

## Exploring the use of artificial intelligence in higher learning institutions: a case of David Livingstone College of education

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### ABSTRACT

The study aimed at exploring the use of Artificial Intelligence (AI) by faculty and students at David Livingstone College of Education (DALICE) in teaching, learning and research. The study was conducted at David Livingstone College of Education in Livingstone, Southern Province of Zambia. The study was guided by the Unified Theory of Acceptance and Use of Technology (UTAUT). The study enrolled 141 respondents: One college administrator, all 6 Heads of Department, 54 faculty members and 80 students. The study adopted a cross-sectional design using simple random sampling to select students for inclusion in the study while faculty were all purposely selected and included in the study. An Online survey was used to collect data from faculty and students while a structured interview guide was used to collect data from the Heads of Departments and college administrator. The study findings show that the majority of the faculty (93.8%) and students (84.2%) were aware of the existence of AI tools and technologies used for teaching, learning and research. The most used AI tools by faculty were Turnitin (40.6%), ChatGPT (25%), Google Cloud AI (25%) and Grammarly (12.5%), Wordtune (6%), MATLAB (6%) and DALL-E (1%). The most commonly used AI tools by students included ChatGPT (45.5%) Google Cloud (41.8%) plagiarism software (3.6%) and MATLAB (1.8%). The study established challenges that impede the utilization of AI at DALICE and these include a lack of AI policy, Inadequate ICT infrastructure, erratic internet connectivity, low skills, high subscription fees to some AI tools and lack of training on AI.

**Keywords:** Artificial intelligence, education, research, technology, teaching, learning

### INTRODUCTION

The use of Artificial Intelligence (AI) in higher education delivery and support is vital in the contemporary world of technological advancement. Artificial intelligence (AI) is defined as the ability and development of information technology-based computer systems or other machines to complete tasks that usually require human intelligence and logical deduction. Artificial intelligence as a

machine based technique with algorithmic power for making predictions, diagnoses, recommendations and decisions has seen significant growth within the education spectrum for its potential to enhance and support learning in diverse environments in the contemporary world (Hwang, Xie, Wah, & Gašević, 2020). Artificial Intelligence is a computer system which performs tasks that are typically associated with human intelligence or expertise. Artificial Intelligence is transforming our world, our

life, our society and is affecting every aspect of our modern lives and the education sector is no exception.

The opportunities Artificial Intelligence provides to the education system in higher learning institutions are significant and well documented. The lecturers can use AI to teach effectively and efficiently through individualized and specialized instructions (Iftikhar, P., Kuijpers, Khayyat, Iftikhar, & De Sa, 2020). AI-empowered educational systems can be used to analyze classroom changes and student engagement, subsequently helping to identify at-risk students in real time mode, leading to timely intervention (Iftikhar et al, 2020). According to Chassignol, Khoroshavin, Klimova, & Bilyatdinova (2018) AI can be vital in higher learning institutions as it can be utilized in four perspectives such as personalized instructional materials, innovative instructional strategies, technology assisted assessment and communications between students and lecturers or faculty members.

Despite the pedagogical advantages of Artificial Intelligence on teaching and research, scant literature exists on the application, benefits and challenges of AI in higher learning institutions in Zambia. Therefore, the study aimed at exploring the use of Artificial Intelligence (AI) at one of Zambia's higher learning institutions. The study firstly seeks to assess the scope of utilization of artificial intelligence (AI); secondly, identify the specific AI tools and technologies; thirdly examine the benefits associated with the use of AI; and fourthly, investigate the institutional support and resources available for faculty members in implementing AI-based teaching, learning and research strategies including the challenges of using AI tools and technologies.

## LITERATURE REVIEW

### Theoretical framework

This study was guided by the Unified Theory of Acceptance and Use of Technology (UTAUT). Venkatesh established the Unified Theory of Acceptance and Use of Technology (UTAUT), which includes four major elements for technology acceptance and use: effort expectancy, performance expectancy, social influence, and facilitating conditions. Liu & Yan (2020) explain that effort expectancy refers to the degree of ease

association with the use of the system, performance expectancy refers to the degree to which a student believes that using the system will help him or her achieve gains in academic performance, social influence refers to the degree to which an individual perceives that if the majority believes the new system is good then he or she should use the new system and facilitating conditions refers to the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.

### Review of Literature

The utilization of Artificial Intelligence (AI) in higher learning institutions has gained substantial attention in recent years as institutions seek innovative ways to enhance educational processes and outcomes. It is evident that AI is here to stay and higher learning institutions must find ways of embracing this development. Kaela (2023) observes that Artificial intelligence (AI) is rapidly reshaping various sectors globally, and education is no exception. In developing nations like Zambia, where the government is making concerted efforts to develop quality human capital, these advanced technologies could play a vital role in amplifying educational outcomes and skill development initiatives. This literature review section aims to provide an overview of the existing research and scholarship surrounding the application of AI in higher education. The purpose of this literature review is to show various researches that have been done concerning the utilization of AI in higher learning institutions across the world.

Syed & Basil A. Al-Rawi (2023) conducted a study aimed to evaluate Awareness, Perceptions, and Opinions towards Artificial intelligence (AI) among pharmacy undergraduate students at King Saud University (KSU), Riyadh, Saudi Arabia. Materials and Methods: A cross-sectional, questionnaire-based study was conducted between December 2022 and January 2023 using online questionnaires. The data collection was carried out using convenience sampling methods among senior pharmacy students at the College of Pharmacy, King Saud University. Statistical Package for the Social Sciences version 26 was used to analyze the data (SPSS). Most of the students 73.9% knew about AI. In addition, 69.4% of

the students thought that AI is a tool that helps healthcare professionals (HCP). However, more than half 57.3% of the students were aware that AI would assist healthcare professionals in becoming better with the widespread use of AI. Furthermore, 75.1% of the students agreed that AI reduces errors in medical practice. Overall, pharmacy students showed a good awareness of AI in Saudi Arabia. Moreover, the majority of the students had positive perceptions about the concepts, benefits, and implementation of AI. Moreover, most students indicated that there is a need for more education and training in the field of AI. Consequently, early exposure to content related to AI in the curriculum of pharmacy is an important step to help in the wide use of these technologies in the graduates' future careers.

Ajlouni, Wahba, & Almahaireh (2023) conducted research aimed at examining students' attitudes toward using ChatGPT as a learning tool using a quantitative approach with a descriptive study design. The study was conducted among a random sample of 623 undergraduates who enrolled at the University of Jordan. The results indicate that there is a high level of positive attitude toward utilizing ChatGPT as a learning tool. The study established that (73.2%) agreed on the potential ability of ChatGPT to facilitate the learning process. However, 20.7% of the study participants raised apprehensions regarding the precision of the data produced by ChatGPT, while an equivalent percentage (20.7%) reported feeling uncomfortable utilizing the platform; conversely, 14.6% acknowledged experiencing anxiety when unable to access ChatGPT's services. The results of this study encourage decision-makers and educators at the University of Jordan to incorporate ChatGPT into curricula and instructional practices, considering student concerns and the risk of misuse.

According to Crompton and Burke (2023), they established in their study that AI in education was used for: Assessment/Evaluation, Predicting, AI Assistant, Intelligent Tutoring System, and Managing Student Learning. This was according to a systematic review examining AI in higher education that was conducted in 6 continents up to the end of 2022. The study involved analyzing a total of 138 articles that

were used for full examination. Using a priori, and grounded coding, the data from the 138 articles were extracted, analyzed, and coded. This systematic review provided unique findings with an up-to-date examination of artificial intelligence (AI) in higher education (HE) from 2016 to 2022.

Slimi (2023) explored the impact of AI on higher education by examining its effects on teaching and learning, assessment, ethics, required skills, and future careers. The aim of this study was to analyse the influence of AI on higher education, investigate its impact on the teaching and learning process, examine its effect on assessment and grading, and predict its influence on graduates' future careers. To accomplish this, the study employed a qualitative approach based on a survey of the higher education audience. The results of this study demonstrated the crucial role of AI in the future of higher education. The findings highlighted the effectiveness and efficiency of AI in equipping graduates with new skills for their future careers. They also emphasised the importance of considering the ethical implications of AI. The study revealed that higher education institutions needed to integrate AI more extensively in their programs to prepare graduates for the future workforce. AI had the potential to revolutionize education by personalizing teaching methods to suit individual student needs, providing prompt feedback, and automating administrative tasks. It could also assist in grading and assessment, freeing educators to focus on developing curriculum and providing quality instruction. The study findings suggested that AI has a positive impact on the learning experience by facilitating the acquisition of new knowledge and skills. This research provided insights into the potential of AI to transform higher education and contribute to the development of new skills for graduates. The study findings suggested that AI should be more extensively integrated into higher education curricula, and that institutions needed to consider the ethical implications of AI in the development and implementation of their programs.

Pisica (2023) investigated the perspectives of Romanian academics on implementing Artificial Intelligence (AI) in Higher Education (HE). The study analyzed the pros and cons

of AI in HE, based on the views of eighteen academics from five Romanian universities. The conclusions revealed by this study were in line with similar studies that existed in the literature. The positive aspects of AI implementation in HE were related, in the view of academics, to gains in the learning-teaching process, improvements in students skills and competencies, better inclusion, and greater efficiency in administrative costs. Similarly, the negative aspects revealed by the research were linked to psychosocial effects, data security, ethical aspects, and unemployment threats. However, there were some aspects (mostly negative) related to implementing AI in HE that were less exposed by the interviewed academics, which were mostly related to the costs and efforts of implementing AI in HE. The study suggested developing better policies concerning the implementation of AI in HE and for a strategic vision toward AI, with the ultimate purpose of achieving progress and prosperity for the entire society. Chan (2023) conducted a study that aimed to develop an AI education policy for higher education by examining the perceptions and implications of text-generative AI technologies. Data was collected from 457 students and 180 teachers and staff across various disciplines in Hong Kong universities, using both quantitative and qualitative research methods. Based on the findings, the study proposed developing an AI Ecological Education Policy Framework to address the multifaceted implications of AI integration in university teaching and learning. This framework is organized into three dimensions: Pedagogical, Governance, and Operational. The Pedagogical dimension concentrates on using AI to improve teaching and learning outcomes, while the Governance dimension tackles issues related to privacy, security, and accountability. The Operational dimension addresses matters concerning infrastructure and training. The framework fosters a nuanced understanding of the implications of AI integration in academic settings, ensuring that stakeholders are aware of their responsibilities and can take appropriate actions accordingly.

Lainjo (2023) explored the impact of artificial intelligence (AI) on information technology (IT) in the 21st century. The study examined the role of AI in enhancing data analysis,

automating IT procedures, and strengthening cybersecurity, healthcare, finance, manufacturing, and transportation. The study demonstrated that AI has significantly transformed IT by improving data analysis, decision-making processes, predictive analytics, and insights extraction. AI-powered automation had reduced human errors, enhanced operational efficiency, and allowed IT staff to focus on strategic and creative work. While AI integration in IT brought numerous advantages, challenges such as bias in AI outputs, data security, privacy, lack of AI-skilled IT employees, and system resilience needed to be addressed. Chatterjee and Bhattacharjee (2020) conducted a study on the Emergence of the use and application of Artificial Intelligence (AI) in higher education in India. They discovered that the use of AI in higher learning institutions brought in effective change of governance in the entire internal architecture of Indian Institutes of higher education. The prospect of use of AI included investigation of educational implications as to how teachers would enrich them, how students would learn, and how accurate and prompt decisions can be taken in the institutes of higher education. This was important since the workload had been multiplied due to massification of higher education. The purpose of this study was to explore how the lecturers and students were able to adopt AI. They took many adoption theories and models including the 'Unified Theory of Acceptance and Use of Technology' (UTAUT) model. They developed hypotheses and a conceptual model and got it validated through survey with the help of feedback from useable 329 respondents. It had been found that the model could help the authorities to facilitate adoption of AI in higher education.

A study was done by Popenici and Kerr (2017) to explore the phenomena of the emergence of the use of artificial intelligence in teaching and learning in higher education. It investigated educational implications of emerging technologies on the way students learn and how institutions taught and evolved. Recent technological advancements and the increasing speed of adopting new technologies in higher education were explored in order to predict the future nature of higher education in a world where artificial intelligence was part of the fabric of our

universities. The researchers pinpointed some challenges for institutions of higher education and student learning in the adoption of these technologies for teaching, learning, student support, and administration and explore further directions for research.

Ahmad, Han, Alam, Rehmat, Irshad, Arraño-Muñoz, & Ariza-Montes (2023) study examined the impact of artificial intelligence (AI) on loss in decision-making, laziness, and privacy concerns among university students in Pakistan and China. Primary data was collected from 285 students from different universities in Pakistan and China. The purposive Sampling technique was used to draw the sample from the population. The data analysis findings showed that AI significantly impacts the loss of human decision-making, makes humans lazy, impacts security and privacy. The findings show that 68.9% of laziness in humans, 68.6% in personal privacy and security issues, and 27.7% in the loss of decision-making are due to the impact of artificial intelligence in Pakistani and Chinese society. From this, it was observed that human laziness is the most affected area due to AI. A research project Hung & Jackson (2023) investigated the major benefits and risks of Chinese students using ChatGPT for academic activities and also assessed, if applicable, how ChatGPT can be regulated in Chinese academic settings to maintain academic integrity and ethical standards. The findings were that, the opinion of using ChatGPT to fulfill academic responsibilities has been polarized in China. The conservative camps worry that students are using ChatGPT to commit academic cheating. However, some Chinese educators believe AI-powered technologies should be incorporated into academic learning as AI-enabled writing tools can help improve the quality of academic outputs. A major concern that Chinese educators hold, to date, is plagiarism violations by students as an act of academic cheating.

A study by Alenezi (2023) aimed to identify factors that influence the adoption of artificial intelligence in teaching and learning environments in Saudi universities and assist in developing proposals that can effectively support the adoption of artificial intelligence (AI) in Saudi Arabia universities'

teaching and learning environments. The study employed a qualitative approach based on a semi-structured interview, with the participation of 17 faculty members from Saudi universities specializing in educational technology. The study makes several recommendations to encourage the use of artificial intelligence in Saudi universities, including teaching faculty members how to use artificial intelligence in the classroom, emphasising the benefits of implementing AI for educational leaders, offering AI tools, programmes, and technical support, as well as offering faculty members incentives and promoting scientific research in the area of AI in higher education.

All the studies that were reviewed were not conducted in Africa. This paper will shed light on the current trends in the utilization of AI tools and technology in institutions of higher learning.

## **METHODOLOGY**

The study adopted a cross-sectional design. This research design allows researchers to collect data from many different individuals at a single point in time. Cohen (2011) notes that a cross-sectional study produces a snapshot of a population at a particular point in time in which a representative sample of the population consists of individuals of different ages and different positions. Cross-sectional study was chosen because it does not require follow-up of individuals over time, is inexpensive, easy to conduct and useful for establishing preliminary evidence in planning a future advanced study.

### **Target Population and Sample Size**

The study targeted 80 out of the 328 registered students at DALICE. Simple random sampling was used to select students for inclusion in the study. Simple random sampling is a statistical method in which everyone in a population has an equal chance of being selected into a sample (Frost, 2023). The first, second and third-year students had an opportunity to be included in the sample. A list of all the 328 registered students was accessed and the selection was done by picking every 4th name on the list.

All 54 faculty members, the six heads of department and 1 representative from top college management in charge of college academics (Vice Principal) were all purposely

selected and included in the study. Frost (2023) noted that purposive sampling is a non-probability method for obtaining a sample where researchers use their expertise to choose specific participants to help the study meet its goals. These subjects had particular characteristics that the researchers needed to evaluate the research question. In other words, the researchers picked the participants “on purpose.” A total of 141 respondents were targeted for this study.

### **Data Collection tools**

The study used Google form and interview schedule to collect data from the targeted population.

### **Google form**

A Google form was created and questions were generated. Google Form is a tool within Google Drive for creating online survey forms. The Google form was used to collect data from students and faculty members. Google contained both closed and open-ended questions. A link was shared with the target population to allow them to fill in the form.

### **Interview**

Data from the 6 Heads of Department and the representative for the college senior management (Vice Principal) was collected using interviews. Interview guides were prepared in advance to allow for the collection of relevant data for the study.

### **Data analysis**

Google form allowed for automatic quantitative data analysis while qualitative data was analyzed thematically.

### **Ethical Considerations**

Ethical consideration in any research is important because of the need to protect participants so they can give honest views during data collection (Laryeafio and Ogbewe, 2023). This is an important part of every study that collects primary data. Some of the ethical considerations considered were informed consent, ensuring anonymity, and confidentiality. Informed consent was obtained from the participants. Participants had the freedom of choice to participate in the study or decline. The anonymity and confidentiality of the participants was preserved by not revealing their names and

identity in the data collection, analysis and reporting of the study findings

### **Ethical Approval**

Ethical approval was sought and granted by the research committee at DALICE.

### **FINDINGS**

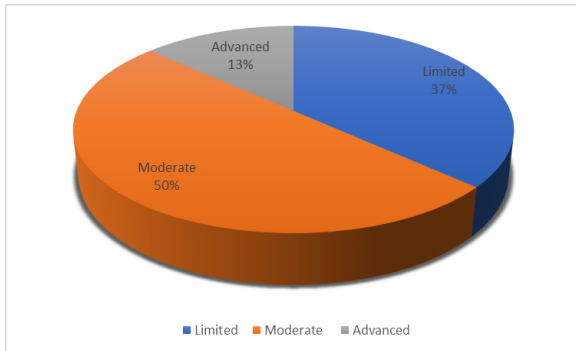
The response rate for students was 72.5 %, 100% from Heads of Department, and 60% from faculty members. 1 response was recorded from a representative of the College administration.

The study highlighted that 43.8% of faculty members were 50 years old and above, 21.9% were between 41-45 years old, 15.6% were between 46-50 years old and 12.5% were between 36-40 years old. At the time of the study, DALICE had six functional departments. 21.8% of the respondents were from the Department of Education, 21.9% from the Department of Social Sciences, 18.8% were from the Department of Languages, 12.5% were from the Department of Science and Mathematics, 9.4% were from the Department of Early Childhood Education and 9.4% were from Department of Business Studies.

The age range of students varied with 60.3% aged between 18-24 years, 24.1% aged between 25-30 years and 13.8% aged between 31-35 years. The majority of the students 74.1% were pursuing Secondary Teachers' Diploma and only 25.9% were pursuing Early Childhood Diploma. In terms of year of study, 50% of the students were in the first year, 32.8% were in the third/final year and 17.2% were in their second year of study.

### **AI tools and technologies used by faculty and students for teaching, learning, and research**

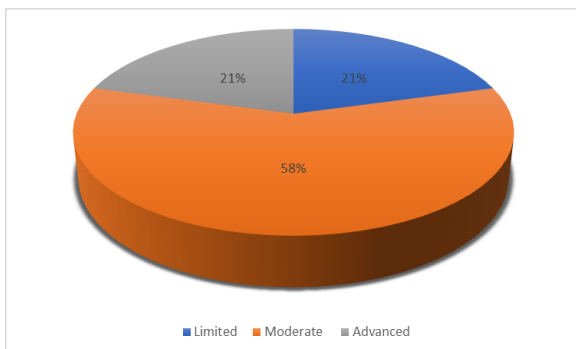
The study revealed that 93.8% of faculty indicated that they were aware of the existence of AI tools and technologies while 6.3% indicated that they were not. Additionally, 84.2% of students indicated that they were aware while 15.8% of the students were not aware. Both Faculty and students were asked to evaluate their level of competence when using AI tools and Technologies. See figure 1 below.



**Figure 1:** Level of competence in the use of AI tools and Technologies by faculty

50% of the Faculty indicated that they had moderate skills in using AI tools and technologies. In comparison, 37% indicated that they had limited skills and 13% indicated they had advanced skills in AI tools and technologies.

Furthermore, 58% of Students indicated they had moderate skills working with AI tools and technologies, 21% had limited competence and 21% had advanced competencies as indicated in Figure 2 below.



**Figure 2:** Level of competence in the use of AI tools and Technologies by students

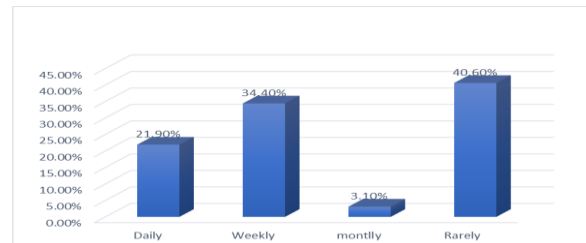
### AI tools and technologies scope of utilization in teaching, learning and research

Both faculty and students were asked to indicate which AI tools and technologies they had used. 40.6% of faculty indicated they have used Plagiarism software e.g. Turnitin, 28.1% used ChatGPT, 25% used Google Cloud AI, 25% used Grammarly, 12.5% had used word tune, 6% had used MATLAB, 6% had used DALL-E and 1% had used google meet, Perplexity AI and Jasper AI.

The responses of the students indicated that they also utilized a variety of AI tools and technologies. The study revealed that 45.5% used ChatGPT, 41.8% used Google Cloud AI,

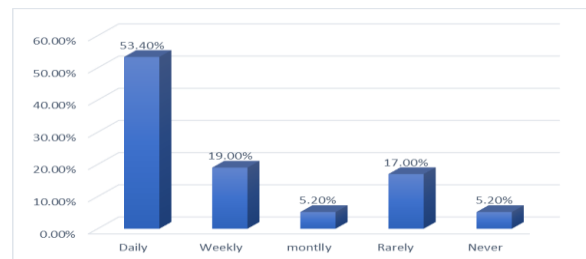
3.6% used plagiarism software, 1.8% used MATLAB and 1.8% indicated they did not use any AI tools and technologies.

The study also sought to establish how frequently both faculty and students used AI tools and technology in their academic work. The frequency of use differed significantly between faculty and students. The findings show that most students used AI tools daily while faculty rarely used AI tools.



**Figure 3:** Faculty frequency use of AI tools and technologies

The above Figure 3 above shows that most of the faculty (40.6%) rarely used AI tools and technologies.



**Figure 4:** student frequency use of AI tools and technologies

Above figure 4 above shows that most students (53.4%) frequently use AI tools and technologies daily.

### Benefits associated with the use of AI in teaching, learning, and research

Faculty listed several benefits they derived from using AI tools and technologies. 75% used AI tools and technologies to develop teaching notes to enhance the classroom teaching environment, 43.8% used plagiarism software to detect plagiarism in academic assignments, 40.6% used AI for research and data analysis, 34.4% used AI to develop teaching aids, 28.1% used it to develop test and exam question papers, 21.9% used AI to develop lesson plans, 3.1% used AI to automate administrative procedures, 3.1% used AI for machine learning.

About 75.5% of students benefited from using AI tools to assist with writing academic assignments, 57.9% of the students used AI tools and technologies to access study materials, 28.1% used AIs for conducting research, 7% of the students were using AI for group work assigned to them, 3.5% used AIs to help them to develop lesson plans SPT (student Teaching Practice) and 1.8% used AI to find or confirm sources of information.

These findings show that both faculty and students draw benefits from using AI tools and technologies. The fact that DALICE is a training college, these results may also be inferred to other teacher-training colleges in Zambia.

The representative from college management mentioned that one of the benefits of the AI tools and technologies was that they provide access to vital information to support academic work for both faculty and students.

#### **Institutional support in implementing AI-based teaching and research strategies**

The study also sought to establish if there is support from the institutions to implement AI-based teaching, learning and research strategies. 68.8% indicated that there was no support from the institution to support the use of AI tools and technologies. However, 18.8% highlighted that the institution provided some kind of training on how to use tools like ChatGPT. This was supported by a respondent from the faculty who pointed out that *“the college supported the training of lecturers in chatGPT”*. 6.25% indicated their institutions rarely provided support with the use of AI tools and technologies to support teaching, learning and research.

The Heads of Department indicated that the college provided access to the ICT infrastructure necessary to access AI tools and technologies but also noted these facilities are not adequate to meet the demands of both faculty and students. The representative from the College's top administration was asked if the College had a policy specifically tailored to support AI-based teaching, learning, and research strategies and he indicated that the college uses the Ministry of Education policy of 1996.

#### **Challenges of using AI tools and technologies in teaching, learning and research**

The study revealed that faculty members experienced several challenges when accessing and using AI tools and technologies. 28.1% of faculty highlighted limited, erratic and unreliable internet access and connectivity as a major challenge that hinders the use of AI tools and technologies. 21.8% cited the lack of knowledge of the existence of different AI tools and technologies available and their various uses. 15.6% identified low skills in the use of Information Communication Technologies (ICTs) hindering the use of AI tools and technologies. 15.6% indicated that the college generally lacks or has inadequate ICT infrastructure in the college to support the use of AI tools and technologies.

About 6.3% of faculty members were concerned that the use of AI tools and Technologies had the potential to make students lazy since they can use these tools to write their assignments without critical thinking on their part. This is a view also shared by one of the Heads of Department who said that *“AI can dilute proper thinking if not properly and analysis of students' thinking capabilities if not properly used”*. A similar view was shared by one of the faculty members who elaborated that *“AI If not properly used by learners has the potential to replace student creativity and innovative critical thinking”*. 6.3% of the faculty also noted some administrators do not understand the potential of AI tools and technologies in enhancing teaching and research, hence they cannot support the adoption of these tools and 6.3% cited the subscription fees to some of the AI tools and technologies as challenges since most faculty may not afford the fees and college was not paying subscription to any of AI tools and technologies.

The Heads of Departments also highlighted all the challenges outlined by the faculty. When asked what should be done to improve access to AI tools and technologies at the college, 71.8% indicated that there is need to have regular training on AI tools and technologies that are useful and can be applied to improve learning, teaching and research, 9.3% suggested the improvement of overall ICT infrastructure in the college to



improve internet access which is vital to access AI tools and technologies, 3.1% suggested the need to pay subscription fees to some AI tools and technologies to increase access by faculty.

Students experienced several challenges as they used AI tools and technologies. 50.9% said that they had limited knowledge of available AI tools and technologies that are beneficial to their academic work, 27.3% experienced challenges with regards to limited/erratic internet connectivity affecting their ability to access AI tools and technologies in the college, 16.4% indicated they felt that lack of training on access and utilization of AI tools and technologies affected their ability to access AI platforms, 12.7% indicated that lack of support for adopting AI tools and technologies by the college affected their ability to access AI platforms and 10.9% noted that high subscriptions fees also negatively affect their ability to access AI platforms.

It can be assumed that these challenges faced by faculty and students at DALICE while utilizing AI tools are also faced by faculty and students in teacher training colleges within Zambia.

## **DISCUSSION OF FINDINGS**

### **AI tools and technologies used by faculty and students for teaching, learning, and research**

The study established that the majority of the respondents both faculty and students, were fully aware of the existence of AI tools. 93.8% of faculty and 84.2% of students indicated that they were aware of the existence of AI tools and Technologies. The findings show that the majority of respondents were aware of the existence of AI tools and technologies being used in the education sector. These findings are similar to one established by Syed & Basil A. Al-Rawi (2023) where it was reported that the majority of the students had positive perceptions about the concepts, benefits, and implementation of AI. The fact that the majority of the faculty and students were aware of the existence of AI tools and technologies may be a good indicator that both groups are using these tools in their academic work.

Furthermore, about half of the respondents had moderate skills in accessing and utilizing AI tools and technologies. Those with moderate or limited skill sets to access AI tools and technology may be disadvantaged as they will not be able to access valuable information and services provided by these AI tools that may be helpful in their academic undertaking. Even though both faculty and students were aware of the existence of AI tools and technologies only half basic skills were needed to access and utilize these tools. This means that moderate skills may inhibit the capacity of faculty and students to utilize fully AI tools and technologies.

In addition, 21% of students and 13 % of faculty were highly skilled in using AI tools and technology. These findings indicate that only a small percentage of both faculty and students had adequate technical skills to access and utilize AI tools and technologies. It is important therefore that DALICE must put in place measures that will ensure that both faculty and students are regularly trained to acquire the necessary technical skills to access and utilize AI tools and technology.

### **AI tools and technologies scope of utilization in teaching, learning and research**

The research established that both faculty and students used a variety of AI tools and technologies. The most popular AI tool by faculty was plagiarism detection software. This is in line with findings established by Crompton and Burke (2023) where AI tools were applied to check for plagiarism on assignments submitted by students for grading. This is to ensure that no student submits plagiarized work for grading. In short, faculty use AI tools that help facilitate the submission of assignments by students and also check plagiarism.

The study further showed that the most used AI tool by the students was ChatGPT. The study also revealed that more students (45%) used ChatGPT compared to 25% of the faculty. The use of ChatGPT suggests that students are using this tool to conduct research and access information relevant to their course of study. These findings are similar to the ones highlighted by Ajlouni, Wahba, & Almahaireh (2023) which indicate

that there was a high level of a positive attitude toward utilizing ChatGPT by students as a learning tool.

It is important to highlight that AI tools and technologies used by faculty were more tailored towards the processing of student assessments while students were utilizing tools that assist them in conducting research and writing academic assessments. In addition, the frequency of use of AI tools and technology by students was higher as compared to faculty. The attributing factor to this could be age. This simply means that students who by age are younger compared to the lecturers have a high ability to explore new technologies and hence are more likely to use AI tools and Technology. This view was echoed by the representative from the college administration who was concerned that faculty members were not utilizing AI tools and technologies as much as students. This observation was validated by the data showing that 53.40% of the students used AI tools and technologies daily while only 21.90% of the faculty members used these tools daily. In short, students are using more AI tools and technologies than faculty.

#### **Benefits associated with the use of AI in teaching, learning, and research**

There are many benefits that both faculty and students derive from the utilization of AI tools and technologies such as improving classroom teaching environment, detection of plagiarism, data analysis, developing teaching aids, setting test and exam question papers, developing lesson plans, automating administrative procedures and accessing study material. The representative from college management mentioned that one of the benefits of the AI tools and technologies was that they provide access to vital information to support academic work for both faculty and students. These findings are consistent with those of the study conducted by Pisica (2023) which also highlighted similar benefits as a result of using AI tools and technology. The findings suggest that both faculty and pupils are more likely to utilize AI tools and technologies provided they can derive several benefits from accessing these tools.

#### **Institutional support in implementing AI-based teaching and research strategies**

The findings indicate that there was inadequate administration support from the institution to support the use of AI tools and technologies. Despite inadequate support, the college was putting measures to improve access points of AI tools and technologies. The heads of departments and other faculty members indicated that the college provided access to the ICT infrastructure necessary to access AI tools but also noted these facilities are not adequate to meet the demands of both faculty and students. It is important to note that the college management has put effort into improving access to ICTs infrastructure. This will help increase access to AI tools and technology for both faculty and students. A study by Alenezi (2023) proposed the training of faculty members on how to use artificial intelligence in the classroom, emphasizing the benefits of implementing AI for educational leaders, offering AI tools, and technical support. Improving access to ICT, prompting the use of AI in classrooms and providing technical support can greatly increase the ability for faculty to access and utilize AI tools and technologies in their teaching and research work.

Another factor that affects the implementation of AI-based teaching is the lack of a dedicated AI policy by the college. The representative from the College's top administration did indicate that the college uses the Ministry of Education policy of 1996. This policy is generic and does not address the issues of AI utilization in institutions of higher learning. As such the college may not have the necessary guidelines to follow to support the adoption of AI-based learning. The importance of institutions developing policies on AI utilization was echoed by Pisica (2023) and Chan (2023) who also emphasized that higher education institutions should develop better AI policies to address the multifaceted implications of AI integration in university teaching and learning. AI policy is crucial for your organization's success in navigating the complexities of artificial intelligence. An AI policy provides a framework for decision-making, helping organizations make informed choices about data privacy, algorithm transparency, and bias mitigation and also helps you set guidelines for

responsible AI use, ensuring that your organization operates ethically and in compliance with relevant regulations. It is thus important that learning institutions develop policies to provide guidelines on how they can support the adoption and utilization of AI to support teaching, learning and research.

### **Challenges of using AI tools and technologies in teaching, learning and research**

Both faculty and students faced similar challenges that limited access to and utilization of AI tools and technologies such as erratic and unreliable internet access and connectivity, lack of knowledge of the existence of different AI tools and technologies, low skills to access AI tools and technologies, encourage laziness among students and inadequate ICT infrastructure in the college. Some of the challenges are similar to the ones in a study by Ahmad, Han, Alam, Rehmat, Irshad, Arraño-Muñoz, & Ariza-Montes (2023) but one challenge that was echoed by Ahmed et al (2023) was that AI tools promoted laziness among university students. This was a concern by the faculty at DALICE. Faculty assumes that students will just go to AI tools to write their assignments without critical thinking hence promoting laziness. These views were shared by Hung & Jackson (2023) who highlighted that the use of ChatGPT by students facilitated academic cheating. The major concern from faculty at DALICE is plagiarism violations by students since they may use AI tools without proper acknowledgment of sources of information. There has been genuine concern from faculty about how students are using AI tools and technology to do their academic work.

One particularly interesting challenge was concerning subscription fees to access some of the AI tools and technology. This is a legitimate concern. High subscriptions will mean that only those with financial resources can access AI platforms hence creating a divide between those who can pay these fees and those who cannot. In the case of students, it can mean the inability to access vital information or tools necessary to undertake their academic undertaking. For members of the faculty, the inability to subscribe to AI platforms can mean poor preparation of lecture materials and

ultimately lead to poor learning and teaching experience for students. These challenges faced by both faculty and students impede the ability to access AI tools and technologies that provide multiple benefits and advantages that can enhance the teaching and learning experience.

To mitigate the challenges faced by heads of departments, faculty and students, the college representative emphasized the need to improve ICT infrastructure and expand access to stable Internet connectivity. A study by Alenezi (2023) also agrees that to mitigate challenges of access to AI tools and technologies universities must encourage faculty members to use artificial intelligence in the classroom, educate faculty regarding the benefits of implementing AI for education, offer AI tools to be accessed and utilized by faculty and offer technical support, as well as offering faculty members incentives and promoting scientific research in the area of AI in higher education. University/college administrations have a critical role to play in providing an enabling environment to support the use of AI tools and technologies. This means improving ICT infrastructure within the school campus, ensuring access to reliable internet, and developing AI policies to support the use of AI tools and technologies.

### **CONCLUSION**

This study sought to answer the following research questions; what is the scope of utilization of AI tools and technologies by faculty and students?, what specific AI tools and technologies are used by faculty and students? What are the benefits associated with the use of AI tools and technologies by faculty and students, what kind of institutional support is given to faculty and students to facilitate the utilization AI and technologies and what challenges are faced by faculty and students while utilizing AI tools and technologies. The study established that the majority of the faculty members and students are fully aware of the existence of AI tools and technology. Although faculty members and students are aware of AI tools and technology, there is low utilization as most faculty and students are incompetent or insufficiently skilled. The research established that both faculty and students use AI tools and technologies such

as plagiarism detection software and ChatGPT. Plagiarism software is used to check for plagiarized assignments submitted by students for grading. This is to ensure that no student submits plagiarized work for grading. ChatGPT is mostly used by students to conduct research and access information relevant to their course of study. In addition, the frequency of use of AI tools and technology by students is higher as compared to faculty members. AI tools and technologies provide access to vital information to support academic work for both faculty and student populace. There is inadequate Institutional support for implementing AI-based teaching and research strategies. The institution provides access to the ICT infrastructure necessary to access AI tools and technologies but these facilities are not adequate to meet the demands of both faculty and students. The institution has no AI policy to guide faculty and student populace on the adoption and utilization of AI tools and technology. The challenges faced by faculty and students in institutions can be minimized by improving ICT infrastructure and expanding access to stable Internet connectivity and training both faculty and students on the use of AI tools and technologies.

This study is the first of its kind to be conducted at DALICE. It brings out pertinent issues that need agent attention to support the use of AI tools and technologies in institutions of higher learning. Other colleges can use the findings of this study to advocate for the improvement of ICTs in their respective campuses and pursue collegement to develop AI policies that are vital to support the adoption and utilization of AI tools and technologies for teaching, learning and research.

#### Limitation of study

The study was conducted in a limited time frame hence this could not have given enough time for all respondents to submit their responses.

#### RECOMMENDATIONS

Based on the findings in this research paper, the researchers recommend that higher education institutions should use AI in their teaching, learning and research. However, using AI implies that higher learning

institutions should develop AI policies concerning the implementation of AI in teaching, learning and research. The researchers also recommend that management in higher learning institutions must conduct regular training for both faculty and students on latest development in AI tools relevant to the education sector, higher learning institutions must invest in improving internet and network infrastructure to ease access to AI and technology tools and finally higher learning institutions must adequately equip staff and students on the best ways of making AI useful.

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