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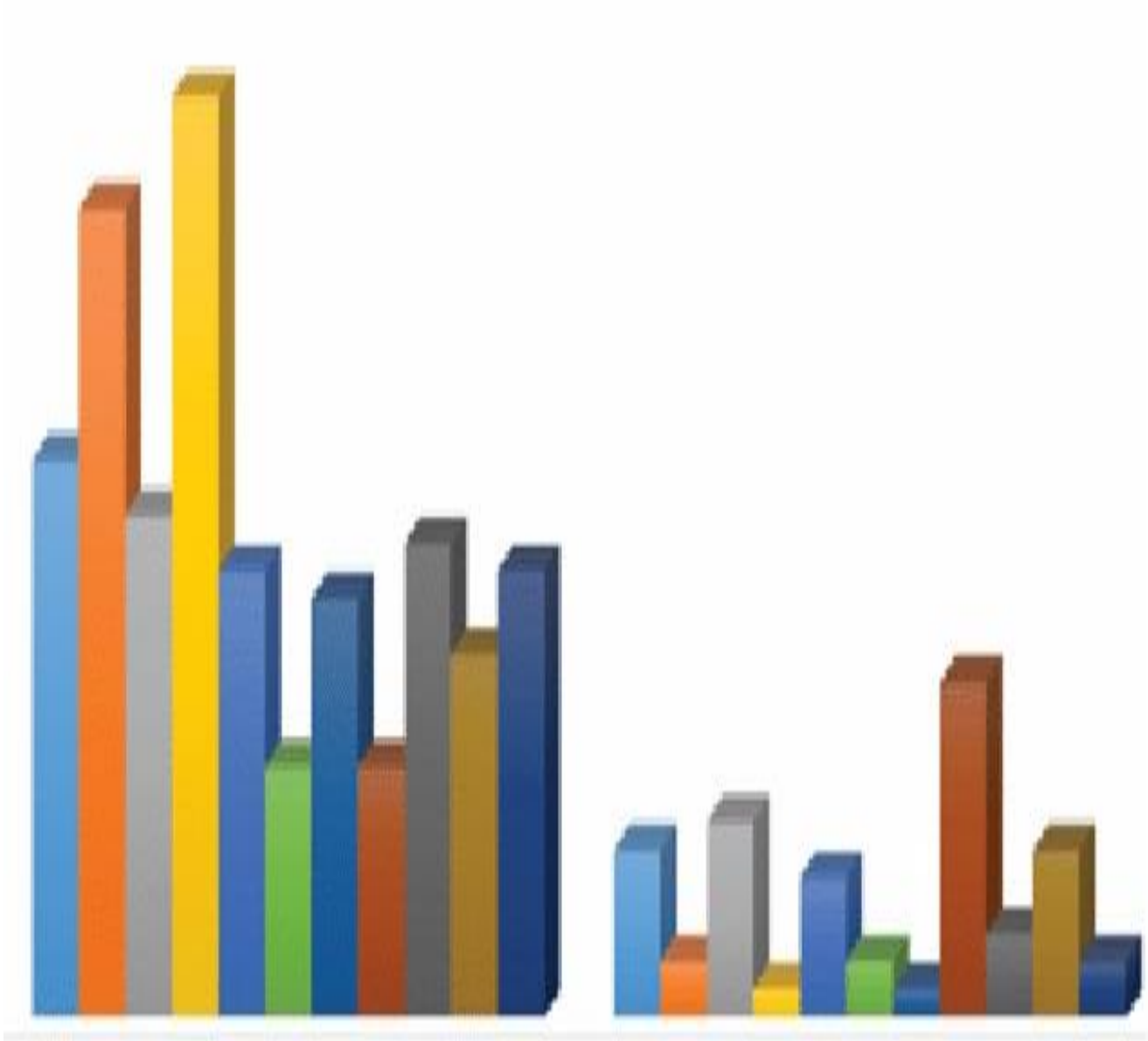

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Research Article

Perceptions and Attitudes of Lecturers Towards Emergence of Artificial Intelligence in Zimbabwe State Universities

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ABSTRACT

Artificial Intelligence (AI) is bringing enormous changes in various sectors across the globe, and the tertiary education sector is not an exception as it is affected immensely. Understanding lecturers' perspectives and attitudes towards the emergency of AI is paramount because it enables effective integration of AI tools into the educational system. This study sought to explore the perceptions and attitudes of lecturers towards the emergence of AI in Zimbabwe State Universities. Qualitative research methodologies were employed and in-depth interviews were conducted with lecturers from Zimbabwe State Universities in all faculties. The interviews were conducted to obtain lecturers' insights, expectations, and concerns regarding the integration of AI in the tertiary education context. The study focuses on several key areas of concern including lecturers' awareness and understanding of AI, realized and perceived benefits and challenges associated with integrating AI into teaching and learning, and their attitudes towards AI's potential impact on the overall teaching and learning process. The findings provide valuable insights regarding the awareness and readiness of lecturers in Zimbabwe State Universities to embrace AI tools, identifying potential challenges impeding the successful integration of AI in teaching and learning. More so, these findings contribute to the extant literature on AI in tertiary education, particularly in the context of Zimbabwe State Universities. Policymakers, higher and tertiary education institutions, and relevant stakeholders can develop appropriate strategies and support frameworks to enable the effective adoption and utilization of AI tools in tertiary learning institutions.

Keywords: artificial intelligence, perceptions, attitudes, lecturers, teaching and learning

INTRODUCTION

Artificial intelligence is bringing with it major advancements and transformations across all sectors of the economy in the world, and this includes the field of education as well. Recently AI tools have started to infiltrate the learning environments and classrooms of institutions of higher learning. Zimbabwean state universities are always eager to improve their world rankings in terms of quality in all areas, this can be witnessed by the introduction of the Education 5.0 framework that was introduced by the Ministry of Higher and Tertiary Education, To swiftly achieve this goal these Zimbabwe state universities may leverage on AI tools and be early adopters of AI tools. To date, the state of AI adoption in Zimbabwe state universities is not well documented. Given the pace with which AI is changing the teaching and learning landscape, this study therefore seeks to understand the perceptions and attitudes of lecturers in Zimbabwe state universities towards the emergence of AI.

AI development dates back to the 1950s when researchers envisioned the possibilities of designing machines with the capability of simulating human intelligence (Russell & Norvig, 2016), AI therefore can be defined as a branch of computer science that focuses on developing machines that can easily perform tasks that typically require human intelligence. The development of AI has been progressing well over time and this has led to the development of sophisticated algorithms, intelligent systems, and machine learning, these major advancements and milestones led to the development of large language models and applications that can be used in various domains including healthcare, finance, agriculture, climate and now education (Nilsson, 2010). It is these major shifts in AI use in universities that motivated this research paper to determine the perceptions and attitudes of university lecturers toward the emergence of AI. Like students and other stakeholders in the university community, lecturers are a major key ingredient, hence successful integration of AI tools in teaching and learning heavily relies on understanding perceptions, attitudes and capabilities of lecturers. A greater part of student learning experiences at the university is shaped by lecturers, therefore undertaking a study to understand their perceptions and attitudes is commendable.

AI technologies have already shown their immense capabilities of revolutionizing the traditional teaching and learning approaches in many ways as they can benefit both students and lecturers, students now can have their assistants in the form of AI chatbots where they can find answers to a variety of questions in a split of a second, hence this facilitates individualized learning experiences (D'Mello & Graesser, 2012; Udupa, 2022). Lecturers may benefit from automating repetitive administrative tasks and assignment grading using AI tools thereby providing instant feedback. All of this frees up lecturers' time enabling them to focus on other value-adding aspects such as research, community service, and national development. However, it is also crucial to take note that AI comes with its own unique set of challenges that need to be addressed during the early stages of AI adoption in learning institutions such as fairness, ethics and safety, and skills gap among instructors (Huang, et al., 2021).

In the African continent adoption and utilization of AI technologies is increasing gradually. Even though lagging behind African universities are also roping in AI technologies in their teaching and learning frameworks. Looking at the pace with which universities in the global north are adopting and discussing AI technologies, more needs to be done by African universities to ensure students are aware and

are utilizing AI tools for their benefit. It is this 'stillness' by African universities particularly Zimbabwean Universities that led to this paper to try and understand the perceptions and attitudes of state universities lecturers towards the emergence of AI in teaching and learning. Table 1 shows institutes and centres that have a focus on AI and emerging technologies in African Universities.

Table 1: Artificial Intelligence and Emerging Technologies Institutes and Centres in African Universities

University	Institute/Centre
University of Rwanda	Africa Centre of Excellence in Data Science
Addis Ababa Science and Technology University	Artificial Intelligence and Robotics Centre of Excellence
University of Pretoria	1. Intelligent Systems Group 2. Institute of Big Data and Data Science
Makerere University	AI and Data Science Research Group
University of Johannesburg	Institute for Intelligent Information Systems
Malawi University of Science and Technology & IBM	Digital Nation (D-NA) Project
Strathmore University	@iLabAfrica Research Centre
University of Lagos	Data Science Community Centre and Artificial Intelligence Hub

Source: Adapted from African Center for Economic Transformation (2023)

Since the emergence of AI in education, focus has been on intelligent tutoring systems which aims at providing adaptive and personalized learning experiences for students (VanLehn, 2011), given that current AI capabilities have since expanded beyond intelligent tutoring systems as a result of complex machine learning algorithms learners can benefit more from AI use because it now has the power to even track learning systems, provide tailored feedback and model student knowledge at a faster rate than before (D'Mello & Graesser, 2012).

Recent studies (Blikstein & Worsley, 2016; Chen et al 2020; Zhang &Zhou, 2021) have shown increasing use of AI tools such as AI-powered chatbots that have the capability of providing instant support and answers to student queries. Effective use of AI-powered algorithms by educators and even

administrators can ensure data-driven decisions are made because AI can analyse enormous quantities of data swiftly (Blikstein & Worsley, 2016; Teng, et al., 2023). Some educators are worried about the capabilities of AI because they are concerned about its negative implications such as algorithmic bias, and data privacy issues and some even feel they may soon be displaced by AI (Chen, et al., 2020). Any major shifts in technology may indeed come with economic, social, and ethical implications but in most cases and

the long run improvements in technology have been witnessed to bring positive changes, in this instance, the adoption of AI by educators can lead to improvement in student learning outcomes, provide individualized instruction and enhanced student engagement (D'Mello & Graesser, 2012). Given this, educators should try to focus more on the positives of inculcating AI in their teaching frameworks because AI and emerging technologies are here to stay and are getting better by the day in terms of mimicking human capabilities. Additionally, Popenici & Kerr (2017) note that AI should be seen just as a tool to augment human capabilities and not replace instructors. Therefore, getting to understand the perceptions and attitudes of lecturers in Zimbabwe state universities is essential for ensuring the effective adoption of AI tools in Zimbabwe state universities.

The following are the research objectives for this study:

- To assess the level of understanding and awareness of artificial intelligence (AI) use among lecturers in the context of teaching and learning in Zimbabwe state universities.
- To examine lecturers' attitudes and perceptions towards the potential impact of AI on the teaching and learning process in Zimbabwe state universities.
- To identify mechanisms used to ensure effective assessment in light of artificial intelligence in Zimbabwe state universities.

LITERATURE REVIEW

What is Artificial Intelligence (AI)?

AI involves the study of agents that perform actions on the percepts received from the environment (Russell & Norvig, 2016). Perception, intuition, and cognitive abilities are generally considered to be characteristics inherent in humans, however, the definition by Russell & Norvig (2016) emphasise that at least machines can now perceive their surroundings and respond intelligently based on such perceptions from their surroundings. On the other hand, Nilsson (2010) defined AI as an activity that involves creating machines with the capability to perform tasks that normally require human intelligence.

In their 1955 proposal McCarthy, et al (1955) described AI as the science of engineering intelligent machines, their argument during the meeting in 1955 was that the study to be carried out should be on the pretext and belief that every aspect of human learning and human intelligence can be broken down into detailed processes and components that can accurately be replicated by a machie. i.e. the scholars had a strong belief that human intelligence can be recreated through computational means. McCarthy, et al (1955) and Russell & Norvig (2016) definitions and descriptions of AI are similar in meaning because they all emphasise on machines being intelligent and capable of reasoning like a human being.

Artificial intelligence tools

There are a variety of AI tools that are used in the teaching and learning process, these include intelligent tutoring systems, chatbots and automated grading tools. Intelligent tutoring systems provide customized and personalized instructions to learners, these systems make use of complex machine learning algorithms that adapt to the learning content and align that to each individual student and provide tailor made tutorials, support and feedback (VanLehn, 2011).

Chatbots use natural language processing techniques to analyse speech and written text, and they can provide human like responses (Abdul-Kader & Woods, 2015). These chatbots such as ChatGPT, Notion and Bing can engage in interactive conversations with learners providing instant answers to their questions. Chatbots are proving to to be useful and efficient in assisting students with assignments and brainstorming (Udupa, 2022).

There are AI tools that can assist in plagiarism and AI written text detection such as Turnitin. More so, automated grading tools are infused in most electronic learning management systems and these have the advantage of reducing grading burden on lecturers, thus providing instant feedback to students (Kumar, 2020). However, automated grading tools have their own drawbacks such as bias when grading qualitative essays that are subjective in nature and may require human professional judgment (Gallagher & Breines, 2022).

THEORETICAL FRAMEWORK

This study is anchored on two major theories: the Technology Acceptance Model (TAM) and the Innovation Diffusion Theory (IDT).

Technology Acceptance Model (TAM)

TAM was developed by Davis (1989), this is a commonly used theory for getting to understand the acceptance and adoption of new technologies by individuals, in this regard acceptance and adoption of new AI by lecturers in Zimbabwe state universities. TAM mainly focuses on two key aspects: perceived usefulness and perceived ease of use, therefore it generally tries to understand the perceptions of individuals under study regarding the technology in question. On perceived usefulness, the emphasis is understanding the extent to which lecturers believe that using AI enhances their job of teaching, research, and even community service. Perceived ease of use shows the degree to which lecturers believe that using AI will be free from a lot of effort and confusion, therefore by adopting this theory, we get to understand the perceptions and attitudes of lecturers in Zimbabwe state universities towards the emergence of AI on the teaching and learning process.

Innovation Diffusion Theory (IDT)

IDT has been in use since the 1950s (Alzighaibi, et al., 2016), and was brought into the limelight by (Rogers , 1962; 1995) when he introduced the commonly used and well-known innovation-decision process. IDT focuses on the process of accepting or rejecting an innovation. Rogers outlines a five-stage process to innovation adoption, these five stages are called IDT stages:

Stage 1: This is when an individual becomes aware of the innovation/ technology, its purpose, and how it works. One of the objectives of this study is to determine levels of understanding and awareness or AI by lecturers in Zimbabwe state universities.

Stage 2: This is when an individual decides to like or dislike the new technology under study, on this stage individuals will be considering things like attributes of the new technology, compatibility, complexity, relative advantage, observability, and triability.

Stage 3: Individual decides to accept or reject the new technology.

Stage 4: Involves the individual implementing the new technology.

Stage 5: This is confirmation of the decision of accepting or rejecting by the individual.

The IDT gives foundation to our study in that it identifies different lecturer categories as adopters of AI technology based on their willingness to adopt the AI tools, and to get to know the lecturers' willingness we sought their perceptions and attitudes towards the emergence of AI in teaching and learning in their respective respective state universities.

AI in higher education institutions and its implications

Analysis carried out in 2021 shows that 67% of higher education institutions in Africa have AI researchers or experts and 54% at least have courses related to AI (African Center for Economic Transformation, 2023). However, it is crucial to note that the AI courses on offer in these institutions were in disciplines such as

computer science, Information Technology, and Statistical Modelling, which means that there were no AI courses to cater to those in other disciplines such as commerce, humanities, and social sciences. Given the pervasive impact and benefits of AI in individuals and businesses there is a need for a holistic approach in institutions of higher learning to offer AI courses in all disciplines to fill the AI skills gap.

Studies show that some lecturers poses a basic understanding of AI whilst many are still to get comprehensive knowledge and understanding on the application and potential benefit of AI use (Abdous, 2023). This knowledge gap warrants the need for capacitating lecturers with AI skills through training and support so that they can ensure the responsible use of AI tools by their students and integrate AI tools in their teaching and learning frameworks.

Perceptions and attitudes of lecturers on AI use are varied, some lecturers consider AI tools as enhancers of student engagement and offering personalised learning experiences (Schiller International University, 2023). On the other hand, some lecturers are worried about the potential negative consequences of AI adoption in teaching and learning such as loss of jobs and ethical implications (Chen, et al., 2020; Abdous, 2023), hence there is a greater need to address these diverse lecturer perceptions on the emergence of AI to ensure effective integration of AI tools in teaching and learning processes. These diverse lecturer perceptions on the emergence of AI tools in teaching and learning is a result of many factors such as technological competency, training and support, institutional culture and policies, and perceived benefits and risks (Hodges & Ocak, 2023; Abdous, 2023; Schiller International University, 2023).

AI technologies are still evolving and the trend is likely to remain so, therefore universities should come up with an 'open and ongoing' ethical framework to guide the implementation of AI in universities, for example, the Open University in the UK came up with an AI working group which seeks to determine AI contributions in terms of improving student retention, success and satisfaction (Nichols & Holmes, 2018). Currently, ethical standards on AI are being proposed, however, they are generic and high-level and thus may not be capable of serving and guiding the education sector (Nichols & Holmes, 2018). This calls for universities to come up with policy frameworks and ethical standards that are specific to universities so that responsible AI use can be instilled in university stakeholders using AI technologies.

Al-Shoqran & Shorman (2021) suggest that universities should consider ways to become smart universities by adopting AI in their teaching and learning framework because AI brings with it many benefits such as improved quality and effective resource utilisation. It is therefore paramount that AI tools be embedded in all the key pillars of university curricula such as research, teaching, and learning. University management should priorities investment in AI for them to have smart universities, for instance, chatbots have become a solution to the teaching and learning process. However, for students and lecturers to truly gain an understanding of AI systems they need to be trained on how to use these AI tools responsibly to their advantage (Stachowicz-Stanusch & Amann, 2018). A cause for concern is that most universities are still devoid of policy frameworks regarding AI and this may delay formal AI adoption in these higher education institutions.

Additionally, some scholars are advocating for enhanced quality in institutions of higher learning, and to achieve that, personalised learning has been suggested as a solution. However, traditional teaching methodologies are unable to meet individual learning needs of students (Xiao & Yi, 2020). In order to ensure individual learning experiences are enhanced (Xiao & Yi, 2020) proposed that AI should be adopted

in the teaching and learning process because AI has the capability to analyse each student's information and therefore design personalised training models.

A 2016 report by Stanford University reveals that learning institutions have been adopting AI technologies at a slower rate due to lack of funding and lack of empirical evidence that these AI tools actually help students achieve learning objectives. This revelation shows that there is need for extended research through experiments on determining the usefulness of AI tools in achieving learning objects on the part of the student.

Bali, et al (2022) find that adopting AI technologies in universities bring with it both positive and negative impact on the learning outcomes for students, for example when AI is used in non-traditional settings it positively affected emotional quotient, spiritual quotient and intelligent quotient. Similarly, Popenici & Kerr (2017) undertook a study on the impact of AI on teaching and learning in higher education and found that AI has the potential to automate most administrative tasks such as student support. However, they note that AI still has a challenge in understanding complex aspects that require intuition such as humor and sarcasm, therefore human teachers remain relevant to strike a balance between technology and human-centered education.

METHODOLOGY

The study seeks to understand the perceptions of lecturers on the emergence of artificial intelligence in Zimbabwean state universities, and qualitative methodologies are usually ideal for studies on perceptions and attitudes. The population for this study was lecturers in Zimbabwean state universities. Face-to-face interviews and telephone interviews were used to gather data. Data saturation was reached at the 12th interview, and to save on resources and time interviews were stopped. Thematic analysis was adopted for data analysis. Interviews were conducted twice after one-month intervals, to establish data trustworthiness. Interview participants were consistent in both interviews making the results and conclusions for this study trustworthy, credible, and transferable. To comply with ethics study participants were free agents and allowed to withdraw from interviews at any time.

RESULTS AND DISCUSSION

Level of understanding and awareness of artificial intelligence (AI)

The first objective of the study was to identify the level of understanding and awareness of artificial intelligence among state university lecturers. There was a disparity in terms of age and faculties in the level of understanding and knowledge of artificial intelligence. Younger lecturers demonstrated an understanding of artificial intelligence as compared to older lecturers who participated in the study. For example, R3 stated this, "I hear about artificial intelligence from younger colleagues we work with in our faculties, I haven't given it much thought." This resonates with Zhang & Zhuo (2021) that young lecturers are tech-savvy, and this seems to be a worldwide trend. The study found that lecturers in computer science departments are knowledgeable about artificial intelligence. R12 stated this, "As a lecturer from the computer science department, I know that students are using artificial intelligence for their assignments.....they use chatbots that are available on the internet such as chatgpt, and other chatbots found in social media such as Whatsapp and Telegram." This finding also converges with Hodges & Ocak (2023) who found that lecturers in computer-savvy departments are more knowledgeable about artificial intelligence because it is, what they teach.

Lecturers attitudes and perceptions towards potential impact of AI on the teaching and learning process.

The second objective was on attitudes and perceptions on the potential impact of AI. In general,

there is a negative attitude and perception on artificial intelligence. Three themes emerged in terms of this negative perception. The major theme was plagiarism. The study found that plagiarism is a serious offence in state universities. This is frustrating for lecturers that students are using artificial intelligence such as chatgpt to write assignments for them. For example, R5 said, "Our students are abusing artificial intelligence, they make it to write whole essays, and then they copy and paste and submit.....plagiarism is a serious offence." This is also similar to findings by Bali et al (2022) that artificial intelligence is resulting in a lot of plagiarism. The second theme that emerged was on lack of research skills. The purpose of assignments is to make students to research from a lot of scholars in the field and make a comprehensive submission. With artificial intelligence students no longer research they only rely on one chatbot and then submit their assignment. This was echoed by R10 that "The purpose of assignments and other assessment task is to make students to learn important research skills, but this is no longer the case with artificial intelligence." This is closely linked to the third theme of half-backed graduates. Lecturers believe that artificial intelligence will lead to half-backed graduates. This was stated by R5 "Our future graduates will lack problem-solving skills and they won't be able to be positioned to work effectively because they only know copy and paste." However, this is not the case with findings from Chen et al (2020) as they state that artificial intelligence is positive and graduates need to learn about them because even at the workplace they will be using artificial intelligence. The deviation is that in Zimbabwe many industries haven't adopted artificial intelligence.

However, there was only one positive attitude towards artificial intelligence. Lecturers view artificial intelligence as a source of information. Lecturers explained that artificial intelligence is a source of valuable information for research if used very well. This was echoed by R8 "In Zimbabwe state universities are finding it expensive to acquire both digital and hard copy textbooks, students are taking advantage of artificial intelligence chatbots for information for assignment writing and in preparing for examinations." This finding is similar to Udupa (2022) that chatbots are a low-cost source of information that students can use for research and in studying for their degrees.

Mechanisms used to ensure effective assessment in light of artificial intelligence

With regards to mechanisms to ensure effective assessment in light of artificial intelligence, the study has four mechanisms. The use of in-class tests for coursework is one of the mechanisms used by state universities to ensure effective teaching. According to R4 "The purpose of assignments is to assess students, and this is frustrated by the use of chatbots by students, I am no longer giving my students assignments I give them more in-class tests." This finding deviates from Xiao & Yi (2020) who found that students are still being given assignments in China in light of artificial intelligence. The other mechanism established in the study is the use of class presentations. State university lecturers are replacing assignments with presentations. This was stated by R10 who said "I have begun to phase out assignments and I give my students presentations to do.....there is no way they are going to subcontract a presentation." This finding also deviates from Blikstain & Worsley (2016) that assignments are the most preferred assessment activity. The other mechanism established in the study is reducing the coursework percentage of assignments. The study found that lecturers in state universities are reducing coursework percentage contribution of assignments to ensure effective teaching in universities. For example, R3 said, "For my coursework, I give students two assignments, one in-class test, and a face-to-face presentation.....the assignments contribute only 5% and the other two contribute 25%.....this is because I no longer trust

whether it is the student who did the assignment or it is AI or ML." This again deviates from Chen et al (2020) who found that assignments still contribute more to coursework. The other mechanism established is viva voce. Lecturers in state universities are using viva voce for students who have submitted their research projects. Viva voce is an oral examination for students to demonstrate that they are the ones who did the research or they used artificial intelligence. This finding resonates with P1, P2, P7, P8, P11 and P12. This converges with Udupa (2022) who posits that viva voce is frequently used to assess students who have submitted their research.

CONCLUSIONS AND RECOMMENDATIONS

The study concludes that young lecturers and lecturers in computer sciences are more knowledgeable about artificial intelligence than others. The investigation also concludes that lecturers in Zimbabwe state universities have a negative perception on artificial intelligence as it results in plagiarism which is a serious offense. The research concludes that lecturers are using in class tests and presentations in place of assignments for effective assessment of students in light of artificial intelligence. The investigation concludes that lecturers have lowered the coursework contribution of assignments, and they are using viva voce for students who have submitted research in light of artificial intelligence. The study therefore recommends the following:

- Lecturers to embrace artificial intelligence because its impact on higher education is here to stay;
- Zimbabwe state universities to come up with anti-plagiarism that can detect the use of artificial intelligence in assignments;
- Use of assignments along with other face-to-face coursework activities; and
- Future studies to focus on the perceptions of university students on the use of artificial intelligence in learning.

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