

Awareness and Usability of Artificial Intelligence in Teaching and Learning in Selected Higher Learning Institutions of Zambia

Chanda Chansa Thelma¹, Zohaib Hassan Sain², Memory Mumbi³, Daniel L. Mpolomoka⁴, Edwin Vinandi Phiri⁵, and Chisebe Sylvester⁶

¹Chreso University, Lusaka, Zambia, Department of Education and Social Sciences

²Superior University, Lahore, Pakistan, Faculty of Business & Management Sciences

³Chreso University, Lusaka, Zambia, Department of Business and Humanities

⁴Unicaf University, Lusaka, Zambia, School of Education, Humanities and Social Sciences

⁵Kafwimbi Day Secondary School, Isoka, Zambia, Department of Education and Social Sciences

⁶Eden University, Lusaka, Zambia, School of Education and Social Sciences

Abstract: The awareness and usability of artificial intelligence (AI) in teaching and learning within higher learning institutions highlight a growing recognition of its transformative potential. AI technologies are being integrated into various aspects of education, such as personalized learning, intelligent tutoring systems, and administrative processes, enhancing efficiency and accessibility. However, awareness levels among educators and students vary significantly, influenced by factors such as digital literacy, institutional support, and access to resources. Hence, this study was conducted to assess the awareness and usability of AI in teaching and learning in higher learning institutions. The study was conducted in four higher learning institutions of Lusaka district. The study adopted a mixed methods and a descriptive design consisting a sample of 100 respondents; Officials from HEA, University Lecturers, and Students. The study made use of the questionnaires and interview guides to collect data from respondents. The data collected were analyzed using appropriate statistical methods, such as SPSS and Microsoft excel as well as research themes. The study found that significant proportion of educators and students demonstrated moderate awareness of AI technologies, with the primary sources of knowledge being online platforms and workshops. However, there was a notable disparity in the practical usability of AI, largely attributed to inadequate infrastructure, limited technical skills, and inconsistent institutional support. Furthermore, concerns about data privacy, ethical implications, and the digital divide emerged as critical barriers to broader AI adoption. Therefore, the study recommended the need for targeted capacity-building initiatives, robust policy frameworks, and investment in digital infrastructure to optimize the integration of AI in educational practices.

Keywords: Adoption, Awareness, Innovation, Integration, and Usability.

INTRODUCTION

Awareness and usability of Artificial Intelligence (AI) in teaching and learning in higher learning institutions have gained significant momentum, driven by advancements in technology and the growing demand for innovative educational tools. Awareness among educators and students about AI's potential in transforming education is steadily increasing, as institutions integrate AI-powered tools like adaptive learning platforms, virtual tutors, and automated grading systems to enhance instructional delivery and student engagement (Clark & Prensky, 2019). However, challenges such as limited technical expertise, infrastructural constraints, and varying levels of digital literacy often affect the effective usability of these technologies. While AI holds promise for personalized learning experiences and data-driven decision-making, ensuring equitable access, ethical considerations, and training for educators are essential to maximize its benefits (Elbadiansyah, *et al.*, 2024). The interplay of these factors underscores the need for deliberate policies and investments to foster AI adoption in higher education.

Chanda, *et al.*, (2024a) alluded that awareness plays a crucial role in the successful integration of Artificial Intelligence (AI) in teaching and learning within higher learning institutions. It encompasses the extent to which educators, students, and administrative staff understand the potential applications, benefits, and limitations of AI technologies in academic settings. Glory, *et al.*, (2024) explained that awareness includes familiarity with AI-driven tools, such as adaptive learning systems, virtual assistants, and data analytics platforms, as well as knowledge of their impact on enhancing teaching methodologies and learning outcomes. Furthermore, awareness extends to ethical considerations, data privacy, and the skills required to effectively implement AI solutions (Adamu, 2017). Building awareness is foundational for fostering acceptance, encouraging innovation, and ensuring that stakeholders are prepared to leverage AI technologies to improve educational experiences. Without adequate awareness, the usability and adoption of AI in higher learning institutions may remain limited, undermining its transformative potential.

The concept of adoption plays a pivotal role in understanding the awareness and usability of Artificial Intelligence (AI) in teaching and learning within higher learning institutions. Alma, *et al.*, (2024) in their study noted that adoption reflects the extent to which educators, administrators, and students embrace and integrate AI technologies into their academic practices. It encompasses factors such as willingness, readiness, and the ability to leverage AI tools to enhance teaching efficiency, personalized learning experiences, and administrative operations. Barriers to adoption, including resistance to change, lack of training, and infrastructural limitations, must also be addressed to ensure widespread and effective implementation (Chen, *et al.*, 2020). Furthermore, the rate of adoption can significantly influence the overall awareness and usability of AI, as early adopters often serve as catalysts for broader acceptance and integration within academic environments. Exploring adoption in this context highlights the interplay between technological innovations, institutional policies, and user engagement in driving the effective use of AI in higher education (Munjed, *et al.*, 2024).

Innovation plays a pivotal role in advancing awareness and usability of Artificial Intelligence (AI) in teaching and learning within higher learning institutions. As an essential driver, innovation facilitates the development of cutting-edge AI tools and techniques tailored to educational contexts, enabling personalized learning, enhanced student engagement, and improved teaching methodologies (Chigbu, *et al.*, 2020). By fostering a culture of innovation, institutions can identify novel applications of AI to address challenges such as resource limitations, diverse learner needs, and evolving industry demands. Furthermore, innovative approaches empower educators and learners to integrate AI into their workflows effectively, bridging the gap between technology and pedagogy while promoting adaptive and forward-thinking education systems (Ramsetty & Adams, 2020).

The concept of integration plays a pivotal role in understanding how AI technologies can be seamlessly incorporated into the educational landscape. Integration, in this context, refers to the process of embedding AI tools and systems within existing teaching and learning frameworks to enhance educational outcomes (Ventayen, 2019). It involves not only the technological adoption of AI tools but also the alignment of these tools with curricula, teaching methodologies, and the

institutional culture. Effective integration ensures that AI is not perceived as a standalone solution but as a cohesive part of the broader educational ecosystem, thereby improving the overall user experience for both educators and students. Zohaib, *et al.*, (2024a) noted that this integration requires a collaborative effort among educators, students, IT departments, and administrators to ensure that AI applications are not only accessible but also user-friendly, relevant, and aligned with educational goals. Moreover, the integration process highlights the need for continuous professional development to help educators effectively utilize AI in their teaching practices (Russell & Norvig, 2016).

Statement of the Problem

The integration of Artificial Intelligence (AI) into teaching and learning within Zambian higher learning institutions presents a significant challenge and opportunity. Despite growing global adoption of AI in education, there is limited awareness and usability of these technologies among educators and students in Zambia. The lack of integration is often attributed to insufficient digital infrastructure, inadequate training for educators, and a lack of tailored AI solutions suited to the local context (Chanda, *et al.*, 2024b). Addressing these issues is crucial for leveraging AI's potential to improve educational outcomes and competitiveness in the global knowledge economy (Zohaib, *et al.*, 2025). Hence, the purpose of this study was to explore the integration of Artificial Intelligence (AI) in teaching and learning within Zambian higher learning institutions, focusing on awareness and usability among educators and students. By examining the extent to which AI tools and technologies are incorporated into academic processes, the study aimed to highlight the current level of awareness, challenges, and opportunities for enhancing teaching efficacy and learning outcomes.

Objectives of the Study

- To assess the level of awareness and knowledge of Artificial Intelligence (AI) tools and technologies among educators and students in higher learning institutions in Zambia.
- To evaluate the usability and practical integration of Artificial Intelligence in teaching and learning processes within Zambian higher learning institutions.

Theoretical Framework

The study was guided by the Human-Computer Interaction (HCI) Theory. Human-Computer Interaction (HCI) theory provides a framework for understanding how technology, particularly Artificial Intelligence (AI), can enhance teaching and learning by prioritizing user-centered design, usability, and accessibility. In the context of Zambian higher learning institutions, awareness of AI's potential remains a key challenge due to limited digital literacy and infrastructural constraints. Effective HCI principles can address these gaps by ensuring AI tools are intuitive, culturally relevant, and adaptable to the local educational context. Zheng, *et al.*, (2021) alluded that usability focuses on creating seamless experiences where educators and students can interact with AI systems to personalize learning, automate administrative tasks, and provide real-time feedback, thereby fostering an engaging and efficient learning environment. However, for AI to be widely adopted, there must be a concerted effort to raise awareness, train educators, and integrate these tools into existing curricula in ways that align with institutional goals and the needs of Zambian learners (Chanda, *et al.*, 2024e).

Significance of the Study

The significance of this study lies in its potential to illuminate the current state of awareness and usability of Artificial Intelligence (AI) in teaching and learning within Zambian higher learning institutions. By examining how educators, students, and institutional leaders perceive and utilize AI tools, the study contributes to understanding the extent of technological integration in education. It highlights opportunities for improving teaching methodologies, enhancing learning experiences, and addressing challenges such as resource accessibility and digital literacy gaps. Furthermore, the findings could inform policy formulation, capacity-building initiatives, and the development of tailored AI-driven solutions to support educational transformation in Zambia, fostering a more competitive and technologically adept higher education sector.

METHODOLOGY

The study adopted a mixed-methods approach, combining quantitative and qualitative techniques to provide a robust analysis (Banda et al., 2017).

This mixed-methods approach aimed to provide a comprehensive understanding of AI awareness and usability in teaching and learning. The study was conducted in four higher learning institutions; 2 belonging to public and 2 belonging to private within Lusaka district in Zambia. The sample consisted 200 respondents; 10% of the target population 2000. The population for the study was purposefully drawn from the 4 institutions. Purposive sampling procedure was used to select lecturers (20); 10 from each selected institution and students (180); 45 from each selected institution. The data collection process involved distributing the questionnaires to the selected participants and conducting individual interviews. The quantitative data collected through the questionnaires were analyzed using appropriate statistical methods, such as descriptive statistics using SPSS (Statistical Package for Social Sciences) and Microsoft excel whereas the qualitative data from semi structured interviews were analyzed thematically. The study avoided pressuring respondents to take part in the research. Alternatively, permission consents, assents were obtained from respondents involved in the research and the research topic was strategically selected to ensure that there was no harm whatsoever to the research respondents. The study also upheld research ethical considerations such as voluntary participation of the respondents, confidentiality, honesty, and right of privacy.

FINDINGS AND DISCUSSIONS

3.1 Level of Awareness and Knowledge of Artificial Intelligence (AI) Tools and Technologies among Educators and Students in Higher Learning Institutions of Zambia

According to the study results on the level of awareness and knowledge of artificial intelligence (AI) tools and technologies among educators and students in higher learning institutions of Zambia, the study recorded; Access to Technology to be at 25%, Curriculum Integration at 20%, Digital Literacy and Exposure to Emerging Technologies at 20%, Awareness Among Students at 15%, Public and Private Sector Engagement at 10%, and Training and Professional Development for Educators at 10%. Figure 1 below summarized these findings;

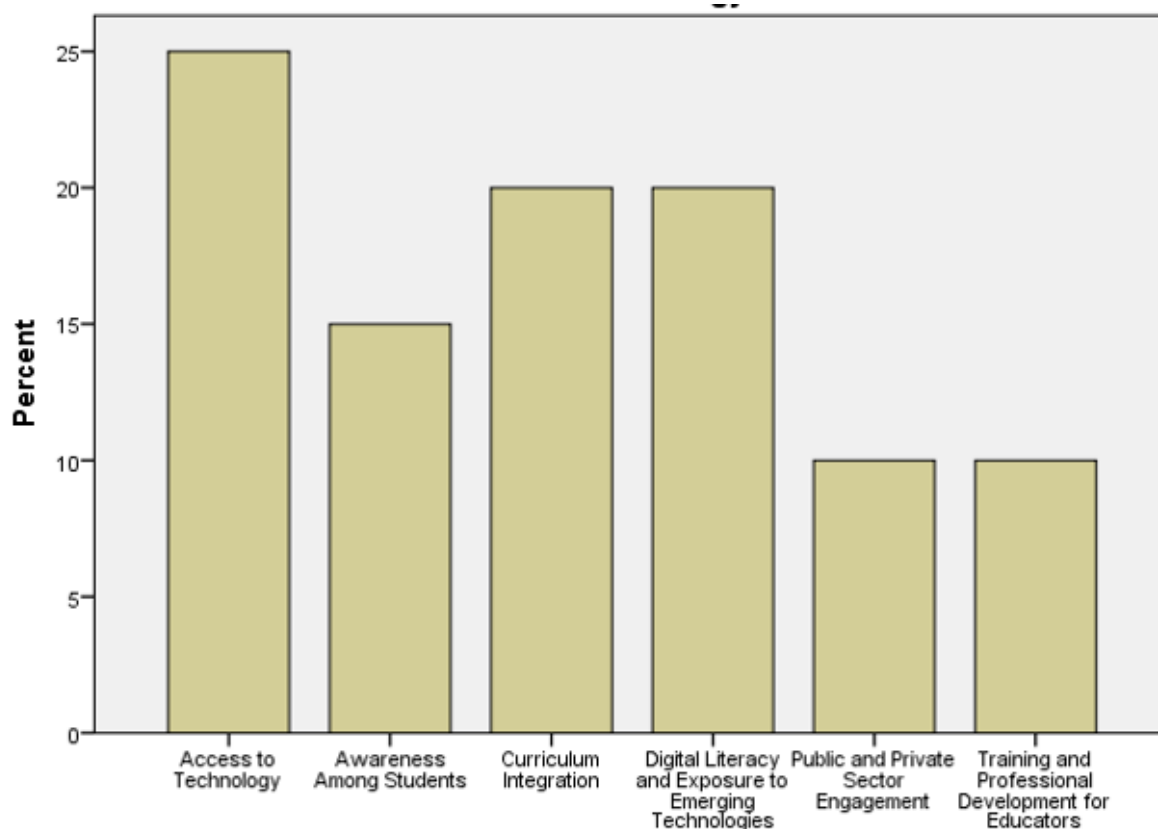


Figure 1: Level of Awareness and Knowledge of AI Tools and Technologies among Educators and Students

The study results revealed that access to technology plays a critical role in assessing the level of awareness and knowledge of Artificial Intelligence (AI) tools and technologies among educators and students in higher learning institutions in Zambia. Zohaib, *et al.*, (2024b) supported this finding by stating that for AI tools to be effectively integrated into education, it is essential that both educators and students have adequate access to the necessary technological resources, including computers, internet connectivity, and AI-based platforms. Limited access to these technologies can hinder the ability of students and teachers to engage with AI tools, thereby impacting their ability to understand and utilize AI in their academic and professional practices. Evaluating the availability of such technology within higher learning institutions helps to identify gaps in access and informs strategies to improve digital literacy, ensuring that both educators and students can develop a comprehensive understanding of AI and its potential applications (Chanda & Phiri, 2024). Addressing disparities in access to technology also promotes equity in education, allowing all students, regardless of their socio-economic background, to benefit from the growing field of AI.

Additionally, curriculum integration is a critical objective for assessing the level of awareness and knowledge of Artificial Intelligence (AI) tools and technologies among educators and students in higher learning institutions in Zambia. This approach involves embedding AI-related concepts, tools, and technologies into various disciplines and courses to enhance both the theoretical and practical understanding of AI. By incorporating AI into the curriculum, students and educators are exposed to its applications across different fields, such as data analysis, machine learning, and automation, preparing them for future technological demands (Ford & Kärger, 2021). The integration of AI content within the curriculum can also foster critical thinking, problem-solving, and adaptability to technological advancements. This method encourages an interdisciplinary approach that not only equips learners with relevant skills but also supports educators in enhancing their teaching methods, ensuring that both groups remain at the forefront of technological innovations.

The respondents also revealed that in today's rapidly advancing technological landscape, it is crucial for both educators and students to be equipped with the foundational skills necessary to navigate and utilize AI effectively. Digital literacy

encompasses the ability to understand, evaluate, and interact with digital tools, including AI-based applications (Buckingham, 2007). Exposure to emerging technologies, such as AI, plays a significant role in enhancing academic and professional development by fostering a deeper understanding of their potential applications across various disciplines. Assessing this objective involves evaluating the extent to which students and educators are aware of AI tools, their capability to use them, and their understanding of how these technologies can be applied within the educational context. It is essential for higher learning institutions in Zambia to promote digital literacy and provide exposure to AI technologies through training, resources, and practical experiences to ensure that both educators and students are adequately prepared for the digital future (Chanda, *et al.*, 2024c).

Awareness among students in higher learning institutions in Zambia regarding Artificial Intelligence (AI) tools and technologies is a critical aspect of preparing them for the rapidly evolving technological landscape. Many students still have limited exposure to AI, with knowledge often confined to basic concepts such as machine learning or automation. One of the lecturers pointed out that:

“This lack of awareness can hinder their ability to fully engage with AI-driven tools that have transformative potential in education, research, and professional development”.

To assess the level of awareness, it is important to consider both the students' understanding of AI's core principles and its practical applications. Ali (2018) added that educational institutions play a pivotal role in bridging this gap by integrating AI-related content into the curriculum, offering training sessions, and promoting research initiatives. As students become more familiar with AI, they are better equipped to leverage these technologies for academic and career advancement. A comprehensive assessment of students' knowledge can help identify areas of improvement and highlight the need for targeted interventions to increase awareness and foster a deeper understanding of AI tools (Anft, 2020).

Moving on, the respondents further explained that public and private sector engagement is crucial in assessing the level of awareness and knowledge of Artificial Intelligence (AI) tools and technologies among educators and students in higher learning institutions in Zambia. The public sector, through

government agencies and educational bodies, plays a significant role in creating policies, frameworks, and initiatives that integrate AI into the education system (Cheng, *et al.*, 2023). These include awareness campaigns, training programs for educators, and the introduction of AI-related curricula. Furthermore, partnerships with private companies, especially those in the tech industry, can provide resources, expertise, and access to advanced AI technologies. By fostering collaboration between these sectors, institutions can ensure that both educators and students are adequately equipped with the necessary skills and knowledge to navigate the rapidly evolving AI landscape. Such engagement can also help bridge the digital divide by ensuring that AI tools are accessible to all, regardless of socio-economic backgrounds, thereby enhancing educational outcomes and promoting technological literacy in Zambia.

Mpolomoka, *et al.*, (2017) also noted that training and professional development for educators are critical in enhancing their understanding of Artificial Intelligence (AI) tools and technologies, especially within the context of higher learning institutions in Zambia. As AI continues to revolutionize educational environments globally, it becomes essential for educators to be equipped with the necessary knowledge and skills to integrate these technologies into their teaching methodologies. Professional development programs should focus on educating instructors about AI's potential in improving personalized learning, automating administrative tasks, and fostering enhanced student engagement. By incorporating AI into their curriculum and teaching strategies, educators can also ensure that students are prepared for future workforce demands, where AI and related technologies are increasingly prominent (Chanda & Zohaib, 2024). Additionally, these training initiatives should assess the level of awareness among both educators and students regarding AI tools, ensuring that educators not only understand the technologies themselves but also know how to foster student awareness and digital literacy. Furthermore, continuous professional development ensures that educators stay up-to-date with rapid advancements in AI, thus allowing them to respond effectively to emerging challenges and opportunities in the educational sector.

3.2. Usability and Practical Integration of Artificial Intelligence in Teaching and Learning

Processes within Zambian Higher Learning Institutions

The study results discovered that enhanced student engagement plays a pivotal role in evaluating the usability and practical integration of Artificial Intelligence (AI) in teaching and learning processes within Zambian higher learning institutions. When AI tools and platforms are incorporated into educational practices, they offer students personalized learning experiences, adapting to individual needs and learning styles (Miller & Hafner, 2008). This heightened engagement fosters active participation in the learning process, as students interact with AI-driven resources that provide real-time feedback and tailored educational content. Additionally, AI systems can support collaborative learning environments where students engage with peers, teachers, and even AI assistants to explore complex topics, enhancing the depth of understanding. As students actively participate in these AI-integrated educational settings, they develop critical digital skills necessary for success in modern, technology-driven job markets. Furthermore, AI-powered tools can monitor student performance, helping educators identify areas for improvement and thereby ensuring that students remain engaged and motivated (Mumbi & Nyirenda, 2024). In the context of Zambian higher learning institutions, the successful integration of AI can not only enhance academic outcomes but also prepare students for the demands of the digital age, making engagement with these technologies essential for shaping the future of education in Zambia.

Moono, *et al.*, (2024) stated that personalized learning, which tailors educational experiences to individual students' needs, preferences, and learning styles, offers promising opportunities for the integration of Artificial Intelligence (AI) in Zambian higher learning institutions. AI has the potential to enhance personalized learning by analyzing data from student interactions, learning patterns, and assessments to provide real-time feedback, adapt instructional content, and recommend learning pathways that suit each student's pace and abilities. One of the students expressed that:

"In evaluating the usability and practical integration of AI, it is essential to consider the local context, including the availability of digital infrastructure, the readiness of institutions to adopt AI technologies, and the digital literacy of both students and educators".

Additionally, Chanda, *et al.*, (2024d) in their study pointed out that the ethical implications of AI in education, such as privacy concerns, data security, and the risk of bias in decision-making, need to be carefully examined. For AI to be effectively integrated into teaching and learning processes, there must be continuous professional development for educators, adequate resources for AI tools, and a collaborative approach to ensure that personalized learning environments foster equitable access to education for all students (Kavi, *et al.*, 2019). Thus, the integration of AI in personalized learning within Zambian higher learning institutions holds transformative potential, but it requires thoughtful implementation and constant evaluation to address challenges and maximize its benefits.

Data-driven insights play a crucial role in evaluating the usability and practical integration of Artificial Intelligence (AI) in teaching and learning processes within Zambian higher learning institutions. One of the lecturers observed that:

"By systematically collecting and analyzing data from various AI-based educational tools and platforms, institutions can assess how effectively AI enhances the learning experience".

Key areas for evaluation include personalized learning, student engagement, and instructional support. For example, AI can analyze student performance patterns to tailor learning materials and provide targeted feedback, improving individual outcomes. Data can also reveal the challenges faced by students and educators in adapting to AI systems, such as access issues, digital literacy, and resistance to change (Lăzăroiu, *et al.*, 2021). Moreover, evaluating AI integration through data-driven insights enables institutions to measure its impact on teaching efficiency, curriculum delivery, and overall academic performance. In the context of Zambian institutions, such evaluations can provide evidence to guide future AI investments, ensure equitable access to technological resources, and refine teaching methods to align with the diverse needs of students. Ultimately, leveraging data helps institutions optimize AI's potential, ensuring it is both usable and practically integrated into the educational process (Thomas & Brown, 2011).

The respondents added that automation of administrative tasks through Artificial Intelligence (AI) in Zambian higher learning institutions has the potential to significantly streamline academic and administrative processes, enhancing efficiency

and reducing human error. By implementing AI systems to manage routine functions such as scheduling, grading, attendance tracking, and student support services, educational institutions can free up valuable time for instructors and administrative staff to focus on more impactful, student-centered tasks. The practical integration of AI tools into teaching and learning processes can also assist in personalizing learning experiences, where AI-driven platforms analyze student performance data to suggest tailored learning pathways (Warschauer & Matuchniak, 2010). This level of automation not only promotes better resource management but also fosters an environment where both teachers and students can engage more effectively with educational content. However, for the successful integration of AI, it is essential to evaluate the usability of these systems, considering factors such as user-friendliness, access to technology, and staff training. Moreover, it is crucial to address concerns related to data privacy, equity of access, and the potential for AI to inadvertently perpetuate biases within academic environments (Yang, *et al.*, 2021). As Zambian institutions adopt AI solutions, continuous assessment and adaptation will be necessary to

ensure that the benefits are fully realized while minimizing any unintended consequences.

Zohaib, *et al.*, (2024c) added that collaboration among key stakeholders, including faculty members, educational technologists, students, and AI developers, can foster a comprehensive understanding of how AI tools can be effectively incorporated into the academic environment. By working together, these groups can identify the specific needs and challenges faced by institutions, such as accessibility issues, infrastructure requirements, and the compatibility of AI with existing curricula. One of the students alluded that: *“Collaborative efforts can also focus on developing pilot programs and testing AI applications, ensuring that the tools are user-friendly, enhance pedagogical outcomes, and align with the unique educational context in Zambia”*.

Additionally, ongoing feedback from all participants can lead to continuous improvements and adjustments, ensuring that AI technologies are not only practical but also sustainable in the long term. Zenke, *et al.*, (2017) noted that this approach allows for the successful integration of AI while addressing potential challenges and maximizing its impact on both teaching and learning.

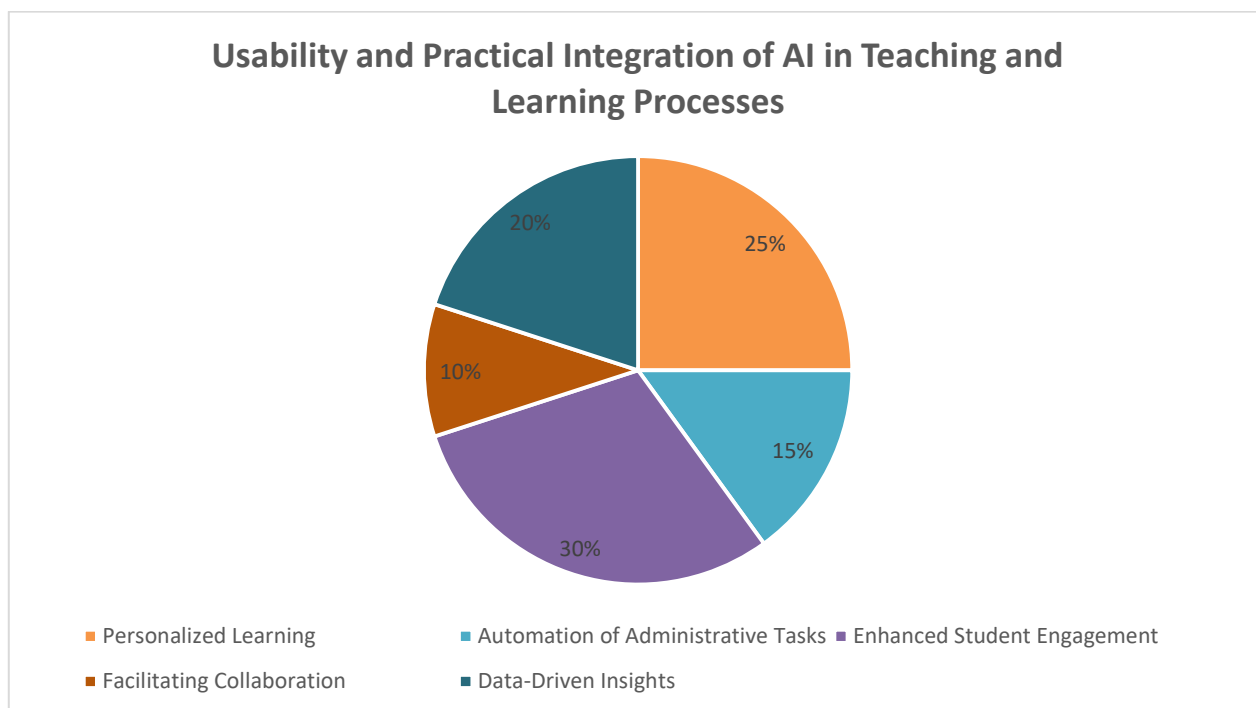


Figure 2: Usability and Practical Integration of Artificial Intelligence in Teaching and Learning Processes within Zambian Higher Learning Institutions

CONCLUSION

In conclusion, the awareness and usability of Artificial Intelligence (AI) in teaching and learning

in selected higher learning institutions in Zambia show promising potential for enhancing educational practices. However, there is a clear gap in comprehensive awareness among both

students and educators regarding AI technologies and their practical applications in educational settings. While a few institutions have begun integrating AI tools into their teaching methodologies, the overall adoption remains limited due to factors such as lack of training, insufficient infrastructure, and resistance to change. Nevertheless, the growing interest in digital literacy and the increasing availability of AI-based educational tools highlight a need for more structured initiatives to promote AI awareness and usability. Enhanced professional development programs, targeted campaigns to increase knowledge, and the provision of resources to support AI integration in the curriculum could significantly improve the efficiency and effectiveness of teaching and learning processes, preparing students for the challenges of an increasingly digital world.

RECOMMENDATIONS

The following are actions that should be taken on the basis of the findings of this study;

1. Increase Awareness and Training Programs for Educators and Students:

Higher learning institutions should implement comprehensive training programs to enhance the awareness and understanding of AI among educators and students.

2. Develop and Integrate AI-Based Tools into the Curriculum:

Higher learning institutions should promote the integration of AI technologies into their teaching practices by adopting AI-powered educational tools such as learning management systems, virtual assistants, and personalized learning platforms.

REFERENCES

- Adamu, M. J. "Awareness Level of Edutainment among Technology Education Lecturers in Colleges of Education in Nigeria." *INCEDI 2017 Proceedings* (2017): 370–377.
- Ali, M. "The Human Intelligence vs. Artificial Intelligence: Issues and Challenges in Computer Assisted Language Learning." *International Journal of English Linguistics*, 8.5 (2018): 259–271.
- Alma, V. L., Zohaib, H. S., Oki, D., Chanda, C. T. & Moses, A. A. "Revolutionary Teaching Approaches: Exploring the Educational Landscape in Pakistan via Outcome-Based Education." *Journal of Information Systems and Technology Research*, 3.2 (2024): 73–79.
- Anft, M. "Expanding the Digital Curriculum." <https://www.Chronicle.Com>. Cervený, L. (2021). Teacher Stress in Response to the Covid-19 Outbreak in the spring of 2020. (Doctoral dissertation, Roberts Wesleyan College (Rochester) (2020).
- Banda, S., Mpolomoka, D. L., Mbono, D. & Sampa, R. L. "Use of Questions in Qualitative Research: How Questions Guided Our Study." *International Journal of Development Research*, 7.12 (2017): 17895–17898. <http://www.journalijdr.com>.
- Buckingham, D. "Digital Media Literacies: Rethinking Media Education in the Age of the Internet." *Research in Comparative and International Education*, 2.1 (2007): 43–55.
- Chanda, C. T., Chisebe, S., Mainde, D., Madoda, D., Mwansa, P. & Zohaib, H. S. "Assessing the Impact of Online Civic Education Platforms on Educator Competency and Student Outcomes: A Case of Selected Higher Learning Institutions in Zambia." *Journal for Studies in Management and Planning*, 10.7 (2024): 1–20.
- Chanda, C. T. & Phiri, E. "The Efficacy and Acceptance of Online Learning vs. Offline Learning in Higher Learning Institutions: A Systematic Review." *International Journal of Research (IJR)*, 11.8 (2024): 149–170.
- Chanda, C. T., Welbeck, A. B., Zohaib, H. S., Mpolomoka, D. L., Chisebe, S. & Phiri, E. V. "The Effect of Management Information System on Student Academic Performance: A Case of Selected Higher Learning Institutions in Lusaka District, Zambia." *World Journal of Advanced Research and Reviews*, 24.3 (2024): 118–129.
- Chanda, C. T. & Zohaib, H. S. "Harnessing Information Communication Technology in Civic Education Teaching and Learning: A Comprehensive Review." *Global Scientific Journals*, 12.4 (2024): 112–131. www.globalscientificjournals.com.
- Chanda, C. T., Zohaib, H. S., Mpolomoka, D. L., Akpan, W. M. & Mainde, D. "Curriculum Design for the Digital Age: Strategies for Effective Technology Integration in Higher Education." *International Journal of Research (IJR)*, 11.7 (2024): 185–201.
- Chanda, C. T., Zohaib, H. S., Shogbesan, Y. O., Phiri, E. V. & Akpan, W. M. "Ethical Implications of AI and Machine Learning in Education: A Systematic Analysis."

- International Journal of Instructional Technology*, 3.1 (2024): 1–13.
13. Chanda, C. T., Zohaib, H. S., Shogbesan, Y. O., Phiri, E. V. & Akpan, W. M. "Digital Literacy in Education: Preparing Students for the Future Workforce." *International Journal of Research (IJR)*, 11.8 (2024): 149–170.
 14. Chen, L., Chen, P. & Lin, Z. "Artificial Intelligence in Education: A Review." *IEEE Access*, 8 (2020): 75264–75278.
 15. Cheng, X., Mo, W. & Duan, Y. "Factors Contributing to Learning Satisfaction with Blended Learning Teaching Mode among Higher Education Students in China." *Frontiers in Psychology*, 14 (2023): 1193675.
 16. Chigbu, G. U., Ukwunna, R. C., Emelogu, N. U. & Okoyeukwu, N. G. "Awareness and Proficiency in Technology Integration for English Language Teaching Among Secondary School Teachers in Nsukka LGA." *IOSR Journal of Research & Method in Education*, 10.1 (2020): 27–31. Available: <https://www.researchgate.net/publication/343971643>.
 17. Clark, C. & Prensky, M. "Teachers' Awareness and Readiness for AI Integration in Education." *TechTrends*, 63.6 (2019): 699–706.
 18. Elbadiansyah, Zohaib, H. S., Uthman, S. L., Chanda, C. T. & Aulia, L. A. "Exploring the Role of Artificial Intelligence in Enhancing Student Motivation and Cognitive Development in Higher Education." *Journal of Computer Science and Technology*, 1.2 (2024): 59–67.
 19. Ford, M. & Kärger, P. "Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development." *British Journal of Educational Technology*, 52.2 (2021): 562–580.
 20. Glory, T., Amosa, I. G., Hamdalat, T. Y., Mutahir, O. A. & Daramola, O. F. "Assessment of Lecturers' Awareness of Artificial Intelligence for Education in a Nigerian University." *Educational Technology Quarterly*, (2024).
 21. Kavi, A., Angadi, N. B. & Hashilkar, N. K. "Effectiveness of Flipped Classroom as a Teaching–Learning Method among Undergraduate Medical Students – An Interventional Study." *Journal of Education and Health Promotion*, 8 (2019): 211.
 22. Lăzăroi, G., Horak, J. & Valaskova, K. "Digital Literacy, Information Evaluation Competencies, and Social Media Misinformation Discernment." *Information Processing & Management*, 58.1 (2021): 102397.
 23. Miller, P. M. & Hafner, M. M. "Moving Toward Dialogical Collaboration: A Critical Examination of a University-School-Community Partnership." *Educational Administration Quarterly*, 44.1 (2008): 66–110.
 24. Moono, M., Musonda, A., Mpolomoka, D. L., Banda, S., Sampa, R. L. & Chalwe, A. N. "Nurturing Parental Involvement in Artificial Intelligence (AI) Literacy among Children in Multicultural Classrooms." *Journal of Culture, Society and Development*, 73 (2024): 72–83.
 25. Mpolomoka, D. L., Banda, S. & Mbono, D. "Invigorating the Teaching Profession for the 21st Century Teacher in Zambia." *Pyrex Journal of Educational Research and Reviews*, 3.4 (2017): 40–43. <http://www.pyrexjournals.org/pjerr>. ISSN: 2550-7885.
 26. Mumbi, M. & Nyirenda, M. "Towards Automated Assessment of Learning Management Systems in Higher Education Institutions in Zambia." *Open Journal of Applied Sciences*, (2024). https://www.researchgate.net/deref/https%3A%2F%2Fdoi.org%2F10.4236%2Fojapps.2024.145083?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19.
 27. Munjed, M. N. & Khaled, A. O. "The Reality of Employing Artificial Intelligence Applications and its Challenges in Teaching People with Learning Disabilities from the Point of View of Teachers (SDG'S)." *Journal of Lifestyle & SDG'S Review*, 4.4 (2024).
 28. Ramsetty, A. & Adams, C. "Impact of the Digital Divide in the Age of COVID-19." *Journal of the American Medical Informatics Association*, 27.7 (2020): 1147–1148.
 29. Russell, S. J. & Norvig, P. "Artificial Intelligence: A Modern Approach." Pearson, (2016).
 30. Thomas, D. & Brown, J. S. "A New Culture of Learning: Cultivating the Imagination for a World of Constant Change." *Create Space Independent Publishing Platform*, (2011).
 31. Ventayen, R. J. M. "Educator's Competencies on the Application of Technological Tools in Teaching." *International Journal of Scientific & Technology Research*, 8.11 (2019).
 32. Warschauer, M. & Matuchniak, T. "New Technology and Digital Worlds: Analyzing

- Evidence of Equity in Access, Use, and Outcomes." *Review of Research in Education*, 34.1 (2010): 179–225.
33. Zheng, L., Zhang, J. & Wang, Y. "Barriers to AI Integration in Education: Insights from Secondary School Teachers." *Computers & Education*, 167 (2021): 104185.
 34. Yang, F., Lin, W. & Wang, Y. "Flipped Classroom Combined with Case-Based Learning is an Effective Teaching Modality in Nephrology Clerkship." *BMC Medical Education*, 21.1 (2021): 276.
 35. Zenke, F., Poole, B. & Ganguli, S. "Continual Learning through Synaptic Intelligence." *Proceedings of Machine Learning Research*, 70 (2017): 3987–3995.
 36. Zohaib, H. S., Asokan, V., Chanda, C. T. & Asfahani, A. "Harnessing ChatGPT for Effective Assessment and Feedback in Education." *Journal of Computer Science and Informatics Engineering (CoSIE)*, 3.2 (2024): 74–82. Available: <http://creativecommons.org/licenses/by-sa/4.0/>, e-ISSN 2827-8356, p-ISSN 2827-9999.
 37. Zohaib, H. S., Chanda, C. T. & Nurulannisa, B. A. "Advancing Educators: Exploring Innovative Strategies for Teacher Training in Pakistan." *Jurnal Ilmiah Pendidikan Holistik (JIPH)*, 3.2 (2024): 115–124. June 2024. Available: <https://journal.formosapublisher.org/index.php/jiph>.
 38. Zohaib, H. S., Sovia, M. A. & Chanda, C. T. "Exploring the ChatGPT Era: Finding Equilibrium between Innovation and Tradition in Education." *Middle East Research Journal of Humanities and Social Sciences*, 4.4 (2024): 116–121. Available: <http://www.kspublisher.com/>.
 39. Zohaib, H. S., Hasan, B., Chanda, C. T., Uthman, S. L., Muhammad, L. H. & Shahzadi, H. S. "ChatGPT in Higher Education: Exploring Usage Patterns, Benefits, and Ethical Implications." *SSR Journal of Engineering and Technology (SSRJET)*, 2.1 (2025): 1–7.