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Impact of Artificial Intelligence on quality of education in higher institutions of learning, a case of IUIU Mbale and Kumi University in Eastern Uganda.

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ABSTRACT

This study explore the impacts of Artificial Intelligence (AI) on the quality of education in higher education institutions using Islamic Univerisy in Uganda and Kumi University as case studies. The primary aim of this study is to explore the milestones of AI since inception and increase understanding of how the quality of education in these institutions has identified significant improvements. A descriptive research design was utilized, whereby simple random sampling was done to include respondents from both universities for their objectivity and inclusion of all populations of interest a total of fifty (50) academic staff and two hundred (200) students were included as the sample. The findings show that AI has improved knowledge acquisition and idea creation of students and lecturers significantly. Moreover, AI tools are not only have been useful in creating, editing and summarising academic texts and with citation but they also presented new challenges such as ethical violations and threats to academic integrity including forms of plagiarism as well as over-dependence on AI driven text. The findings suggest a need for policies and training around AI in academia to enhance benefits while managing risks identified in this study.

Keywords: Artificial intelligence, higher education, influence, quality and education.

1.0 Introduction

As the Fourth Industrial Revolution is upon us, one can no longer deny the impact of technology on our daily life, education included. A significant proportion of the tasks we perform today relies on the use of AI-powered tools and devices, when not connected to the Internet, they become useless. To define it, as Sangrewya (2020) puts it, AI or Artificial Intelligence refers to a machine's ability to imitate the human intelligence activities and/or processes such as learning, solving problems, and making decisions which require thinking.

To put it in a different form, definition proposed by Coursera (2022) states that AI is the capacity of being intelligent for a computer controlled robot or a computer-controlled device. The term AI is widely used to explain the highly challenging objective of creating machines with the capabilities associated with human beings like logical reasoning, interpreting symbols, generalization, and experience-based learning. With the invention of digital computers in the 1940s, they have been able to perform increasingly complex tasks like mathematical theorem proving and expert level chess performance.

As noted by Tiera and Wa (2021), the quality of education in the global north, particularly the USA, seems to improve when administrative tasks are automated via AI tools, enabling personalized attention. Professional development is not optional for UK lecturers (Zou, 2023). Their stance is that students attending AI universities need to be trained technically and be imbued with ethical responsibilities since all these factors greatly influence the standard of education offered.

French universities have also received additional aid from government-sponsored digital education programs aimed at enhancing teaching and learning, which helped them integrate AI tools at all levels successfully (UNESCO Report, 2022). However Qian et al. (2021) maintain that instructors' digital competency is one of the basic determining factors for the successful implementation of AI. When harnessed the right way, such resources positively enhance the students' learning experience and the overall quality of education offered.

Across Africa, AI is being adopted at an astounding rate in higher education. In Egypt, advanced engineering and data science research is now possible at university level because of AI. (Ali and Ibrahim 2022). The use of AI in South African universities has enhanced the quality of research done at the universities through interdisciplinary collaboration and AI-driven data decision making (Ngwane & Mahlangu, 2020).

Some of the most notable drawbacks of these advantages is the lack of training among researchers that prevents the full use of these technologies. Anane (2021) reports that AI-powered tools have improved the speed and quality of research in the major universities of Ghana, especially in education and health sciences. Despite the inadequate funding and expertise available for wider applications of AI-powered systems in Zimbabwe, Moyo and Chisango (2020) noted that these systems have greatly enhanced student engagement particularly in the science and technology subjects.

Other regions have not been left out as there has been remarkable progress towards the use of AI in education in the eastern parts of Africa. Countries like Kenya and Tanzania have come up with creative strategies to solve educational challenges. Through e-learning platforms, AI tools have enhanced

the learning experience and participation of students in Tanzania. With the use of these AI tools in monitoring students, there has been an improvement in the quality of teaching (Mambile & Mwogosi, 2024). In the same manner, Shikokoti and Reuben (2024) contend that AI technology impacts the education in higher learning institutions in Kenya.

As per the report of Namuleme (2022), the use of artificial intelligence in student learning aids and exploration management systems has yielded positive educational outcomes in Uganda. These systems have greatly improved the conditions for learning as well as the pace of administrative processes. Obstacles, however, like poor infrastructure and the need for more comprehensive training for staff do limit adoption and utilization.

AI's capability of transforming higher education is something one cannot overestimate. Rola et al (2019) emphasized the numerous sectors, which include education that AI is profoundly transforming. Martine and Spencer (2021) affirm that the advent of artificial intelligence (AI) drastically changes the services offered in universities by providing unprecedented opportunities to enhance learning, automate administrative processes, and stimulate creativity. Some researchers are of the opinion that many institutions today extensively apply AI in teaching and learning processes, which is true according to Taipa (2022). Tools of Natural Language Processing enable machines to understand and articulate human language, while Intelligent Tutoring Systems provide students with flexible learning that is tailored to their individual needs. These developments have also resulted in the formulation of AI powered chatbots that respond to questions from students, provide instant feedback and moderate discussions in the online forums, making it easier to implement learning for students and instructors.

As AI continues to develop, it displays vast potential for use in higher education institutions, especially in Africa and Uganda. Even though some universities have already accomplished almost human-level performance in some academic tasks, to scale AI there is a need to address infrastructural gaps and ensure that staff receive the necessary training. Despite these challenges, the opportunities that AI provides for improving academic quality, administrative efficiencies, and personalized learning by its very nature are becoming clearer.

2.0 Problem statement

Global integration of AI in education, has significantly disrupted teaching, learning, research and the issues of managing institutions. Knowing the importance of digital transformation in education, Uganda's government and the Ministry of Education, have initiated policy frameworks to support social media integration, ICT integration, and digital literacy. Although AI holds significant potential to improve the quality of education, and students' experiences, AI adoption within higher education institutions in the eastern Uganda is extremely limited, for instance, eastern Uganda higher education institutions such as Management IUIU Mbale and Kumi university have not wholly embraced and integrated AI within their teaching, learning and assessment practices (Mukhaye & Samilu, 2025). Furthermore, the role of artificial intelligence in university research and course design is very limited which has restricted the opportunity of Universities to reap the value of AI to enhance the quality of the research and academic productivity. The contrast between the potential of AI and the actual use of AI indicates a need to understand AI in these institutions.

2.1 Objective of the study

The effect of Artificial Intelligence on the quality of education in Universities in Eastern Uganda

2.2 Research Question

What are some of the effects of Artificial Intelligence on the quality of education in Universities in Eastern Uganda?

3.0 Literature review

There are a variety of academic applications within universities that can benefit from the implementation of artificial intelligence. For example use of chatbots in admissions process can now be customized to the preferences of each unique student. Chatbots can also enhance student services by providing tailored assistance with course selection, financial aid, and counselling Yet (2022). Chatbots provide educational settings with vital instructional support by providing interactive study sessions, tailored feedback, and purposeful research incorporating data collection and analysis. Chatbots enhance student life by providing help with event planning and social aspects of being a university student. Moreover, they use artificial intelligence to provide individualized advice and assistance uniquely adapted to each individual student to improve student retention (Ruabula, 2024).

Academic operations in colleges and universities can be improved using artificial intelligence. Among other duties, improved course design and content development allow facilitators and lecturers to intentionally save time for other important things. AI-enhanced platforms, is the ability to quickly create a number of educational materials and activities; its use of AI technology (algorithms), enables educators to optimize both preparation and instruction. AI tools could also play a role when controlling for the rapidly increasing issue of plagiarism in higher education. They accomplish this by implementing the use of sophisticated detection technologies to ensure academic integrity. Integrating these intelligent systems will enable Universities to provide an increasingly diverse and effective learning platform and experience to enhance teaching and learning Semeda (2021).

In classrooms, automated chatbots contribute to students' digital literacy by facilitating self-directed learning and improving their digital-tool competency. This has positively impacted their ability to locate and learn new technologies on the Internet. Nevertheless, this change creates challenges associated with ensuring the reliability and consistency of quality assurance in education. Steps to address academic integrity issues have been developed in light of the advent of artificial intelligence. Meckler (2022) points out that, in order to enhance monitoring, it would be prudent to require students to produce handwritten work in classes. In addressing the importance of teaching students to assess the reliability of the information produced and additionally to employ digital tools, Javie (2021) notes the importance of students understanding the quality of their academic work.

The use of AI chatbots in the classroom has greatly improved students' digital literacy and prepared them for a changing workforce. AI allows educators to foster the development of curriculum while also creating interactive learning environments by personalizing instruction, automating tasks, and

improving assessment. AI is transforming education by enabling personalized learning environments, active learning, and managing cognitive load. The development of interactive problem-solving scenarios supported by intelligent tutoring systems is supported by constructivist theory, while socio-cultural theory encourages advancements in social interaction and collaborative learning. Cognitive learning theories promote an AI ability to respond to different learning preferences and decrease cognitive overload.

Fadeli (2019) examined AI-computer systems, like adaptive learning systems, and found that these systems improve student engagement by offering personalized paths to learning that allow educators to monitor students' progress and adapt difficulty to the student's performance. This has subsequently created a student's process of learning that is far more effective, and it has been evidenced by improved learning outcomes in higher education context. Other researchers have observed that in addition to allowing researchers not to waste time on menial tasks, reviewing procedures and allowing researchers to analyze large data set and create data audit trails, the larger quantity, quality, and thereby increasing reliability of researcher output. Researcher ability to represent human ability and skill accuracy is enabled through these data processing and data presenting spatial features.

According to Chen (2021), AI grading systems establish with it a release from the commitment of time that a teacher would have spent on marking. Indeed, AI systems allow teachers to be more engaged in their pedagogic responsibilities, and thus, provide more immediate feedback to enrich students' learning experience. The impact of AI use on the quality of education offered at universities was assessed by Hewett (2022). Their findings indicated AI systems can provide value to decision-making in institutions to effect maximal faculty effectiveness, student performance, and institutional resource stipulation. AI use represents an increased capacity for institutions of higher learning to offer data-driven responses that consider multiple aspects of education quality.

A study on the impact of AI on the quality of academic research conducted in European universities, using a phenomenologically-informed framework of analysis, revealed that AI use aids in identifying research gaps which improve quality and impact of research. AI-assisted tools such as intelligent data analysis software and automated citation management software, improve research design and research outcomes (Liu, 2023).

According to George and Ives (2024), Universities that adopt and deploy AI technologies, experience academic quality improvements, specifically higher publication rates and improved collaborations across disciplines. AI-driven learning analytics facilitate enabling student performance in real-time and gaining understanding into students' learning behaviors to forge personalized feedback and even modification to curricula, thereby enhancing educational outcomes for university students. Furthermore, Rani & Ali (2024) explored how AI tools impact educational quality by enhancing educators' agency for research exploring a direct relationship between AI use in education and implications for researcher practice creating better outcomes for university students.

4.0 Methodology

The research design was a descriptive survey because the descriptive survey allows the researcher to properly describe the qualities of a person or group (Okoth, 2024). The descriptive survey focuses on a relationship that exist, an attitude that people have, or an ongoing process. The sample included 50 staff members and 200 students. The staff members were selected using purposive sampling where only staff that had used AI were contacted, (Mugenda & Mugenda, 2019)

Simple random sampling technique was used to select the students which enabled the researchers to have no bias in finding a representative sample of the population. Therefore, students had equal opportunities to participate in the research.

Table 1 Sample size

Staff	50
Students	200
Total	250

5.0 Analysis

This study investigates the effects artificial intelligence has on the quality of education in higher education institutions, examines the benefits and challenges of implementing artificial intelligence in teaching and learning and examines the ethical implications of its use. This study conducts a case study using IUIU and Kumi universities located in the eastern region of Uganda. Student course coordinators fostered the focus group. They were grouped by faculty. One staff member has representative of the student as one of the participants in the group in order to be transparent in the response of students. The information relating to the ethical application of Artificial Intelligence in education was derived from these discussions, as well as from published papers and documents. These conversation documents were examined through a thematic analysis (Chat-Bot/LLC, 2017) and combined into the overall research results from the focus group discussions and published papers.

6.0 Findings

It is evident that artificial intelligence affects many educational practice areas in educational/learning endeavors. Those engaged in higher education are influenced by Artificial Intelligence. Evidence suggests that Chatbots are a useful teaching tool for entrepreneurship education programs in higher education, and improve student learning, and student satisfaction. Technology from Google Meet enables the generation of new information and new knowledge. The instructional materials available on Google Meet Classroom significantly enhance students' skills, abilities, discipline, and self-directed learning.

Besides serving as a tool to create, edit, and summarize texts, artificial intelligence is perfect for improving data generation, idea development, and information retrieval. It enables access to multi-disciplinary knowledge, citation assistance, and methodological advice: all of which enrich students' educational experiences.

The results suggest that Uganda can leverage grants, partnerships, and open-source solutions to work around financial limits and implement AI in a phased manner. The effective use of AI and protection of data privacy requires the backing of the government as well as education, awareness, and planning.

The results suggest that biases in AI algorithms need to be dealt with in the name of justice as well as mitigating the ethical blowback of the rapid growth of AI. They recommend using AI governance frameworks, a guide to making AI-based decisions, training/skill development, dialogue with stakeholders, and negotiations between ethics and innovation in order to ensure responsible AI development.

The study's findings suggest that a lack of transparency could lead to ethical breaches, and that the clandestine use of AI by staff and students was viewed as a concern. Given AI provides "fast solutions" vs facilitating a deep understanding of concepts, it is possible that it could be detrimental to education. Moreover, to ignore the use of AI in students' academic work, infringes academic integrity.

At IUIU and Kumi universities, students and faculty alike are advocating not only for the addition of artificial intelligence (AI) to computer skills course documents, but even more training sessions on the limitations and appropriate use of AI. If students can provide good prompts to AI, they will be able to retrieve better outputs. Although practical assignments that require practical work do not replace traditional ways of teaching and learning, they serve as a springboard for the use of AI as an adjunct.

7.0 Conclusion

AI undoubtedly has an influence on Ugandan University students, but not all students share equally in its advantages; students from less fortunate backgrounds or living in rural environments find it hard to keep up with their studies because they have less access to technology. The ethical landscape of AI also has implications for how machines might influence and even potentially overly influence education, since students must embrace AI while acknowledging its limitations. To further ensure that no one is left behind in this era of digital revolution, Ugandan universities need to continue to evolve. The quality of higher education is underpinned by artificial intelligence adoption, instructor readiness and the learning milieu that arises from AI research. All things considered, the results demonstrate that the use of AI in higher education (in universities in eastern Uganda) serves to improve the quality of teaching. For higher education to achieve better learning outcomes, it is important that they continue to promote AI technologies and training, while being cognizant of factors like instructor readiness and research that incorporates AI.

8.0 Recommendation

The Universities in Eastern Uganda must prioritise continuous professional development programs for staff in order to build their confidence around AI technologies. The content of these programs should focus on not only the mechanical working of AI tools, but also the real-world application of these tools whilst doing research and teaching.

The Universities in Eastern Uganda should invest in AI infrastructure such as AI capable computational tools, software, and research laboratories, so that researchers can explore how to use AI across fields and develop research infrastructure that improves quality of education through innovative and contemporary research outputs.

Policies that define how these tools should be used, while adhering to the ethical standards which are required, must be considered carefully. And although significant strides have been taken using AI in improving educational tasks (such as administrative tasks like maintaining records and summarizing current research), not much has established specific solutions for the particular needs of educators (and especially educational assessment of whether intended learning outcomes have been achieved by students.

For the University to effectively endorse the adoption of AI technologies, it must also make the relevant capital investment, such as smart classrooms, AI-based learning management systems and AI administrative tools that both improves education and makes learning more fun and efficient.

There must be guarantee that AI is ethically embedded into education while considering problems related to bias, privacy, and inclusiveness attributes. And for effectively adopting AI in a Ugandan education context this will mean providing equitable access to AI technology and developing the human resources.

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