JRIIE Journal of Research Innovation and Implications in Education
Center for Research Implications & Practice

Website:www.jriiejournal.com ISSN 2520-7504 (Online) Vol.8, Iss.4, 2024 (pp. 445 – 456)

Application of Artificial Intelligence Platforms and Its Influence on Education of Students in Higher Learning Institutions in Arusha City, Tanzania

Grace M. Sarakikya
Buguruni primary school, Namanga
grace.sarakikya12@gmail.com

Paul Raphael Kitula
Saint Augustine University of Tanzania
kitula07@gmail.com

Abstract*: This study explored the application of artificial intelligence (AI) platforms and their influence on education in higher learning institutions in Arusha region. The research objectives were to investigate attitudes towards AI from both students and lecturers and assess strategies to mitigate AI-assisted plagiarism. Grounded in the Technology Acceptance Model, the study adopted a mixed-methods approach using a convergent design to collect both qualitative and quantitative data. The target population included 2176 students, 104 course instructors, and 18 technology experts across six higher learning institutions, with a final sample size of 96 respondents. Data collection instruments included questionnaires and interview guides. Instruments were validated through expert and reliability (0.95 for SQ and 0.89 for LQ) was done through test-retest procedures in a pilot study. Descriptive analysis was used for quantitative data in the SPSS version 23 whereby tables were generated to aid the interpretation of data. For qualitative data, the analysis was in themes whereby the interview data was first transcribed and emerging themes were identified. Findings indicated a high level of AI integration in educational practices, positive attitudes towards AI from both students and lecturers, and effective strategies such as face-to-face presentations and plagiarism detection of software to combat AI-assisted plagiarism. The study concluded that AI is positively influencing education in universities and recommended further investment in AI education, ethical guidelines, continuous professional development for lecturers and student workshops to foster responsible AI use.The study recommends clear policies and guidelines for the ethical use of AI in academic settings.*

Keywords: *Artificial, Institutions, Intelligence, Platforms, Education, Tanzania*

How to cite this work (APA):

Sarakikya, G. M. & Kitula, P. R. (2024). Application of artificial intelligence platforms and its influence on education of students in higher learning institutions in Arusha City, Tanzania. *Journal of Research Innovation and implications in Education, 8*(4), xxx – xxx. https://doi.org/10.59765/nvthtd5.

1. Introduction

Universities worldwide are embracing the transformative potential of Artificial Intelligence (AI) across various facets of their operations and educational activities. This shift reflects a strategic recognition of AI capacity to revolutionize traditional approaches to teaching, learning, and administrative functions. As noted by George and Wooden (2023), AI is increasingly perceived as a valuable

tool for enhancing the quality of educational services while also providing universities with a competitive advantage in the dynamic higher education sector. Okunlaya et al. (2022) highlight the proactive stance of universities in integrating AI technologies into their systems to optimize processes and enrich teaching and learning experiences for students and lecturers. Furthermore, Alam et al. (2022) showed a global trend towards AI adoption across the education sector. This collective momentum towards AI integration signifies a pivotal moment in higher education, where universities worldwide are actively harnessing AI capabilities to innovate and enhance their educational offerings.

The pervasive influence of artificial intelligence (AI) is increasingly evident in university settings worldwide, marking a significant shift in higher education practices. Embracing this transformative technology, universities across Europe are actively integrating AI into their teaching and learning methodologies, reflecting a progressive approach to education (Tapalova and Zhiyenbayeva, 2022). In Jordan, students demonstrate a strong attitude towards AI educational applications, showing a growing acceptance of its role in Education (Al Saad et al., 2022). Similarly, Lebanese students express an awareness of AI significance in educational contexts, highlighting a growing recognition of its potential benefits (Doumat et al., 2022). Moreover, in Oman, both students and educators appreciate the adoption of AI for personalized learning, emphasizing its positive impact on educational outcomes (Al-Badi et al., 2022). This global trend shows not only the widespread acceptance of AI in higher education but also its potential to revolutionize teaching and learning practices, ultimately enriching the academic experience for students and lecturers.

Despite the efforts undertaken by universities to maintain academic integrity, the prevalence of dishonesty persists and has been further fuelled by the advent of emerging technologies such as artificial intelligence (Oravec, 2022). As educational institutions attempt to uphold the principles of academic honesty, the rise of AI-driven academic misconduct presents a tough challenge. Distinguishing between work generated by students and that produced by AI algorithms has become increasingly difficult, adding a layer of complexity to the detection process (Ibrahim et al., 2023). This challenge is particularly pronounced for lecturers who possess limited knowledge about AI, as they may struggle to distinguish between automatically generated content and students' original work (Abd-Elaal et al., 2022). The lack of awareness among faculty members regarding AI platforms not only undermines their ability to effectively address instances of academic dishonesty but also raises concerns about the overall quality of higher education delivery.

In the Tanzanian context, such as at the University of Dar es Salaam, artificial intelligence has gained attention among both students and teachers, as evidenced by its utilization in various educational practices (Lyimo, 2023). However, despite the widespread use of AI platforms in Tanzanian universities, there exists a scarcity of literature examining their impact on the quality of teaching and learning within these institutions. Furthermore, there is a dearth of research addressing the extent to which lecturers and students are equipped with the requisite knowledge and skills to effectively utilize AI for educational purposes. Against this backdrop, the current study sought to fill this gap by assessing the influence of artificial intelligence on the quality of learning in Tanzanian universities, with a specific focus in Arusha region.

1.1 Research Questions

The following research questions guided the study:

1. What are the attitudes of university students and lecturers towards the influence of artificial intelligence on student learning?
2. What strategies are implemented to mitigate artificial intelligence-assisted plagiarism in universities in the Arusha region?

2. Literature Review

The theoretical and empirical literature was reviewed with reference to research questions. The study was grounded in the Technology Acceptance Model (TAM) developed by Fred Davis in 1986.

2.1 Technology Acceptance Model (TAM)

TAM posits that perceived usefulness (PU) and perceived ease of use (PEOU) are the two primary determinants of users' attitudes towards and intentions to use a technology. According to TAM, users are more likely to adopt a technology if they perceive it to be useful for their tasks and if they believe it is easy to use(Davis, 1986). TAM assumes that users are rational decision-makers who carefully evaluate the utility and usability of a technology before deciding to adopt it. In the context of the current study on assessing the influence of artificial intelligence on students' learning in Tanzanian universities, TAM can provide a framework for understanding students' and lecturers' attitudes towards AI platforms and their intentions to use them in educational settings.

2.1.1 Strengths of Technology Acceptance Model

One of the strengths of TAM is its simplicity and ease of application. The model's straightforward conceptualization of the relationship between perceived usefulness, perceived ease of use, and technology acceptance makes it accessible to researchers and practitioners alike. This simplicity enhances the model's utility in the current study, as it allows for a clear and structured analysis of the factors influencing students' and lecturers' acceptance of artificial intelligence in university education. By focusing on perceived usefulness and ease of use, TAM enables researchers to identify specific factors that drive or inhibit the adoption of AI platforms, thereby informing strategies to promote their effective implementation in Tanzanian universities.

2.1.2 Application of Technology Acceptance Model

The selection of the Technology Acceptance Model (TAM) for the current study is justified by its established empirical support and its relevance to the research objectives. TAM provides a well-established framework for understanding users' attitudes and intentions towards technology adoption, making it particularly suitable for assessing the influence of artificial intelligence on students' learning in Tanzanian universities. In this study, TAM was applied through surveys and interviews to measure students' and lecturers' perceptions of the usefulness and ease of use of AI platforms, as well as their intentions to use these technologies in educational contexts. By employing TAM, the study identified key determinants of technology acceptance and strategies for promoting the effective integration of artificial intelligence in Tanzanian higher education.

2.2 Empirical Review

The researcher reviewed empirical studies with respect to research themes derived from research questions.

.

2.2.1 Attitudes of University Students and Lecturers on the Influence of Artificial Intelligence on Student's Learning

In Serbia, Ilić et al. (2021) conducted a performance analysis of changes deemed necessary for higher education reform, exploring the potential role of AI and extended reality (XR) technologies. The study utilized a mixed methods research approach, drawing on theoretical frameworks and existing knowledge to assess the viability of integrating AI and XR in higher education strategy. The study found that the attitudes of university students and lecturers towards AI influence learning. In Spain, Slimi (2023) explored the impact of artificial intelligence (AI) on higher education through a qualitative survey of the higher education audience. The study investigated various dimensions of AI's influence on teaching, learning, assessment, ethics, required skills, and future careers. The study provided valuable insights into the potential of AI to transform higher education towards teaching and learning.

In Turkey, Keleş and Aydın (2021) aimed to determine university students' perceptions of artificial intelligence (AI). The study utilized a sample of 130 fourth-grade students from various faculties and employed a snowball sampling method for participant selection. The study provided insights into students' perceptions of AI highlighting the interest shown by studentstowards AI. In Ecuador, Govea et al. (2023) explored the impact of cloud computing and AI on education, focusing on accessibility, efficiency, and quality of learning. The study provided valuable insights into the potential benefits of AI and cloud computing in education, focusing on AI as a source of knowledge without stress.

2.2.2 Strategies Implemented to Mitigate Artificial Intelligence-Assisted Plagiarism in Universities

Oravec (2023) conducted a study in the United States to investigate the escalating issue of academic cheating in higher education, particularly concerning the role of artificial intelligence (AI) in facilitating plagiarism. The study employed a comprehensive review of existing literature on academic cheating and AI's role in it. Findings indicated that collaborative efforts between humans and AI, framed as "misattributed co-authorship," could potentially mitigate academic cheating. Abd-Elaal et al. (2022) aimed to raise awareness among academics about the emergence of Automatic Article Generator (AAG) writing powered by Artificial Intelligence and its potential to facilitate serious academic misconduct. The study explained the features of AAG writing and investigated whether academics could distinguish it from human writing. Findings revealed the difficulty for academics, without prior knowledge of AAGs, to identify this writing, and demonstrated that raising awareness through training sessions improved their ability to detect AAG writing.

Ibrahim et al. (2023) compared the performance of the state-of-the-art AI tool, ChatGPT, against that of students on university-level courses and assessed its detectability by specific classifiers. The study also explored students' and educators' perceptions of ChatGPT's use in school work through global and institutional surveys. Findings suggested that ChatGPT's performance was comparable, if

not superior, to that of students in various courses, and current AI-text classifiers could not reliably detect its use. Roe et al. (2023) conducted a conceptual review in Singapore to systematically categorize digital writing tools available to writers, particularly focusing on the implications of artificially intelligent tools like ChatGPT in language classrooms. The study highlighted the need for comprehensive pedagogical approaches and academic integrity policies to address a broader range of tools beyond ChatGPT and Large Language Model (LLM)-driven text creation tools. Campo et al. (2023) conducted a study on the development of critical thinking skills in higher education institutions in Spain. The study utilized a quantitative design, surveying 263 university students about their perspectives on critical thinking and effective methodologies for fostering it. The study found that six methodologies were particularly effective: debates, project-based learning, practices in real contexts, doing research, cooperative learning, and case studies. These findings are valuable as they highlight effective strategies for developing critical thinking, which can be applied to mitigating AI-assisted plagiarism by encouraging deeper engagement with content.

3. Methodology

the study adopted a mixed-methods approach using a convergent design to collect both qualitative and quantitative data. The target population included 2176 students, 104 course instructors, and 18 technology experts across six higher learning institutions, with a final sample size of 96 respondents. The selection of sample was based on the Yamane formula for sample size determination of 1967which states: $n = \frac{N}{1+N(e)^2}$ (Yamane,1967)

Where:

n= required sample size
N=total population
e= margin error (0.1 or 10%).

Therefore:

$$n = \frac{2298}{1 + 2298(0.1)^2}$$

$$n = \frac{2298}{1 + 2298\ (0.01)}$$

$$n = \frac{2298}{1 + 22.98}$$

$$n = \frac{2298}{23.98}$$

$$n = 95.8$$

Therefore; the sample size was 96.The system administrators were sampled using criterion purposive sampling technique. Simple random sampling was employed to select 24 lecturers who participated in the study. The researcher selected six lecturers from each of the four sampled universities, totalling 24 lecturers. Stratified sampling was employed to select a total of 68 students, 17 students from each of the four universities to participate in the study, with the basis of stratification being gender. Data collection instruments included questionnaires and interview guides.

Validity of the questionnaires was ensured through expert review and refinement. To ensure reliability of the questionnaires, test-retest technique was employed in a pilot study, whereby the research instruments were administered in two universities. In this study, the students' questionnaire, comprising 21 items, achieved a reliability coefficient of 0.95, while the lecturers' questionnaire, consisting of 10 items, obtained a reliability coefficient of 0.89. Both values exceed the threshold of 0.7, thereby confirming the reliability and of the instruments used to collect data(Cohen et al., 2018).Upon receiving permission letters from the sample institutions, the researcher visited each university to make prior arrangements with lectures, system administrators and students in order to collected data on the agreed date.

Descriptive analysis was used for quantitative data whereby frequencies, percentages and mean scores were generated to aid the interpretation of data. This was done with the help of SPSS version 22. For qualitative data, the analysis was in themes whereby the interview data was first transcribed and then the key emerging themes were identified. These themes were generated in accordance to the research objectives. The presentation of quantitative data was done in tables while qualitative data was presented in words being supported with verbatim quotations. The researcher took steps to minimize risks to participants such as stress and loss of privacy, while upholding confidentiality and acknowledging sources of information.

4. Results and Discussion

The findings were discussed according to the research questions.

4.1 Attitudes of lecturers and students on the influence of artificial intelligence on students' learning

The study aimed at assessing the attitudes of lecturers and students on the influence of artificial intelligence on students' learning. An attitude scale with ten statements was designed to measure the attitudes. Frequencies were computed and mean scores were calculated. The responses from lecturers have been presented in table 1.

Table 1: Lecturers Responses on Their Attitudes towards the Influence of Artificial Intelligence on Students' Learning (n=24)

statements	Agree	Neutral	Disagree	Mean
Incorporating artificial intelligence platforms can enhance students ' learning outcomes.	87.5	8.3	4.2	4.29
I believe that artificial intelligence tools have a positive impact on students' learning experiences	79.2	8.3	12.5	3.96
Artificial intelligence platforms can help students develop critical thinking skills.	75	12.5	12.5	3.92
Artificial intelligence can provide valuable insights into students' learning progress and areas for improvement.	83.4	16.7	0	4.13
I am concerned that overreliance on artificial intelligence might hinder students' independent learning skills.	87.5	8.3	4.2	4.33
I believe that incorporating artificial intelligence can increase student engagement in learning activities.	70.9	16.7	12.5	3.84
I am unsure about the long - term impact of artificial intelligence on students' learning habits.	79.1	4.2	16.7	3.96
I am worried that artificial intelligence might create inequalities in access to educational resources for students.	70.8	20.8	8.3	3.87
Artificial intelligence can help students develop essential digital literacy skills necessary for the future.	83.3	4.2	12.5	3.92
I am worried that artificial intelligence might lead to a loss of critical thinking skills.	75	16.7	8.3	4.04

Source: Field Data (2024)

The data in table 1 show that 87.5% of the lecturers agreed that incorporating artificial intelligence platforms can enhance students' learning outcomes, while 4.2% of them disagreed and 8.3% remained neutral. This suggests that most lecturers believe in the positive impact of AI on enhancing learning outcomes, implying a generally positive attitude towards the integration of AI in education. Such positive attitudes can significantly facilitate the implementation of AI, as lecturers who see the benefits are more likely to support and adopt these technologies in their teaching practices. The mean score of 4.29 supports this positive perception. These findings align with Su et al. (2024), who found that AI tools improved students' learning outcomes. Thus, the consensus among lecturers in this study reinforces the potential of AI to enhance educational experiences.

The data indicate that 79.2% of lecturers believe that artificial intelligence tools have a positive impact on students' learning experiences, with 12.5% disagreeing and 8.3% neutral. This suggests a strong positive perception of AI's role in enriching learning experiences. Positive attitudes towards AI can encourage more innovative teaching methods and greater integration of AI tools in the classroom, thereby improving overall student engagement and learning outcomes. This is reflected in the mean score of 3.96. These findings are consistent with Salido (2023), who reported that AI can revolutionize education by enhancing students' academic performance and comprehension. Thus, the positive outlook on AI tools among lecturers in this study underscores their potential benefits in education.

According to the data, 75% of lecturers agreed that artificial intelligence platforms can help students develop critical thinking skills, 12.5% disagreed, and another 12.5% were neutral. This implies that a majority of lecturers see AI as a tool for fostering critical thinking. Such a positive attitude can lead to a greater emphasis on AI in curricula and teaching strategies designed to develop

critical thinking skills in students. The mean score of 3.92 supports this perception. These findings are in agreement with Seo et al. (2021), who highlighted the potential of AI in personalizing learning and providing just-in-time support. Thus, lecturers' positive views on AI's role in developing critical thinking skills could enhance its adoption and effectiveness in education.

The data indicate that 87.5% of lecturers are concerned that overreliance on artificial intelligence might hinder students' independent learning skills, with 4.2% disagreeing and 8.3% neutral. This high level of concern suggests that while lecturers see the benefits of AI, they are also wary of its potential drawbacks. Such concerns can lead to a more balanced approach to AI implementation, ensuring that it complements rather than replaces traditional learning methods. The mean score of 4.33 reflects this significant concern. These findings are in line with Ahmad et al. (2023), who highlighted the risks of AI leading to a loss of critical thinking skills. Thus, acknowledging these concerns can help in developing strategies that mitigate the negative impacts of AI in education.

The data show that 79.1% of lecturers are unsure about the long-term impact of artificial intelligence on students' learning habits, with 16.7% disagreeing and 4.2% remaining neutral. This uncertainty highlights a cautious optimism among lecturers regarding AI's influence over time. Such concerns might lead to a more measured and reflective approach to adopting AI, ensuring that its long-term effects are carefully monitored. The mean score of 3.96 indicates this ambivalence. These findings are in agreement with Seo et al. (2021), who reported concerns about AI affecting responsibility, agency, and surveillance. Thus, understanding and addressing these uncertainties can help in formulating balanced strategies for AI integration in education.

The data reveal that 70.8% of lecturers are worried that artificial intelligence might create inequalities in access to educational resources for students, with 8.3% disagreeing and 20.8% remaining neutral. This concern suggests that lecturers are aware of the potential for AI to exacerbate existing disparities. Addressing these concerns is crucial for ensuring equitable access to AI-driven educational tools. The mean score of 3.87 reflects these apprehensions. These findings align with Ahmad et al. (2023), who found that AI could lead to inequalities in resource access. Thus, mitigating these risks is essential for the fair implementation of AI in education.

The data show that 83.3% of lecturers agreed that artificial intelligence can help students develop essential digital literacy skills necessary for the future, with 12.5% disagreeing and 4.2% remaining neutral. This indicates a strong belief in the role of AI in preparing students for a digital future. Positive attitudes towards AI's role in developing digital literacy can lead to its widespread adoption in educational curricula. The mean score of 3.92 supports this positive outlook. These findings are in agreement with Wong et al. (2023), who emphasized the role of AI in fostering digital literacy. Thus, promoting AI as a tool for digital literacy can enhance students' preparedness for future challenges.

Finally, 70.9% of lecturers believe that incorporating artificial intelligence can increase student engagement in learning activities, with 12.5% disagreeing and 16.7% remaining neutral. This positive attitude suggests that lecturers see AI as a means to make learning more interactive and engaging. Positive perceptions of AI's ability to boost engagement can lead to its increased use in creating dynamic and interactive learning environments. The mean score of 3.84 supports this view. These findings are consistent with Ilić et al. (2021), who found that AI and extended reality technologies facilitate increased motivation and engagement in learning. Thus, the belief in AI's potential to enhance engagement supports its broader implementation in educational practices.

The use of tools that test for plagiarism was also pointed out during the interviews, one of the key informants noted that students are becoming aware of the negative consequences of submitting copied works and therefore they work hard to ensure that their documents are not replications other documents. The system administrator said:

> *Our students are really smart, they know that their assignments will be tested for plagiarism. Therefore, they normally use different paraphrasing tools for the purpose of avoiding unintentional plagiarism. One of the commonly used tool is "Turnitin" that helps the students to identify similarities form other documents and make needful adjustments* (Personal interview, 4th June, 2024).

This implies that students are aware of the importance of maintaining academic integrity and actively use Turnitin to avoid plagiarism in their assignments. These findings are in agreement with Abd-Elaal et al. (2022), who revealed the difficulty for academics without prior knowledge of AI-assisted plagiarism to identify such writing, and demonstrated that raising awareness through training sessions improved their ability to detect AI-assisted plagiarism. Key informants also acknowledged to be offering assistance to the students on how to use different

artificial intelligence platforms. One of them had the following to say;

> *Students have been coming to this office asking on how to work with a number of artificial intelligence platforms. Mostly I have assisted postgraduate students on how they can use such platforms to improve their writing skills and also to search for different resources needed for their dissertations* (Personal interview, 6thJune, 2024).

This implies that students are increasingly seeking guidance on effectively utilizing AI tools to enhance their academic work, reflecting a growing interest in and reliance on these technologies. These findings are in agreement with Roe et al. (2023), who highlighted the need for comprehensive pedagogical approaches and academic integrity policies to address a broader range of tools beyond ChatGPT and large language model-driven text creation tools. As the students seek for support on how to use such platforms, it is an indication that artificial intelligence is becoming increasingly used by the students in the universities within Arusha region.

Students also were provided with a Likert scale with 11 items and requested to indicate their agreement or disagreement with each statement. Their responses were also computed to generate percentages and mean scores as presented in table 2.

Table 2: Students' Responses on Their Attitudes towards the Influence of Artificial Intelligence on Students' Learning (n=68)

statements	Agree	Neutral	Disagree	Mean
I believe artificial intelligence platforms can enhance my learning experience	86.8	5.9	7.4	4.34
I am open to using artificial intelligence in my studies	70.6	23.5	5.8	3.87
I think artificial intelligence platforms can help me understand complex concepts better.	80.9	10.3	8.9	4.22
I am excited about the potential benefits of using artificial intelligence for learning.	79.4	16.2	4.4	4.12
I am concerned that artificial intelligence might replace human teachers.	58.8	20.6	20.6	3.54
I am worried that artificial intelligence might compromise my privacy.	58.8	19.1	22.1	3.53
I am unsure about how artificial intelligence could impact my academic performance.	57.3	29.4	13.2	3.59
I am concerned that artificial intelligence might make learning too impersonal.	64.8	16.2	19.1	3.68
I am unsure if artificial intelligence platforms can cater to my individual learning needs.	63.3	23.5	13.3	3.77
I believe artificial intelligence can help me save time on repetitive learning tasks.	85.3	10.3	4.4	4.28
I am worried that artificial intelligence might lead to a loss of critical thinking skills.	75	7.4	17.6	3.97

Source;: Field data (2024)

The data in table 2 show that 86.8% of the students agreed that artificial intelligence platforms can enhance their learning experience, while 7.4% of them disagreed and 5.9% remained neutral. The data suggest that most of the students were positive about the potential of AI to improve their learning experiences. This positivity indicates that artificial intelligence is likely to be well-received and effectively implemented among students who see its benefits. These findings are in agreement with Salido (2023), who also reported that AI has the potential to revolutionize education by enhancing academic performance and comprehension. The findings from students also agree with those reported by the lecturers, where most of them acknowledged the benefits of AI in education. Thus, both students and lecturers show a strong belief in the positive impact of AI on learning experiences.

The data show that 70.6% of students are open to using artificial intelligence in their studies, with 5.8% disagreeing and 23.5% remaining neutral. The data suggest that a significant majority of students are willing to incorporate AI into their learning process. This openness indicates that artificial intelligence can be successfully integrated into educational practices if students are

receptive to its use. These findings are in agreement with Dahri et al. (2024), who reported that students' acceptance and use of AI tools are influenced by performance and effort expectancy. The findings from students also agree with those reported by the lecturers, whereby most of them supported the use of AI tools in education. Thus, both students and lecturers show a readiness to adopt AI in academic settings.

The data show that 80.9% of students think artificial intelligence platforms can help them understand complex concepts better, while 8.9% disagreed and 10.3% remained neutral. The data suggest that most of the students believe AI can aid in comprehending difficult subjects. This positivity indicates that artificial intelligence can enhance learning by simplifying complex topics for students. These findings are in agreement with Su et al. (2024), who found that AI tools can improve students' learning outcomes, especially in understanding complex concepts. The findings from students also agree with those reported by the lecturers, where most of them acknowledged the capability of AI to help students develop critical thinking skills. Thus, both students and lecturers see AI as a valuable tool for understanding complex concepts.

4.2 Strategies for Mitigating Artificial Intelligence Assisted Plagiarism

The study also aimed at identifying the suitable strategies for mitigating artificial intelligence assisted plagiarism in universities. Lecturers and students responded to an open ended question in their respective questionnaires while the system administrators were interviewed. For the case of students and lecturers, their responses were quantified to generate frequencies as presented in table 3.

Table 3: Strategies to Mitigate AI Assisted Plagiarism

Strategies	f	%
Provision of practical oriented tasks that will involve the learners' thinking	45	46.88
Limit time for assignments and ensure all students are in class	32	33.33
Conducting face to face presentations	78	81.25
Educating the students on effective use of artificial intelligence	29	30.21
Using software to check plagiarism	55	57.29
Using open service software like Moodle	13	13.54

Source: Field data (2024)

One of the strategies identified was "Conducting face-to-face presentations," as suggested by 81.25% of lecturers and students. This shows that face-to-face presentations are sought to be a better way to avoid artificial intelligence-assisted plagiarism. As face-to-face presentations require students to demonstrate their understanding and engage directly with the material, this method can minimize the chances of AI-assisted plagiarism by ensuring that students cannot simply present work generated by AI tools. This strategy was also suggested by Kang et al. (2019), who revealed that oral examinations provided students with an opportunity to develop skills through different means of engaging material and fostered a concept-based learning approach. Similarly, Campo et al. (2023) found that practical methodologies like face-to-face presentations contributed significantly to developing critical thinking among students. Therefore, implementing face-to-face presentations can effectively deter AI-assisted plagiarism by requiring active participation and direct demonstration of knowledge and skills.

Another effective strategy is "Using software to check plagiarism," as suggested by 57.29% of respondents. This strategy is crucial in detecting and preventing AI-generated content from being passed off as original work. Plagiarism detection tools, such as Turnitin or Grammarly, can identify patterns indicative of AI generation, thus serving as a deterrent for students considering such methods. In this regard, Quiminales et al. (2023) noted that the presence of AI-powered plagiarism detection tools acts as a deterrent to potential plagiarists by ensuring that their work undergoes rigorous scrutiny, encouraging them to maintain academic integrity and produce original content. Additionally, Roe et al. (2023) highlighted the need for comprehensive pedagogical approaches and academic integrity policies to address a broader range of tools beyond AI-driven text creation tools. Therefore, using plagiarism detection software is an effective strategy to mitigate AI-assisted plagiarism and uphold academic integrity.

Provision of practical-oriented tasks that involve learners' thinking was suggested by 46.88% of respondents, is another effective strategy. These tasks require students to apply their knowledge in practical settings, making it difficult to rely on AI-generated content. Practical tasks

encourage critical thinking and problem-solving skills, ensuring that students' work reflects their understanding and abilities. Campo et al. (2023) identified that practical methodologies like project-based learning and real-context practices significantly contribute to developing critical thinking. Therefore, assigning practical-oriented tasks can effectively minimize AI-assisted plagiarism by requiring students to engage actively and think critically about the material.

Educating the students on the effective use of artificial intelligence as recommended by 30.21% of respondents, is a proactive strategy to mitigate AI plagiarism. By educating students on the ethical use of AI tools and the importance of academic integrity, institutions can foster a culture of responsible AI usage. Abd-Elaal et al. (2022) found that raising awareness through training sessions improved the ability to detect AI-assisted plagiarism. McGee (2020) also argues that clear policies on AI use in academic settings are essential for preventing misuse and promoting ethical behavior among students. Therefore, education and awareness are critical components in mitigating AI-assisted plagiarism by informing students about the ethical implications and proper use of AI technologies.

During interviews with system administrators, various strategies for preventing artificial intelligence-assisted plagiarism among students were discussed. One of the strategies identified was the use of plagiarism detection software. One key informant stated

> *Implementing plagiarism detection software like Turnitin will help us identify AI-generated content by comparing student submissions against a vast database of existing works. This ensures that any unoriginal content is flagged and addressed promptly. Failure to detect the plagiarized works may negatively affect the quality of education offered in the universities* (Personal interview, 4thJune, 2024).

This implies that using Turnitin helps in identifying AI-generated content and maintains the quality of education by ensuring originality. These findings align with Quiminales et al. (2023), who noted that the presence of AI-powered plagiarism detection tools acted as a deterrent to potential plagiarists, encouraging students to produce original content. Therefore, the use of robust plagiarism detection tools is crucial in upholding academic integrity and preventing AI-assisted plagiarism.
Another key informant added:

> *By integrating plagiarism detection tools into our learning management system, we can automatically check assignments for originality before they are graded. This approach may help to maintain academic integrity and deter students from using artificial intelligence to complete their work* (Personal interview, 5thJune, 2024).

This implies that embedding plagiarism detection tools within the learning management system can systematically check for originality and uphold academic integrity. These findings are consistent with Cotton et al. (2023), who argued that using various methods to detect and prevent cheating is essential for maintaining academic standards and integrity. Thus, integrating these tools within academic systems enhances the ability to ensure that students' work is genuine and free from AI-assisted plagiarism. The use of AI-detection tools was also emphasized as a critical strategy. One key informant noted:

> *Using AI-detection tools specifically designed to recognize artificial intelligence generated writing patterns will allow us to differentiate between human and contents that are created by artificial intelligence. This will help to maintain the authenticity of students' assignments and uphold academic standards* (Personal interview, 6thJune, 2024).

This implies that AI-detection tools are effective in distinguishing between human and AI-generated content, thereby preserving the authenticity of student work. These findings are supported by Roe et al. (2023), who highlighted the need for comprehensive approaches to address a broader range of tools beyond ChatGPT and LLM-driven text creation tools. Therefore, employing AI-detection tools is vital for maintaining the credibility and integrity of student submissions.

5. Conclusion and Recommendations

5.1 Conclusion

Based on the findings of the current study, the following conclusions were drawn:

It was also concluded that both lecturers and students have positive attitudes towards the use of artificial intelligence in universities. Lecturers view AI positively for its potential to enhance teaching effectiveness through personalized learning experiences and efficiency gains in administrative tasks. They expressed concerns about ethical issues such as privacy and data security but emphasized the need for ongoing professional

development to effectively integrate AI into educational practices. Similarly, students showed enthusiasm for AI's ability to simplify learning, provide feedback, and improve study efficiency, though they were cautious about its impact on traditional teaching methods and future career prospects. Overall, both groups recognize AI's potential benefits while remaining mindful of the need for ethical and educational considerations in its implementation.

In conclusion, artificial intelligence is moderately applied in universities in the Arusha region and is perceived to have positive impacts on the teaching and learning process. AI platforms are widely integrated among both students and lecturers, reflecting a high level of awareness and acceptance. This integration is beneficial for enhancing educational practices, facilitating personalized learning experiences, and improving administrative efficiency. Arusha universities appear well-prepared to further incorporate AI into their educational strategies, fostering innovation and improved academic outcomes. The positive attitudes towards AI among lecturers and students underscore a promising future for continued advancements in educational technology within the region, while also highlighting the importance of addressing ethical and educational challenges associated with AI implementation. Consequently, Plagiarism detection tools, such as Turnitin or Grammarly, should be used to identify patterns indicative of AI generation, thus serving as a deterrent for students considering such methods.

5.2 Recommendations

Based on the study conclusions, the following recommendations were made

1. The government should invest in AI education and infrastructure to ensure equitable access and competency among students and educators, fostering a technologically inclusive learning environment.
2. University management should establish clear policies and guidelines for the ethical use of AI in academic settings, promoting transparency and accountability in AI-driven educational practices.
3. Lecturers should undergo continuous professional development on AI tools and methodologies to effectively integrate them into teaching practices, enhancing pedagogical innovation and student engagement.
4. Students should actively participate in workshops and training sessions to develop critical thinking skills in using AI, empowering them to responsibly use AI tools for academic enrichment and career readiness.

References

Abd-Elaal, E.-S., Gamage, S. H. P. W., and Mills, J. E. (2022). Assisting academics to identify computer generated writing. *European Journal of Engineering Education*, *47*(5), 725–745. https://doi.org/10.1080/03043797.2022.2046709

Alam, A., and Mohanty, A. (2022). Foundation for the Future of Higher Education or 'Misplaced Optimism'? Being Human in the Age of Artificial Intelligence. In M. Panda, S. Dehuri, M. R. Patra, P. K. Behera, G. A. Tsihrintzis, S.-B. Cho, & C. A. Coello Coello (Eds.), *Innovations in Intelligent Computing and Communication* (pp. 17–29). Springer International Publishing. https://doi.org/10.1007/978-3-031-23233-6_2

Al-Badi, A., Khan, A., and Eid-Alotaibi. (2022). Perceptions of Learners and Instructors towards Artificial Intelligence in Personalized Learning. *Procedia Computer Science*, *201*, 445–451. https://doi.org/10.1016/j.procs.2022.03.058

Ahmad, A. E., Buraimoh, O. F., Aladesusi, G. A., & Babalola, E. O. (2021). Artificial Intelligence for Learning in Kwara State. *Indonesian Journal of Teaching in Science*, *1*(2), 91–104.

Campo, C. K. Y., and Hu, W. (2023). Students' voices on generative AI: Perceptions, benefits, and challenges in higher education. *International Journal of Educational Technology in Higher Education*, *20*(1), 43. https://doi.org/10.1186/s41239-023-00411-8

Cotton, D. R. E., Cotton, P. A., and Shipway, J. R. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*, *0*(0), 1–12. https://doi.org/10.1080/14703297.2023.2190148

Doumat, G., Daher, D., Ghanem, N.-N., and Khater, B. (2022). Knowledge and attitudes of medical students in Lebanon toward artificial intelligence: A national survey study. *Frontiers in Artificial Intelligence*, *5*. https://www.frontiersin.org/articles/10.3389/frai.2022.1015418

Dahri, D., Siemens, G., and Sadiq, S. (2023). Empowering learners for the age of artificial intelligence. *Computers and Education: Artificial Intelligence*, *4*, 100130.

https://doi.org/10.1016/j.caeai.2023.100130

George, B., & Wooden, O. (2023). Managing the Strategic Transformation of Higher Education through Artificial Intelligence. *Administrative Sciences*, *13*(9), Article 9. https://doi.org/10.3390/admsci13090196

Govea, J., Ocampo Edye, E., Revelo-Tapia, S., & Villegas-Ch, W. (2023). Optimization and Scalability of Educational Platforms: Integration of Artificial Intelligence and Cloud Computing. *Computers*, *12*(11), Article 11. https://doi.org/10.3390/computers12110223

Ibrahim, H., Liu, F., Asim, R., Battu, B., Benabderrahmane, S., Alhafni, B., Adnan, W., Alhanai, T., AlShebli, B., Baghdadi, R., Bélanger, J. J., Beretta, E., Celik, K., Chaqfeh, M., Daqaq, M. F., Bernoussi, Z. E., Fougnie, D., Garcia de Soto, B., Gandolfi, A., … Zaki, Y. (2023). Perception, performance, and detectability of conversational artificial intelligence across 32 university courses. *Scientific Reports*, *13*(1), Article 1. https://doi.org/10.1038/s41598-023-38964-3

Ilić, M. P., Păun, D., Popović Šević, N., Hadžić, A., and Jianu, A. (2021). Needs and Performance Analysis for Changes in Higher Education and Implementation of Artificial Intelligence, Machine Learning, and Extended Reality. *Education Sciences*, *11*(10), Article 10. https://doi.org/10.3390/educsci11100568

Kang, P. U., and Aydın, S. (2021). University Students' Perceptions About Artificial Intelligence. *Shanlax International Journal of Education*, *9*(S1-May), 212–220. https://doi.org/10.34293/education.v9iS1-May.4014

Kelly, A., Sullivan, M., and Strampel, K. (2023). Generative artificial intelligence: University student awareness, experience, and confidence in use across disciplines. *Journal of University Teaching and Learning Practice*, *20*(6). https://www.academia.edu/105670805/Generative_artificial_intelligence_University_student_awareness_experience_and_confidence_in_use_across_disciplines

Lyimo, B. (2023). *The Double-Edged Sword of AI: How Its Use in Tanzanian Academia Can Both Help and Harm*.

McGee, H. (2020). Artificial Intelligence: Higher Education Students' Knowledge and Understanding. *Towards Excellence*. https://doi.org/10.37867/TE130268

Oravec, J. A. (2023). Artificial Intelligence Implications for Academic Cheating: Expanding the Dimensions of Responsible Human-AI Collaboration with ChatGPT. *Journal of Interactive Learning Research*, *34*(2), 213–237.

Oravec, J. A. (2022). AI, Biometric Analysis, and Emerging Cheating Detection Systems: The Engineering of Academic Integrity? *Education Policy Analysis Archives*, *30*(175). https://eric.ed.gov/?id=EJ1374195

Roe, J., Renandya, W., and Jacobs, G. (2023). A Review of AI-Powered Writing Tools and Their Implications for Academic Integrity in the Language Classroom. *Journal of English and Applied Linguistics*, *2*(1). https://doi.org/10.59588/2961-3094.1035

Salido, S. Z., & Yang, Y. (2023). Artificial intelligence applications in Latin American higher education: A systematic review. *International Journal of Educational Technology in Higher Education*, *19*(1), 21. https://doi.org/10.1186/s41239-022-00326-w

Seo, K., Tang, J., Roll, I., Fels, S., and Yoon, D. (2021). The impact of artificial intelligence on learner–instructor interaction in online learning. *International Journal of Educational Technology in Higher Education*, *18*(1), Article 1. https://doi.org/10.1186/s41239-021-00292-9

Su, V., Sarancha, V., Maslak, V., Shevchenko, O., and Tur, O. (2023). Educational Potential of ChatGPT: Teaching Tool for Students' Competencies Development. *2023 IEEE 5th International Conference on Modern Electrical and Energy System (MEES)*, 1–6. https://doi.org/10.1109/MEES61502.2023.10402380

Slimi, Z. (2023). The Impact of Artificial Intelligence on Higher Education: An Empirical Study. *European Journal of Educational Sciences*, *10*(1). https://doi.org/10.19044/ejes.v10no1a17

Tapalova, O., and Zhiyenbayeva, N. (2022). Artificial Intelligence in Education: AIEd for Personalised Learning Pathways. *Electronic Journal of E-Learning*, *20*(5), 639–653.

Artificial Intelligence-Based Application. *Available at SSRN 4361548*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4361548

Wong, S., Sun, Z., and Chen, Y. (2023). Effects of higher education institutes' artificial intelligence capability on students' self-efficacy, creativity and learning performance. *Education and Information Technologies*, *28*(5), 4919–4939. https://doi.org/10.1007/s10639-022-11338-4