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ARTIFICIAL INTELLIGENCE (AI) INTEGRATION AS A PANACEA FOR HIGHER EDUCATION STUDENTS' DIGITAL LITERACY SKILLS IN SAINT AUGUSTINE UNIVERSITY OF TANZANIA.

By

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Abstract

The study investigates Artificial Intelligence (AI) integration as a panacea for higher education students' digital literacy skills Saint August University of Tanzania. Two specific objectives and two research questions were adopted for the study. The population of the study. The population of the study comprised 1004 respondents, 360 students were drawn from the population. Questionnaire tagged: Artificial Intelligence integration: panacea for higher education students digital skills literacy (AI) (PHESDSQ) were the instrument used for data collection, validity were carried out by experts in Measurement and Evaluation as well as expert in Educational Foundation Saint Augustine University of Tanzania, reliability ranging from 0.74 – 0.82 were obtain using Cronbach alpha coefficient. The results of the analysis revealed that preparations of students in the usage of AI and the impact of AI based learning tools significantly influence the utilization of AI in the actualization of university goal. The study recommends that management of university and organizations should adopt the usage of AI in order to assist students' productivity and creativity.

Keywords: Artificial Intelligent, Integration, Higher Education and Digital Skills Literacy.

Introduction

Artificial Intelligence (AI) is recently recognized in higher education, and it's changing the way students perceive digital literacy skills. Universities now use AI to make learning more personal,

cut down on paperwork, and encourage creative, critical thinking. These days, being digitally literate isn't just about knowing your way around a computer. It's about understanding how these tools work, asking the right questions about what they do, and thinking about their impact on society and ethics (Kpelinbe, 2025).With more digital systems rolling out across universities, students need the right skills to pick up. AI helps assist students in intelligent tutoring or adaptive platforms that adjust to the reach. These tools don't just teach hard skills like coding or data analysis. They also boost problem-solving and reasoning. But as helpful as AI is, it brings some real worries. Not everyone has equal access. Privacy is a big issue, and there's always the risk of bias in how algorithms work. AI to is determine to truly help students build digital literacy, as a result to tackle these challenges, every hand must be on deck (Yaseen et al., 2025; Amin et al., 2025). Ategwu (2026) opined that AI are facility advanced functionalities which include self-learning system capable of real-time analysis of extensive data, detective of behaviour pattern and implementation of corrective actions. Okonta and Nnamdi (2025) suggested that for students of higher institution to be effective AI stands as central agent for a successful school management be mean of utilizing educational programmes and to fulfill institutional objectives.

Using technology such as AI in education isn't new. Way back in the 1960s and 1970s, people tried computer-aided instruction and programmed learning. But those early systems were pretty basic and didn't do much for real digital literacy (Thompson et al., 2025). Things changed with AI, now, systems can adapt to a student's pace, give feedback, help with assessment, and even support group work (Berges-Puyo, 2024). The whole idea of digital literacy has grown. It's not just technical know-how; students also need to think critically, ask questions, and make ethical decisions as digital tools become a bigger part of life (Saputra et al., 2024; Marzuki et al., 2023).

Some countries like the United States, China, the UK have really leaned into AI in higher education. They're backing research, setting up policies for ethical use, and rolling out AI platforms to help students learn (Etheredge, 2025). Personalized AI learning systems are common, helping students develop problem-solving and critical thinking skills at the heart of digital literacy. But even these countries face issues: keeping data private, making algorithms fair, and helping teachers keep up. Research shows AI works best when it's planned out and everyone gets fair access (Lawasi et al., 2024).

In the African countries, many countries just started the use of AI in universities. South Africa, Kenya, Nigeria some have pilot projects, but most schools still don't have the money, fast internet, or enough trained staff to go all-in. Funding is tight. Internet access is spotty. And there aren't enough educators who know how to use AI in the classroom (Birma et al., 2025). Still, there's momentum. Governments and schools are looking at AI as a real way to close the skills gap, especially in science and technology. More programs are popping up that teach digital literacy through AI platforms (Ataguba et al., 2025). It's a sign that interest is growing, and people want to give students the tools they need for jobs where digital skills are necessarily needed.

In Tanzania, integrating AI into higher education is still fairly many challenges. There has been some progress, such as adding ICT and digital literacy to parts of the national curriculum, but the country's infrastructure isn't yet sufficient to support widespread digital learning (Matto & Ponera, 2025). A lot of students in Tanzania, especially those living in rural areas, have a tough time getting their hands on digital devices. Internet connections are shaky, and most teachers haven't had much training with tech, let alone AI. Even though the government wants to modernize education with digital tools, progress is slow. Building e-learning platforms sounds great, but gaps in infrastructure and funding keep holding things back. Some universities have started rolling out pilot AI projects to boost digital skills and help students learn better, but they keep running into big problems mostly in places where resources are already limited (Maganga & Srivastava, 2025; Machemba & Biswal, 2025). AI isn't a magic fix but it opens up new ways to support learning and help students pick up digital skills, but without affordable devices, steady internet, and teachers who actually know how to use these tools, it's hard to get everyone on board. The gap between cities and rural areas just makes things worse. Students in cities have a shot at using these new AI education tools, while others get left behind (Machemba & Biswal, 2025).

In view of these, policymakers and schools need to work together to improve basic infrastructure, make technology affordable, and really invest in teacher training. It's also important to shape AI adoption around what's actually possible in each area, like thinking about whether there's even reliable electricity or internet before rolling out a new program. Therefor these form the basis of this study.

Artificial intelligence is becoming prevalent in higher education, transforming students ability to acquire digital literacy skills. Despite the government's efforts to introduce technology into schools, implement digital literacy programs, and promote e-learning platforms, students in Tanzania still face obstacles in gaining the necessary digital skills. The government has made some progress, but there still isn't enough infrastructure, digital technology isn't widely used, and there aren't enough qualified teachers to effectively implement AI in higher education. Because of this, many students aren't prepared to use digital platforms, especially those powered by AI. This study will explore how integrating AI into higher education can help students develop the digital skills necessary for success today, by examining this more closely, we can suggest strategies and practical steps for using AI to improve learning and prepare students for the digital economy.

The study guided by two objectives which are:

1. To explore the Preparedness of students in the usage of AI in improving digital literacy skills.

2. To examine the impact of AI-based learning tools on the development of digital literacy skills in the learning process.

The study guided by two questions which formulated from the research objectives which are:

i. What is the preparedness of students in the usage of AI in improving digital literacy skills?

ii. What is the impact of AI-based learning tools on the development of digital literacy skills in the learning process?

Theoretical Review

This study leans on constructivism theory, first developed by Jean Piaget in the 1970s and later expanded by Lev Vygotsky. At its core, constructivism says learning isn't passive people actively build on what they already know, drawing from their own experiences. When you look at bringing AI into higher education through this lens, AI turns into more than just a tool. It becomes a way to make learning personal and hands-on. AI platforms can adapt to what each student needs, stepping in almost like a digital mentor that offers support and guidance as students figure things out for themselves. It's similar to how a good teacher or classmate might point you in the right direction, but with technology doing some of the heavy lifting. On top of that, AI opens up more chances for students to work together, solve problems, and really talk things through, which pushes them to think more deeply. So, using AI in class fits well with constructivist ideas it encourages real-world problem-solving, learning by doing, and helps students grow skills like creativity and independent thinking (Chand, 2023; Saleem et al., 2021).

Constructivist theory holds that learners actively build knowledge through interaction with their environment rather than simply receiving information from instructors. When applied to the integration of Artificial Intelligence (AI) in enhancing higher education students' digital literacy skills at St. Augustine University of Tanzania (SAUT), Mwanza, this theory views students as active participants in their own learning process. Through engagement with AI-driven tools such as adaptive learning platforms, intelligent tutoring systems, and data-driven feedback applications, students develop digital competencies by exploring, experimenting, and reflecting on their learning experiences.

One of the main strengths of constructivism is its emphasis on learner-centered instruction, experiential learning, and learning within meaningful contexts. These principles align closely with the capabilities of AI technologies, which offer personalized learning pathways, immediate feedback, and problem-solving opportunities. By interacting with AI tools, students are able to gradually construct digital literacy skills, not only by acquiring technical knowledge but also by applying it in authentic academic situations that require critical thinking, creativity, and collaboration.

In addition, constructivism highlights the importance of social interaction, scaffolding, prior knowledge, and authentic learning environments. Within this framework, AI functions as a

supportive scaffolding tool that responds to students' varying levels of digital competence by adapting content difficulty and learning pace. AI-supported collaborative platforms further encourage peer interaction, discussion, and shared problem-solving, all of which are central to constructivist learning. The flexibility of constructivism and its relevance to contemporary digital learning environments make it a suitable theoretical lens for examining AI integration at SAUT Mwanza.

Overall, constructivism provides a strong foundation for understanding how AI can support meaningful learning and the sustainable development of digital literacy skills in higher education. By enabling students to actively access, evaluate, create, and communicate digital information, AI-enhanced learning environments foster deeper engagement and long-term competence in an increasingly digital academic world.

Literature Review

Preparedness of Students in the Usage of AI in Improving Digital Skills

Several studies have examined students' preparedness in using Artificial Intelligence (AI) and its implications for digital skills development. Zawacki-Richter et al. (2020) conducted a systematic review titled "Systematic Review of Research on Artificial Intelligence Applications in Higher Education", analyzing 146 peer-reviewed studies from various global universities. Using systematic review methodology, the study found that while AI applications were increasingly adopted in adaptive learning and assessment, limited attention was given to structured student preparedness and AI literacy training. The review concluded that lack of foundational AI knowledge among students weakened effective utilization of AI tools. However, the study relied entirely on secondary sources and did not provide primary empirical data from specific institutions.

Similarly, Ng et al. (2021) carried out a mixed-methods study on "AI Literacy: Definition, Teaching, Evaluation and Ethical Issues" across universities in Asia and Europe. The study surveyed 312 students and interviewed 24 lecturers to assess AI literacy levels. Findings revealed that although students frequently used AI tools, many lacked deeper understanding of AI systems, algorithms, and ethical implications. Students who had received structured AI literacy training demonstrated stronger digital problem-solving and critical evaluation skills. The study recommended embedding AI literacy into higher education curricula but was limited to technologically advanced institutions, reducing generalizability to developing contexts.

Holmes et al. (2022) led a multi-country qualitative case study titled "Artificial Intelligence in Education: Promise and Implications for Teaching and Learning" involving 18 universities across the United Kingdom, United States, and Singapore. Through institutional case analyses and student focus groups, the study found that student preparedness significantly influenced AI integration outcomes. Universities that provided AI orientation programs reported improved digital

confidence, autonomy, and engagement among students. However, institutions lacking preparatory training experienced superficial AI usage. A key limitation was limited representation from low-income regions.

Within the African context, Mhlanga (2023) examined a qualitative review artificial intelligence in Higher Education in Africa focusing on universities in South Africa and Zimbabwe. Using survey responses from 150 students and institutional document analysis, the study found that although students expressed positive attitudes toward AI usage, their preparedness was constrained by limited digital infrastructure and insufficient AI training. The study emphasized capacity building as essential for meaningful digital skills development. However, the findings were largely descriptive and lacked robust statistical validation.

In East Africa, Ssekibuule et al. (2021) caried a quasi-experimental study digital platforms and student engagement in East African Universities involving 420 undergraduate students in Kenya and Uganda. Using pre- and post-intervention surveys, the study demonstrated that students who underwent structured AI tool training showed significant improvement in digital literacy and engagement compared to control groups. Nonetheless, disparities emerged between urban and rural institutions due to infrastructural inequalities. The short duration of the intervention limited long-term impact assessment.

Mtebe and Raphael (2023) carried out a descriptive survey titled “Readiness for AI-Supported Learning in Tanzanian Universities” across three public universities, sampling 380 students. The study found that while students widely used AI-enabled platforms, only a minority demonstrated adequate AI literacy competence. Preparedness was strongly associated with digital skills acquisition and academic performance. The study recommended formal integration of AI literacy modules into university curricula but was limited to public institutions, excluding private universities such as those in Mwanza Region.

Impact of AI-Based Learning Tools on Students’ Digital Literacy Skills

Bond et al. (2024) examined a mixed-methods experimental study on generative ai and digital competence development in Higher Education across universities in Germany and Australia, involving 290 undergraduate students. The study found that AI-based feedback and generative tools significantly improved digital communication, research skills, and analytical thinking. However, some students developed overreliance on AI systems, reducing independent critical evaluation. The short experimental timeframe limited longitudinal assessment.

Selwyn (2022) caried a qualitative policy analysis titled “AI and the Future of Higher Education” across European universities. Through document analysis and institutional case studies, the research found that AI tools enhanced students’ efficiency in information retrieval, digital collaboration, and academic writing. Nevertheless, concerns regarding algorithmic bias, data

privacy, and academic integrity were identified. The study was largely conceptual and lacked quantitative student-level performance measures.

Adeniyi et al. (2022) investigated a survey study titled "AI-Driven Learning Systems and Digital Skills in Nigerian Universities" sampling 450 students using structured questionnaires. The findings revealed that AI-based systems significantly improved students' digital research skills, self-directed learning, and online collaboration competencies. However, inconsistent internet connectivity limited sustained AI engagement. The study recommended investment in infrastructure but lacked qualitative insights into student experiences.

African Union (2022) published a policy evaluation report titled "Digital Transformation Strategy for Africa." The report analyzed higher education digital initiatives across multiple African countries. It found that AI-supported platforms enhanced STEM-related digital skills and data literacy. However, implementation gaps persisted due to funding limitations and unequal institutional readiness. The macro-level nature of the report limited micro-level empirical analysis.

Within East Africa, Oketch et al. (2022) caried a cross-sectional study titled "Learning Analytics and Digital Research Skills in East African Universities" involving 310 students in Kenya and Tanzania. The study found that AI-powered learning analytics improved students' data interpretation skills, digital content creation, and research competence. However, lack of faculty training limited optimal AI integration. The study recommended blended pedagogical strategies to maximize impact.

In Tanzania, the United Republic of Tanzania (URT, 2022) conducted a national evaluation under the ICT in Education Policy framework across selected universities. Using institutional surveys and stakeholder interviews, the study found that AI-supported digital platforms improved students' communication skills, problem-solving abilities, and independent learning habits. However, implementation was uneven due to limited AI-specific training and absence of clear institutional AI governance frameworks.

Methodology

This study adopted a quantitative research approach to examine Artificial Intelligence (AI) Integration as a Panacea for Higher Education Students' Digital Literacy Skills in Saint Augustine University of Tanzania (SAUT). The study employed a descriptive research design because it enabled the researcher to collect quantitative data and describe the existing situation regarding the integration of AI in improving students' digital literacy skills. The target population consisted of 1,003 respondents, including students and lecturers from the department of Education foundations. A sample size of 360 respondents was selected using appropriate sampling techniques to ensure adequate representation of the study population. Data were collected using a structured questionnaire titled Artificial Intelligence and Digital Literacy Skills Questionnaire (AIDLSQ).

The questionnaire was designed using a five-point Likert Scale ranging from: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. The decision rule for interpretation of responses was based on mean scores whereby: 1.00–1.80 = Strongly Disagree, 1.81–2.60 = Disagree, 2.61–3.40 = Neutral, 3.41–4.20 = Agree, and 4.21–5.00 = Strongly Agree.

Validity of the research instruments was ensured through face and content validity by consulting research supervisors and experts in educational research. Reliability of the questionnaire items was tested using Cronbach's Alpha Coefficient, where a minimum acceptable reliability coefficient of 0.70 was considered adequate for the study. Quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS) Version 21. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used in data analysis and presentation. Ethical considerations were strictly observed through obtaining research clearance from relevant authorities, seeking informed consent from respondents, ensuring confidentiality and anonymity of participants, maintaining secure storage of collected data, and adhering to APA 7th edition citation and referencing guidelines.

Result and Discussions

The summary statistics of the variables were analyzed using descriptive statistics of frequency and percentage distribution.

Gender of the Respondents

The gender is sub-divided into male and female categories and analyzed using frequency and percentage distribution as indicated in Table 1.

Table 1: Gender of the Respondents

Sex	Freq	%
Male	192	53.33%
Female	168	46.67%
Total	**360**	**100**

Table 1 shows the number of people who responded to male and female and the result is presented above. From the result, it could be deduced that the majority of the respondents who responded to the question are male with the frequency and percentage distribution of 192 (53.33 percent), while 168 (46.67 percent) are female.

Age of the Respondents

Different categories of age-group are determined in this section as indicated in Table 2. The age group considered is from 20 years and above. The categories of the age group include 20 – 30 years; 31 – 40 years; 41 – 50 years, and 51 years and above analyzed using frequency and percentage distribution as explained below.

Table 2: Age of the Respondents

Age	**Freq**	**%**
20-30 Years	64	17.78%
31-40 Years	101	28.06%
41-50 Years	113	31.39%
51 and above Years	82	22.78%
Total	**360**	**100**

From Table 2, it is shown that the majority of the respondents are between the age group of 41-50 years with the frequency and percentage distribution of 113 (31.39 percent); followed by 101 (28.06 percent) of the respondents whose ages are between 31-40 years; 82 (22.78 percent) are 51 and above years, and 64 (17.78 percent) are from 20-30 years.

Research Question 1: What is the preparedness of students in the usage of AI in improving digital literacy skills? Table 3 shows frequency count and percentages of respondents' answers to question one taking cognizance of the Likert scale.

Table 3: Preparedness of students in the usage of AI in improving digital literacy skills (N = 360)

S/N	**STATEMENTS**	**SA**			**N**		**D**		**SD**	
	Preparedness of students in the usage of AI	**Freq**	**%**	**A**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
1	How familiar are you with AI tools	101	28.06	109	57	15.83	53	14.72	40	30.28

2	I know how AI systems are trained	132	36.67	79	26	7.22	59	16.39	64	21.94
3	I can use AI tools effectively compile academic tasks	111	30.83	90	30	8.33	33	9.17	96	25.00
4	I use AI for writing. Summarizing and coding	104	28.89	91	17	4.72	65	18.06	83	25.25
5	AI tools can significantly improve learning quality	130	36.11	61	24	6.67	81	22.50	64	16.94

From Table 3 above, perusing through the frequencies and percentages, the respondents' responses to influence of Preparedness of students in the usage of AI as influence students digital skills in higher institution in Mwanza region-Tanzania shows that the respondents strongly agree to question one. Therefore, it is concluded that Preparedness of students in the usage of AI influence utilization of artificial intelligence in the actualization of university goal achievement in the study area.

Research Question 2: What is the impact of AI-based learning tools on the development of digital literacy skills in the learning process? Table 4 shows frequency count and percentages of respondents' answers to question two taking cognizance of the Likert scale.

Table 4: Impact of AI-based learning tools on the development of digital literacy skills (N = 360)

S/N	**Statements**	**SA**		**A**		**N**		**D**		**SD**	
	Impact of AI based learning tools	**Freq**	%	**Freq**	%	**Freq**	%	**Freq**	%		
1	For what purpose do you use AI tools	141	39.19	69	19.17	48	13.33	49	13.61	53	14.72
2	AI tools adapt to any individual learning pace and needs	108	30.00	63	17.50	14	3.89	72	20.00	103	28.61
3	Using AI increases my motivation to learn	94	26.11	66	18.33	32	8.889	55	15.28	113	31.39

4	AI tools improve my engagement with the materials	160	44.44	40	11.11	18	5.00	58	16.11	84	23.33
5	AI tools help me achieve better academic results	201	55.83	21	5.83	5	1.39	30	8.33	103	28.61

From Table 4 above, going through the frequencies and percentages, the respondents' responses to influence of AI based learning tools on students digital skills literacy in higher institutions in Mwanza region-Tanzania shows that the respondents strongly agree to question one. Therefore, it is concluded that Impact of AI based learning tools influence students digital skills literacy in the study area.

Conclusion

Based on the findings obtained from the descriptive statistics and the two research objectives, the study concludes that preparedness of students in the usage of Artificial Intelligence (AI) and the impact of AI-based learning tools significantly influence students digital skills literacy in university in Mwanza Region, Tanzania. With respect to the first research objective, the results showed that a substantial proportion of respondents agreed and strongly agreed that familiarity with AI tools, understanding of how AI systems are trained, ability to use AI for academic tasks such as writing, summarizing, and coding, and recognition of AI's contribution to learning quality positively influence AI utilization. This implies that students' preparedness and competency in AI usage enhance effective integration of AI in teaching and learning processes, thereby supporting university goal achievement.

Regarding the second research objective, the findings revealed strong agreement that AI-based learning tools improve motivation, engagement, adaptability to individual learning pace, and academic performance. The high frequency of agreement across the Likert-scale items indicates that the perceived benefits and practical impact of AI tools play a critical role in promoting their utilization within universities. Therefore, the study concludes that both students' preparedness in AI usage and the positive impact of AI-based learning tools are key determinants in maximizing AI utilization for institutional effectiveness and goal attainment in higher learning institutions in Mwanza Region.

Recommendations

In line with the results and the findings obtained from answering research questions, the following recommendations were made:

1. Management of universities and organisations should adopt the use of artificial intelligence in order to assist students productivity and creativity.

2. University management and lecturers should adopt the use of artificial intelligence with the ability to learn, recognizing patterns with logical reasoning that would make them have good ethical guidance and observe professional conduct standards as well as competence and training oversight on utilization of artificial intelligence in the actualization of university goal achievement.

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