AI is primarily leveraged for individual, rather than collective, academic gain.

Crucially, the students maintained a balanced and critical perspective, as demonstrated by the analysis of Challenges, Risks, and Trust (Research Question 3), which resulted in a Cluster Total Mean of 3.90 (Agreed). The two most pressing concerns centered on ethical and cognitive integrity. Students most strongly agreed that AI tools can cause academic dishonesty if misused and that over-dependence on AI tools can reduce critical thinking skills. This suggests an acute awareness of the potential academic and pedagogical pitfalls, highlighting the need for institutional guidance on ethical frameworks. The skepticism surrounding data accuracy agreeing that AI may provide misleading or inaccurate information, further indicates that students recognize the limitations of the technology and the necessity of human verification.

Finally, the study investigated the Factors Influencing AI Tool Usage (Research Question 4), with a Cluster Total Mean of 3.87. The findings unequivocally point to technological access as the dominant constraint. The highest levels of agreement were recorded for items related to internet connectivity and the availability of a smartphone or laptop. These results highlight that the primary barrier to equitable and consistent AI adoption is infrastructural, rather than attitudinal. While digital literacy was also seen as a strong personal factor, the weakest influences were external pedagogical and social encouragements, namely guidance from lecturers and peer influence. This implies that efforts to boost AI usage must first address the foundational technological and access gaps before educational and social reinforcement can become truly effective.

In summation, the Education Students at the University of Benin exhibit a pragmatic and favorable view of AI, valuing its ability to enhance efficiency and the quality of academic work. This positive perception is, however, tethered to a clear understanding of the ethical and cognitive risks. The study's most significant practical implication is the identification of infrastructural constraints (access and devices) as the chief obstacle to full and equitable AI integration, suggesting that future institutional efforts should focus equally on providing reliable technological access and establishing robust ethical and critical-thinking guidelines for AI engagement.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter seeks to provide a summary of the work done so far impact of Artificial intelligence usage on learning engagement of university of Benin chemistry education undergraduate student. It provides the conclusion drawn from the research and recommendation based on findings.

Summary

This study examined the perceptions of education students at the University of Benin regarding the usage of Artificial Intelligence (AI) tools in their academic activities. The research adopted a descriptive survey design with a sample of 400 students drawn from the Faculty of Education. The study aimed to explore students' awareness, perceived benefits, challenges, and factors influencing their engagement with AI technologies such as ChatGPT, Grammarly, Quillbot, and Turnitin.

Findings revealed that students generally hold a positive perception of AI tools, recognizing their importance in improving academic work, enhancing engagement, and making learning more efficient and interactive. The mean score (4.18) indicated high acceptance and optimism towards AI integration in education. Students perceived AI as valuable for academic research, information retrieval, and skill enhancement, particularly in writing and presentation. However, AI's collaborative potential was seen as less significant compared to its individual benefits.

Despite these positive attitudes, students expressed concerns about overdependence on AI, the potential for academic dishonesty, and the risk of reduced critical thinking. There was also awareness of AI's occasional inaccuracy and the need for ethical and guided use. Key factors influencing AI adoption were found to be infrastructural and technological, including access to internet connectivity, availability of smart devices, and digital literacy levels. Social and pedagogical influences, such as peer and lecturer encouragement, were comparatively weaker.

Overall, the study established that while students are enthusiastic about AI, infrastructural limitations and ethical apprehensions remain major barriers to its full and effective adoption in higher education.

Conclusion

The study concludes that education students at the University of Benin demonstrate a favorable and pragmatic attitude toward the use of AI tools in their learning processes. They acknowledge AI's capacity to enhance research

efficiency, academic writing, and personalized learning experiences. However, their positive perception is tempered by an awareness of the ethical, cognitive, and infrastructural challenges associated with AI use.

To maximize AI's educational potential, universities must invest in technological infrastructure, ensure reliable internet access, and integrate AI literacy programs into teacher education curricula. Equally important is the need to establish ethical guidelines and institutional policies to prevent misuse and overreliance on AI systems. By addressing these gaps, institutions like the University of Benin can better prepare future educators to responsibly and effectively utilize AI in modern classrooms, fostering a culture of innovation and critical thinking in Nigerian education.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are made to enhance the effective and ethical use of Artificial Intelligence (AI) tools among education students:

1. Integration of AI Literacy into Teacher Education Curriculum: The University of Benin and other tertiary institutions should incorporate AI literacy and digital competence training into teacher education programs. This will help future educators develop the skills necessary to effectively and responsibly use AI in teaching, learning, and assessment.

2. Provision of Adequate Technological Infrastructure: The federal and state governments, through the Ministry of Education and university management, should ensure reliable internet connectivity, stable electricity supply, and access to smart devices to support students' interaction with AI platforms.

3. Regular Training and Workshops for Students and Lecturers: Continuous professional development programs and workshops should be organized to keep both students and lecturers updated on the latest AI tools, their applications, and ethical considerations. This will foster confidence and competence in AI usage.

4. Development of Institutional Policies on AI Usage: Universities should formulate clear policies and ethical guidelines for the use of AI in academic work to address issues of plagiarism, academic dishonesty, data privacy, and misinformation. Such policies will promote responsible and transparent use of AI technologies.

5. Encouraging Responsible AI Adoption: Lecturers should encourage students to use AI as a supportive tool rather than a substitute for independent thinking or creativity. Assignments should be designed to promote critical reasoning and reflection even when AI is utilized.

6. Enhancing Digital Equity: Special provisions should be made for financially disadvantaged students to access digital resources and devices. Partnerships with technology companies or NGOs can help subsidize tools and internet access for low-income learners.

7. Promoting Collaborative and Innovative Learning: Educators should leverage AI to facilitate group projects, peer feedback, and interactive learning environments. Encouraging collaborative applications of AI can enhance creativity and teamwork among students.

Suggestions for Further Studies

1. Comparative Studies Across Disciplines: Future research could compare the perception and usage of Artificial Intelligence tools among students in different faculties, such as science, arts, and engineering, to determine whether disciplinary differences influence AI adoption and effectiveness.

2. Longitudinal Studies on AI Impact: Further studies should investigate the long-term effects of AI usage on students' academic performance, critical thinking, and creativity to understand how sustained exposure to AI tools shapes learning outcomes.

3. Lecturers' Perception and Readiness for AI Integration: Since lecturers play a key role in encouraging or limiting the use of AI, future researchers should explore teachers' attitudes, readiness, and competence in integrating AI tools into instructional practices.

4. Ethical and Psychological Dimensions of AI Usage: Subsequent research can examine the ethical implications, data privacy concerns, and psychological effects (such as dependence or anxiety) associated with continuous use of AI by students.

5. Institutional and Policy-Oriented Studies: There is a need for research on how university policies, government regulations, and infrastructural provisions influence the successful integration of AI in Nigerian higher education institutions.

6. AI Adoption in Secondary Education: Future investigations could focus on assessing awareness, perception, and challenges of AI usage among secondary school teachers and students to understand readiness for AI-driven learning at lower educational levels.

7. Experimental Studies on AI-Supported Learning Models: Researchers should design experimental studies to test the effectiveness of AI-assisted learning platforms in improving students' academic achievement compared to traditional teaching methods.

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