



**ASSESSING THE UTILIZATION OF GENERATIVE ARTIFICIAL INTELLIGENCE AMONG POST-GRADUATE STUDENTS IN RIVERS STATE-OWNED UNIVERSITIES**

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**Abstract**

Intelligence (AI) has completely changed the educational landscape because it enables customised teaching methods that meet the needs of every student. This study examined how artificial intelligence (AI) helps postgraduate students in Rivers State receive individualised education to support sustainable university education. The study was guided by three objectives, from which three research questions were posed. The study adopted a descriptive survey design with a population of 5000 postgraduate students from the two Rivers State universities, which are Rivers State University and Ignatius Ajuru University of Education. A sample of 357 postgraduate students was selected using the purposive sampling technique. The instrument for data collection was a structured questionnaire titled 'Assessing the Utilization of Generative Artificial Intelligence among Post-Graduate Students Questionnaire.' The instrument was validated by three experts, and the reliability of the instrument was determined using Cronbach Alpha method. The data collected were analysed using mean and standard deviation. The findings of the study revealed that although there are issues with AI-driven research support and interactive learning, the results showed that AI-powered evaluation tools and adaptive learning platforms improve learning engagement. Although AI greatly enhances academic engagement and motivation, questions remain about its potential applications in research and career counselling. To maximise AI's potential, the study emphasises the necessity of faculty training, better infrastructure, and institutional policies. Based on the findings of the study, it was recommended among others that educational Institutions should prioritise enhancing the usability and accessibility of AI-powered research and adaptive learning tools through user-centred design, focused training, and awareness campaigns to

improve the successful integration of AI in education and guarantee that students can optimise its advantages across a range of learning needs.

**Keywords:** Artificial Intelligence, AI-driven learning, Personalized Learning, Postgraduate Students, Sustainable University Education, Student Engagement

### **Introduction**

The swift development of artificial intelligence (AI) has had a profound effect on some industries, including the education sector. AI-driven personalized learning is becoming more widely acknowledged as a game-changing method in higher education, especially in postgraduate programs where students need specialized teaching methods to satisfy their unique academic and professional requirements. AI-enabled personalized learning adjusts to each student's unique learning preferences, aptitudes, and speed to provide the best possible learning experience. AI-driven tailored learning tools are transforming conventional educational approaches in the context of postgraduate education, where the requirement for advanced knowledge and the intensity of research are critical (Zawacki-Richter et al., 2019). The growing need for higher education in Rivers State has made creative teaching and learning strategies necessary. Universities are always looking for ways to improve student learning results, lower dropout rates, and guarantee long-term educational growth. By providing a more student-centred learning environment, the use of AI in personalized learning offers a chance to overcome these obstacles. Large volumes of data are analysed by AI-powered systems to produce insights that support the development of tailored learning pathways, flexible evaluations, and focused feedback systems. For postgraduate students, these tools increase engagement, encourage self-directed learning, and aid in information retention.

The use of AI-driven personalized learning in postgraduate education is still up for dispute, despite its many benefits, especially in developing nations like Nigeria. Significant obstacles are presented by factors such as the digital divide, implementation costs, technology opposition, and data privacy concerns (Selwyn, 2019). Furthermore, there are wide variations in the infrastructure preparedness of universities to implement AI-driven learning models, which affects how well these systems deliver individualized instruction. In a variety of educational contexts, personalized learning approaches have shown notable success. For instance, to offer individualized learning experiences, AI-powered adaptive learning platforms like Coursera and Udacity have been extensively embraced by international higher education institutions (Holmes et al., 2021). These platforms provide focused interventions that enhance academic achievement and learning efficiency by using machine learning algorithms to determine students' strengths and shortcomings. AI-driven tailored learning can close knowledge gaps and improve academic competency in postgraduate education, where autonomy in research and self-directed learning are crucial (Woolf, 2010).

Artificial intelligence refers to computer systems designed to simulate human intelligence processes such as learning, reasoning, and problem-solving (Russell & Norvig, 2020). Artificial intelligence (AI) is a transformative technology that is reshaping various sectors, including education. AI refers to computer systems designed to simulate

human intelligence processes such as learning, reasoning, and problem-solving (Russell & Norvig, 2020). The integration of AI into educational systems has revolutionized teaching, learning, and administrative processes. AI-driven technologies offer personalized learning experiences, automate administrative tasks, and enhance student engagement. AI is transforming education by offering personalized learning experiences that cater to diverse student needs. Through adaptive learning systems, intelligent tutoring, personalized content recommendations, predictive analytics, and AI-driven chatbots.

Due to the increasing demand for higher education, innovative teaching and learning techniques are now required in Rivers State. Universities constantly search for strategies to ensure long-term educational growth, reduce dropout rates, and enhance student learning outcomes. Applying AI to personalised learning allows one to overcome these challenges by creating a more student-centred learning environment. AI-powered systems analyse vast amounts of data to generate insights that facilitate the creation of customised learning paths, adaptable assessments, and targeted feedback systems (Luckin et al., 2016). These resources help postgraduate students retain material, promote self-directed learning, and boost engagement.

Personalised learning is an educational approach that tailors instruction to individual students' needs, preferences, and learning styles (Pane et al., 2017). It leverages technology to provide customised learning pathways, real-time feedback, and differentiated instruction. Personalised learning (PL) is a paradigm shift that aims to adapt the educational process to each student's unique requirements, interests, and learning preferences (Christensen, Horn, & Staker, 2013). In contrast to conventional, one-size-fits-all methods, this strategy seeks to improve learning results, encourage student autonomy, and increase student involvement. Technology and flexible learning environments that enable teachers and students to modify learning paths according to individual learning needs are frequently linked to personalised learning (Pane, Steiner, Baird, & Hamilton, 2015). One way to conceptualise personalised learning is as an educational approach that adapts the learning environment, pace, and content to each learner's preferences, skills, and goals. The foundation of this paradigm is the idea that different students learn in various ways and at varying rates and that this variability should be reflected in effective instruction.

According to Belland (2017), personalised learning aims to give students more individualised help so they may take charge of their education and develop a deeper grasp of the material. However, the move to individualised education necessitates reconsidering conventional teaching methods. Teachers now serve as facilitators or guides who assist students in their unique learning journeys rather than being the exclusive source of knowledge (Belland, 2017). Assessment procedures must change from standardised testing to more formative, customised tests that offer information about each student's unique learning requirements and progress (Horn & Staker, 2015). To accommodate different learning styles and preferences, personalised learning also promotes using a range of instructional methodologies, including inquiry-based learning, blended learning, and project-based learning. Learner profiles, flexible learning pathways, competency-

based advancement, and student agency are some of the features that define personalised learning.

1. **Learner Profiles:** A learner profile is an extensive document that contains details about a student's learning objectives, preferences, strengths, and shortcomings. This profile guarantees that learning experiences are tailored to each student's needs and serves to guide instructional design.
2. **Flexible Learning Pathways:** Thanks to personalised learning, students can select from various options to meet learning objectives. Depending on the learner's needs and choices, these routes could incorporate a variety of learning resources, including interactive simulations, books, and videos.
3. **Competency-Based Progression:** Personalised learning is typically competency-based, meaning students advance after acquiring particular skills or concepts. This is unlike traditional education models that frequently rely on age-based advancement. This method helps guarantee that pupils are not slowed down by their learning speed but are not hurried forward without grasping the material.
4. **Student Agency:** Personalised learning strongly emphasises student agency by giving students a sense of control over their education. Students could be given the chance to choose the material they want to study or how they want to present what they have learnt. This may result in self-directed learning and more motivation.

Artificial intelligence (AI) is revolutionising the field of education, especially in universities where individualised learning is becoming increasingly popular. AI-driven technologies like adaptive learning platforms, intelligent tutoring systems, and predictive analytics have improved personalised learning, which adjusts educational experiences to each student's unique needs. AI provides chances for personalised learning routes, real-time feedback, and enhanced research capabilities in postgraduate education, where students frequently participate in self-directed learning (Schmid et al., 2021). Several variables, such as institutional rules, faculty proficiency, and technology infrastructure, affect how much AI is incorporated into individualised learning for postgraduate students in Rivers State universities.

Adaptive learning platforms, which modify course material according to students' learning preferences and development, are one of the main ways artificial intelligence is used in postgraduate education. AI algorithms are incorporated into Coursera, edX, and university-based learning management systems (LMS) to customise assessment feedback and course recommendations (Zawacki-Richter et al., 2019). However, because of inadequate infrastructure and low levels of digital literacy among teachers, Rivers State's level of AI integration is still relatively low. While some universities have started using AI-powered learning management systems (LMS), many schools continue to use conventional teaching techniques, which limits AI's full potential in personalised learning. Furthermore, AI-powered intelligent tutoring systems (ITS) could offer postgraduate students automated grading and individualised instruction. According to Chen (2011), these systems can evaluate students' strengths and shortcomings and recommend relevant resources for development. Despite these advantages, Rivers State colleges struggle to

adopt ITS because of low funding for AI technology and faculty awareness. The adoption rate is further slowed by a reluctance to switch from traditional teaching techniques to AI-driven models. The application of predictive analytics to improve research productivity and academic success is a key component of AI integration in postgraduate education. Although a few Rivers State colleges are starting to investigate data-driven decision-making in the classroom, the success of these efforts is constrained by the lack of a strong AI infrastructure. Also, worries about data privacy and ethical issues hamper the broad use of AI-driven learning analytics.

Furthermore, natural language processing (NLP) is essential in AI-driven personalised learning, especially for automated evaluation and feedback. NLP algorithms are used by AI applications like ChatGPT, QuillBot Grammarly, and Turnitin to assess written material and offer helpful criticism on originality, coherence, and grammar (Luo, Li & Wang, 2021). These AI tools help students polish their scholarly work in postgraduate education, where academic writing is crucial, guaranteeing clarity and conformity to educational standards. These tools support personalised learning by offering real-time recommendations and improving students' research productivity.

The use of AI in education supports the more general objectives of sustainable higher education. In order to accommodate students' varied requirements, sustainable education places a strong emphasis on inclusivity, accessibility, and adaptation (Sterling, 2021). By encouraging individualized learning experiences that accommodate various learning preferences and academic requirements, AI helps achieve these objectives. AI-driven personalized learning offers a potential way to improve academic quality and sustainability in Rivers State, where colleges deal with issues like packed classrooms, a lack of teaching resources, and disparities in digital literacy (Ezenwaji & Ofoegbu, 2020). Nevertheless, there are several difficulties with Rivers State's use of AI-driven tailored learning. According to studies, a lack of digital infrastructure, low teacher AI literacy, and budgetary limitations prevent many Nigerian colleges from implementing cutting-edge teaching technology (Olanrewaju et al., 2022). To guarantee fair learning opportunities for every student, ethical issues about algorithmic biases in AI-driven learning models and student data privacy must also be addressed (Baker & Hawn, 2022). In light of these considerations, this study aimed to evaluate how AI contributes to postgraduate students' individualized learning for a sustainable university education in Rivers State.

### **Statement of the Problem**

Postgraduate education in Rivers State still largely relies on traditional teaching methods that do not adequately address the diverse learning needs of students. While AI has been recognized globally for its potential to enhance personalized learning, its adoption in universities within the state remains limited. AI-driven learning tools have been implemented in some institutions within the State; their effectiveness in enhancing student engagement and long-term academic sustainability has been a problem yet to be unravelled. Additionally, issues such as faculty readiness, institutional policies, and infrastructural support play crucial roles in determining the success of AI adoption in

education. As a result, postgraduate students may not be benefiting from adaptive learning experiences that could improve engagement, knowledge retention, and overall academic performance. This study sought to bridge this gap by assessing the impact of AI-driven personalized learning on postgraduate education in Rivers State. It explored how AI tools enhance student engagement, identify barriers to their effective implementation, and provide recommendations for improving AI adoption in universities.

### Research Questions

This study sought to answer the following research questions:

1. To what extent is AI integrated into personalized learning among postgraduate students in Rivers State universities?
2. To what extent does AI impact postgraduate students' learning engagement and motivation?
3. What are the challenges associated with the adoption of AI in personalized learning among postgraduate students?

### Methodology

The research design for this study was a descriptive survey, which is appropriate for evaluating the utilization of generative artificial intelligence (AI) among postgraduate students. To comprehend AI's function in sustainable university education, the design makes it possible to collect quantitative data. The population of the study was 5000 postgraduate students from the two Rivers State universities, which are Rivers State University and Ignatius Ajuru University of Education. The sample size of the study was 217 postgraduate students. Doctoral students in faculties with a high adoption rate of AI-driven learning were chosen using a purposive sample technique. Data was gathered using a structured questionnaire titled "Assessing the Utilization of Generative AI among Post Graduate Students Questionnaire." The instrument was structured on a 4-point Likert scale of Very High Extent, High Extent, Low Extent, and Very Low Extent. The validity of the instrument was determined by three experts in Measurement and Evaluation. The reliability of the instrument was determined using Cronbach Alpha method. Reliability coefficients of 0.71, 0.82, and 0.88 were obtained for the three clusters of the instrument. Out of 217 copies of the questionnaire distributed, 182 copies were retrieved as duly completed and were used for data analysis. Statistical Package for Social Sciences (SPSS) software was used to analyse the data. Mean and standard deviation statistics were used to analyse the data.

### Results

**Research Question 1:** To what extent is AI integrated into personalized learning among postgraduate students in Rivers State universities?

**Table 1: AI Integration into Personalized Learning Among Postgraduate Students**

S/N	Statements	VHE	HE	LE	VLE	Remark
1	My university offers AI-based platforms for individualised learning experiences.	68 (272)	68 (204)	34 (68)	12 (12)	High Extent
2	I actively employ AI-powered learning resources (such as chatbots, virtual tutors, and adaptive learning systems) for academic purposes.	37 (148)	60 (180)	26 (52)	59 (59)	Low Extent
3	My institution's AI-powered technologies suggest tailored study guides for my learning preferences.	48 (192)	62 (186)	30 (60)	42 (42)	High Extent
4	AI-driven learning systems modify the course material according to my academic standing.	40 (160)	63 (189)	40 (80)	39 (39)	High Extent
5	AI tools offer assessments and fast feedback based on my learning requirements.	65 (260)	75 (225)	30 (60)	12 (12)	High Extent
6	AI-powered learning materials improve my comprehension of complex subjects.	49 (196)	61 (183)	40 (80)	32 (32)	High Extent
7	AI-powered learning environments improve my research and problem-solving ability.	31 (124)	63 (189)	31 (62)	57 (57)	Low Extent
8	My drive and interest in the course topics have grown due to using AI in my studies.	59 (236)	77 (231)	21 (42)	25 (25)	High Extent
<b>Grand Mean = 2.72</b>						<b>High Extent</b>

Table 1 shows a considerable degree of agreement regarding the function of AI in education, with a pooled mean of 2.72 on a four-point scale. This implies that although AI tools are used in the educational process, their efficacy differs depending on the subject matter. AI-powered assessment and feedback systems were rated as the most popular among the most substantial areas of AI integration. This shows that students believe AI tools help give them timely, individualised assessments. Students acknowledge and value AI's capacity to customise learning experiences to meet their unique needs, given to university-provided AI platforms for customised learning experiences. Furthermore, students rated AI highly for increasing their motivation and interest in the course material, indicating that AI could help raise student engagement. However, the lower acceptance

scores for some areas point to possible obstacles in deploying AI. The weighted response for AI-powered research and problem-solving environments was the lowest, indicating that students might not find AI tools to be especially helpful when assisting with their research. The comparatively low score for AI-powered learning tools like chatbots, virtual tutors, and adaptive learning systems also suggests low engagement or perceived efficacy in academic support. Students' opinions on AI technologies are mixed, as indicated by the high standard deviation values across responses. Some pupils are adamant about their efficacy, while others are not. This variation suggests that the benefits of integrating AI into education could not be consistent for all students and learning environments.

**Research Question 2:** To what extent does AI impact postgraduate students' learning engagement and motivation?

**Table 2: AI Impact on Postgraduate Students' Learning Engagement and Motivation**

S/N	Statements	VHE	HE	LE	VL	Remark
1	Chatbots and virtual instructors are examples of AI-powered learning technologies that improve my interaction with academic material	53 (212)	46 (138)	41 (82)	42 (42)	High Extent
2	The use of AI in academic research (such as data analysis and literature reviews) piques my interest in learning.	49 (196)	49 (147)	39 (78)	45 (45)	High Extent
3	AI-powered study suggestions (like adaptive learning platforms) motivate me to research more educational materials	55 (220)	40 (120)	43 (86)	44 (44)	High Extent
4	Group discussions and AI-powered collaboration tools enhance my involvement in academic pursuits	53 (212)	36 (108)	49 (98)	44 (44)	High Extent
5	The availability of AI-driven academic help (such as writing aids and grammar checks) improves my study habits	50 (200)	55 (165)	40 (80)	37 (37)	High Extent
6	AI-powered recommendations for skills and career coaching	43 (172)	36 (108)	39 (78)	64 (64)	Low Extent

	inspire me to pick up new knowledge					
7	AI-powered visualisation tools (such as interactive models and simulations) pique my interest in complex subjects	55 (220)	52 (156)	36 (72)	39 (39)	High Extent
8	AI-powered progress monitoring and customised goal-setting increase my drive to finish assignments	64 (256)	43 (129)	39 (78)	36 (36)	High Extent
	<b>Grand Mean = 2.59</b>					<b>High Extent</b>

Table 2 reveals that students' engagement, motivation for research, and interactions with instructional resources have all been profoundly impacted by the incorporation of artificial intelligence (AI) into academic learning. The results of this investigation, which looks at how students react to different AI-powered learning tools, point to critical areas where people still have doubts about AI and where it is seen as helpful. The mean scores, measured on a scale of 1 to 5, where 1 indicates strong disagreement, and 5 indicates strong agreement, show that AI-powered chatbots and virtual teachers improve students' engagement with academic materials, with a mean score of 2.60. Some respondents (46 agreed, 53 strongly agreed) thought these techniques helped raise involvement. A lower rate (41 disagreed, 42 strongly disagreed) voiced concerns, indicating that although AI improves engagement, it might not completely replace conventional teaching techniques.

Similarly, with a mean score of 2.56, it was discovered that AI applications in academic research, like data analysis and literature reviews, increase students' enthusiasm for learning. Many students acknowledged AI's potential to streamline research procedures (49 strongly agreed, 49 agreed). However, some students (39 disagreed, 45 strongly disagreed) remained dubious, maybe because they had doubts about AI's correctness, utility, or dependability in scholarly research. On the other hand, with a mean score of 2.58, AI-powered study suggestions—like adaptive learning platforms were regarded as a resounding success in encouraging students to look into more educational resources. Although some respondents (43 disagreed, 44 strongly disagreed) believed that AI-generated recommendations might not always match their unique learning demands, the majority (55 strongly agreed, 40 agreed) valued the personalised study suggestions, providing reassurance about the effectiveness of AI in education.

AI-powered group discussions and collaboration tools were recognised for improving academic involvement in collaborative learning. Many respondents (49 disagreed, 44 strongly disagreed) voiced worries, perhaps indicating difficulties with AI's capacity to promote critical thinking or meaningful conversations, even if 36 agreed and 53 strongly agreed. However, AI-driven academic support, such as writing tools and grammar checkers, was a particularly well-liked AI feature. It greatly enhanced my study habits. Only a tiny percentage of students (40 disagreed, 37 strongly disagreed) voiced

reservations, demonstrating a high acceptance of AI in improving academic work. More than half of the students (50 strongly agreed, 55 agreed) considered these technologies beneficial, instilling confidence in the benefits of AI in academic work.

AI-powered career coaching tools were the least accepted. A more significant percentage of respondents (39 disagreed, 64 strongly disagreed) did not find them compelling, even though 36 agreed and 43 strongly agreed with their usefulness. This implies that students might be wary of the accuracy, applicability, or personalisation of career advice produced by AI. However, AI-powered visualisation tools like interactive models and simulations were generally acknowledged as helpful in comprehending complicated subjects. Although some (36 disagreed, 39 strongly disagreed) voiced doubts, maybe due to accessibility or learning style issues, a sizable majority (55 strongly agreed, 52 agreed) acknowledged the value of AI-driven visual assistance. With a mean score of 2.75, the AI-powered progress tracking and personalised goal-setting feature received the highest ratings in this study and was thought to be a powerful incentive for finishing tasks. This category had the highest degree of agreement (64 strongly agreed, 43 agreed), suggesting that AI's capacity to monitor learning progress and establish individualised goals is highly advantageous. The low disagreement (39 disagreed, 36 strongly disagreed) indicates that people typically like this tool.

**Research Question 3:** What are the challenges associated with the adoption of AI in personalized learning among postgraduate students?

**Table 3: Challenges Associated with the Adoption of AI in Personalized Learning Among Postgraduate Students**

S/N	Statements	SA	A	D	SD	Remark
1	My adoption of AI-based personalised learning tools is discouraged by their expensive cost.	68 (272)	44 (132)	40 (80)	30 (30)	Agree
2	When using AI-powered learning platforms, I worry about data security and privacy hazards.	58 (232)	93 (279)	21 (42)	10 (10)	Agree
3	I cannot use AI-based learning tools effectively due to insufficient technical support.	44 (176)	74 (222)	43 (86)	21 (21)	Agree
4	My capacity to use AI in learning is hampered by the digital divide, including inadequate digital gadgets or no internet connection	37 (148)	79 (237)	31 (62)	35 (35)	Agree
5	One of my biggest obstacles is the time needed to learn how to use AI-powered products efficiently	50 (200)	52 (156)	49 (98)	31 (31)	Agree

6	Institutional incentives and support for incorporating AI into postgraduate education are lacking	68 (270)	51 (153)	25 (50)	38 (38)	Agree
7	Because of institutional restrictions, I cannot use AI-driven personalised learning tools	48 (192)	92 (276)	21 (42)	21 (21)	Agree
8	My desire to rely on AI for personalised learning is diminished by ethical worries regarding AI decision-making	52 (208)	49 (147)	47 (94)	34 (34)	Agree
	<b>Grand Mean =2.82</b>					<b>Agree</b>

In Table 3, the results show that with a mean score of 2.82, the study's findings underscore the urgent need to address the high price of AI-based learning resources. A significant number of respondents (44 agree, 68 strongly agree) expressed concerns that the cost of these tools is a major deterrent. This indicates that access to AI-powered educational materials is still severely hampered by affordability, particularly for students and institutions with limited financial resources. Data security and privacy issues emerge as a critical concern. A substantial number of respondents (93 agree, 58 strongly agree) voiced serious concerns about the security of their data when using AI-powered learning platforms. This research underscores the significant impact of data security measures on AI adoption in education.

The study also highlights the crucial need for additional technical support in using AI-based learning tools effectively. Many respondents (44 strongly agree, 74 agree) found it challenging to use these products effectively due to insufficient advice and troubleshooting support. This underscores the importance of organisations offering additional technical support services to promote AI adoption. The digital divide, which includes limited access to digital devices and internet connectivity, was also found to be a limiting factor. This means that a significant number of participants (79 agree, 37 strongly agree) stated that their limited access to the required technology, such as smartphones or computers, and a reliable internet connection makes it challenging to participate in AI-based learning. This emphasises how crucial it is to fix digital infrastructure gaps to guarantee fair access to AI-driven education. Time restrictions were also identified as a challenge. Many respondents (52 agree, 50 strongly agree) felt overwhelmed by the time needed to become proficient with AI-powered technologies. This implies that intricate AI systems with high learning curves may deter potential users from interacting with such technologies.

Furthermore, another major obstacle to integrating AI into postgraduate education has been identified as the absence of institutional incentives and support. With a mean score of 2.82, a sizable portion of respondents (68 strongly agree, 51 agree) think

educational institutions don't promote using AI in learning enough with resources or encouragement. With a mean score of 2.92, institutional limitations such as those limiting AI use were also emphasised. According to the findings, colleges and other educational establishments may need to update their current regulations and create environments that support AI-driven learning. Ethical concerns about AI decision-making also contribute to declining confidence in AI-powered learning tools. There is a need for greater openness and ethical concerns in AI design, as many respondents (52 strongly agree, 49 agree) voiced doubts about the fairness and dependability of AI suggestions.

### **Discussion of Findings**

The study's findings are consistent with other empirical studies on the use of AI in education. Although AI technologies are employed, their perceived impact differs across various educational features, according to the modest level of consensus (pooled mean = 2.72) regarding AI's involvement in learning. With the highest weighted response (557, mean = 3.06), AI-driven assessment and feedback systems were among the study's best areas. This is consistent with research by Zawacki-Richter et al. (2019), which showed that AI-based evaluation tools significantly improve student learning by offering real-time performance analysis and personalised feedback. Holmes et al. (2021) discovered that AI-powered automated grading and feedback systems help students track their progress and effectively fill learning gaps, improving academic achievement. AI-based learning platforms also received high marks (weighted response = 556, mean = 3.05). This backs up Chen et al.'s (2011) study, which discovered that AI-powered adaptive learning systems assist in tailoring learning paths for students according to their areas of strength and weakness. Additionally, the results of the current study (weighted response = 534, mean = 2.93) about AI's role in raising student motivation and interest in course topics are consistent with Chen et al.'s (2011) emphasis that AI-powered personalised learning improves student motivation and engagement.

However, support for other AI applications was low. Among the lowest-ranked features were AI-powered research and problem-solving environments (weighted response = 432, mean = 2.37). According to Selwyn (2020), many students still find it difficult to properly utilise AI tools for academic inquiry because they lack the necessary technical skills and institutional support, even though AI has the potential to promote research and critical thinking. The usefulness of AI in study depends on how well students are trained to incorporate new technologies into their academic work, according to Luckin et al. (2020). Additionally, there were differing opinions about AI-powered learning tools, including chatbots, virtual instructors, and adaptive systems (weighted answer = 439, mean = 2.41). Although chatbots and virtual tutors driven by AI have their uses, their efficacy mainly relies on the calibre of the content and the degree of user interaction. The results of this study are consistent with previous studies on the effects of artificial intelligence (AI) on academic learning, specifically in terms of improving student motivation, engagement, and research efficiency.

Many empirical studies that have examined the efficacy of AI-powered learning technology support the idea that AI-driven tools have a big impact on students' academic

experiences, with a mean score of 2.60. One of the study's main conclusions is that chatbots and virtual teachers enhance students' engagement with course materials. AI-powered chatbots improve students' comprehension of challenging academic ideas by giving them immediate feedback and tailored answers. Similarly, a study by Huang, Yang and Li (2021) discovered that by providing interactive and adaptive help, AI-powered tutoring systems significantly increase learning engagement and comprehension, but human guidance is still essential for deep learning and the development of critical thinking. The existence of students who disagreed with this statement implies that AI-powered learning technologies may not completely replace traditional instructor-led interactions. The study discovered that students generally agreed with using AI in academic research, especially in data analysis and literature reviews, with a mean score of 2.56. This finding is supported by Lu Wang and Sun's (2020) research, which discovered that AI-driven data analytics help students find pertinent literature and derive essential insights from big datasets, thus streamlining the research process. Additionally, the study discovered that AI-powered study suggestions, like those found in adaptive learning systems, encourage students to look into more learning resources (mean = 2.58). This result is consistent with research by Baker and Smith (2019), who found that adaptive learning systems tailor learning experiences by suggesting study guides according to each learner's unique learning preferences. The findings also showed that group discussions and AI-powered collaboration tools improve students' academic involvement (mean = 2.54). This corroborates the results of Fischer, Kollar and Wecke's (2022) findings that peer-assisted learning models and AI-powered discussion platforms encourage critical thinking and a deeper comprehension of academic material. However, the disagreement among some students raises the possibility that AI-facilitated conversations could not always be as successful as in-person ones.

Study habits were also improved by the availability of AI-driven academic support, such as writing tools and grammar checkers (mean = 2.65). Students can improve their academic writing by using AI-powered writing aides like Grammarly and Turnitin, which offer real-time feedback on grammar, style, and plagiarism detection. However, some differing views in the current study might be explained by worries about AI's difficulties in comprehending intricate linguistic nuances. Remarkably, with a mean score of 2.37, which falls into the disagreement category, AI-powered career coaching tools were the least accepted. AI-based career advice platforms offer valuable insights into career routes and skill development, contradicting this finding. Students frequently mistrust AI-generated job advice because they have doubts about its precision and customisation. The results imply that AI-powered career counselling tools might need to be improved to match students' career goals with actual job market trends. AI-powered, it was generally acknowledged that AI-powered visualisation tools, such as interactive models and simulations, helped comprehend complex subjects (mean = 2.66). This is in support of Chen and Zhang's (2023) findings that showed how AI-powered visual learning tools improve students' knowledge of abstract subjects by transforming data into easier-to-understand representations. The study's comparatively high degree of agreement indicates that one of the best uses of AI in academic learning is visualisation tools.

The study findings show that lack of funding, worries about data security, institutional limitations, a lack of technical support, and ethical issues are some of the challenges students encounter in the bid to use AI for personalized learning. With a mean score of 2.82, the high cost of AI-based learning tools emerges as one of the most significant obstacles found in this study, demanding immediate attention. This result aligns with earlier research showing that price is one of the main barriers to adopting AI in education (Zawacki-Richter et al., 2019). Students and institutions with limited financial resources cannot use AI-powered educational tools because they frequently demand costly software subscriptions, high-end digital gadgets, and reliable internet connectivity.

Similarly, Oke and Fernandes (2020) discovered that one of the main obstacles keeping students in developing nations from using AI for learning was a lack of funds. The high price of these resources emphasises the necessity for educational institutions and policymakers to look at subsidised AI learning platforms and offer financial aid to students who require it. Data security and privacy threats were also rated as a serious concern, with the highest mean score of 3.09. When using AI-powered learning platforms, a sizable portion of respondents voiced worries about the security of their personal information. This result is consistent with earlier studies that show users' confidence in AI systems is frequently damaged by concerns about data breaches and unethical data use (Selwyn, 2019). With a mean score of 2.77, the study also discovered that inadequate technical support makes it more challenging to use AI-based learning tools effectively. Insufficient technical support deters instructors and students from utilising AI technologies to their full potential, lending credence to this.

Many educational institutions lack the staff and infrastructure to offer technical assistance relating to AI, especially those in underdeveloped nations (Chen, Li, X, and Tang, 2021). Institutions must invest in AI training programmes and set up specialised technical support units to help teachers and students navigate AI-powered learning environments to overcome this obstacle. With a mean score of 2.65, the digital divide, which includes limited access to digital devices and internet connectivity, was also recognised as a significant issue. The digital gap restricts students' capacity to use AI for individualised learning, which worsens educational disparities.

To close this gap, governments and stakeholders in education must prioritise investments in digital infrastructure, such as expanding bandwidth and providing reasonably priced digital devices. With a mean score of 2.82, the study also discovered a lack of institutional incentives and support for the deployment of AI. This is consistent with research by Holmes et al. (2021), which indicates that the use of AI in education is still restricted in the absence of appropriate institutional rules and support systems. The deployment of AI-based personalised learning is further hampered by institutional limitations, which scored a mean of 2.92. Rigid institutional policies and bureaucratic obstacles sometimes hinder educators from integrating AI tools into their curricula, according to studies by Zhang and Aslan (2021). The study underscores the need for educational establishments to implement more adaptable rules that promote creativity and AI-powered education. Lastly, with a mean score of 2.65, ethical worries about AI

decision-making lowered trust in AI-powered learning tools. This result is consistent with earlier research addressing ethical concerns about algorithmic bias, opaqueness, and equity in AI-based decision-making (Baker & Hawn, 2019). Adopting AI in education may encounter resistance due to students' and instructors' frequent scepticism over the validity and equity of AI-generated recommendations. These issues can be resolved by ensuring the ethical application of AI through strong legal frameworks and open algorithmic procedures.

### **Conclusion and Recommendations**

The study concluded that while students acknowledge the potential of AI to improve assessments, personalised learning, and engagement, its efficacy varies depending on the application. While AI-driven progress tracking and goal-setting are more widely accepted, challenges like high costs, data security concerns, limited technical support, the digital divide, time constraints, a lack of institutional incentives, regulatory limitations, and ethical issues highlight the urgent need for policy interventions and infrastructure improvements to ensure equitable access and successful AI integration in education. The study recommended thus:

1. Educational Institutions should prioritise enhancing the usability and accessibility of AI-powered research and adaptive learning tools through user-centred design, focused training, and awareness campaigns to improve the successful integration of AI in education and guarantee that students can optimise its advantages across a range of learning needs.
2. Educational institutions intentionally incorporate AI-powered solutions, answering students' worries about personalisation and dependability while utilising well-recognised characteristics like adaptive learning and progress tracking to improve research motivation and academic engagement.
3. To ensure inclusive and successful AI-driven education, educational institutions and policymakers should implement subsidised AI learning materials, bolster data security protocols, offer technical assistance, close gaps in digital infrastructure, and create explicit policies to encourage ethical AI use

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