Original Article

Consequences of Artificial Intelligence on Teaching and Learning in Higher Education in Kenya: Literature Review

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ABSTRACT

This article investigates the global impact of Artificial Intelligence (AI) on higher education, focusing on Kenya. Examining published studies, the prevalence of AI in higher education was found to be highest in Asia (41%), compared to 1% in South America and 2% in Africa. A 2023 global student survey revealed that Generative AI was most popular in Kenya, with a usage rate of 63%. Moreover, a study among students aware of AI content detectors in their institutions indicated a significant reduction in the use of AI-generated content, affirming the deterrent effect of such detectors. The future of higher education is poised for a revolution with AI, particularly in individualized learning. Algorithms will assess academic scores, passions, and preferred learning strategies to tailor personalized education paths, adapting and evolving with the learner. AI technologies have enhanced inclusivity in education, benefiting learners with various impairments. Despite the transformative potential, challenges emerge, including the potential impact on careers requiring specific skills and ethical concerns. The absence of protocols and policies addressing ethical matters in AI learning, such as information accuracy, control, and learner privacy, underscores the need for ethical frameworks. Notably, the article underlines that AI cannot replace human teachers, who bring unique qualities like critical thinking, creativity, and emotional understanding to the educational process. The review shows minimal studies have been conducted on AI in Kenya's higher Education. The article recommends that institutions of higher learning should employ AI detectors to mitigate cheating.

INTRODUCTION

According to Schiller International University (2023) and Eaton Business School (2023), artificial intelligence (AI) is the capability of gadgets and computer systems to carry out activities that need human cognition. They include voice awareness, natural language ordering, deliberating and machine understanding.AI also uses complicated algorithms and arithmetical models to interpret huge bulks of data and elicit patterns, empowering machines to understand and upgrade with time. Artificial Intelligence (AI) is an umbrella term defining the creation of computer machines that can carry out difficult activities that need human like cognition.

According to Popenici and Kerr (2017); and Eaton Business School (2023), the earliest influential definition of AI was made by John McCarthy in 1956 that stated that to prove there is presence of artificial intelligence a machine should be capable of learning or should have aspects of cognition that it can imitate.

According to Wafula (2023); and Akello (2022), AI has been upgrading rapidly in recent times due to the accessibility of huge quantities of data, strong computing resources and Algorithms advancements. It can change several areas of society like education which is both a vital driver of socioeconomic improvement and a human right.

According to Schiller International University (2023); and Eaton Business School (2023), AI may appear perplexing but it is vital to know that its main intention is to ease and improve our lives. It can be a powerful instrument in the education sector by offering customized, effective and interactive learning opportunities. It is vital to understand that AI is not meant to oust tutors but to complement and improve their capabilities. It automates routine activities and provides real-time data assessment thus ensuring tutors concentrate on offering advice and emotional aid and promoting creativity and critical thinking in learners.

According to Popenici and Kerr (2017); and Eaton Business School, the advancement of higher education is associated with the development of novel technologies and the computing capabilities of new intelligent machines. This will open up novel chances and challenges. The future of higher education is intrinsically linked with developments in new technologies and computing capacities of the new intelligent machines. In this domain, progress in artificial intelligence presents fresh opportunities and obstacles for the educational landscape in higher education. It holds the potential to significantly alter the governance and internal structure of higher education institutions.

According to Farrelly and Baker (2023); and Marr (2021), generative AI is a group of artificial intelligence systems created to form data like text, pictures, videotapes, tunes, and computer code that are associated with human made content. These systems utilise gadget learning methods like deep learning to recognise and imitate patterns, designs and structures found in the input information they are skilled about. The article will therefore explore the prevalence of Artificial Intelligence (AI) use in higher education, types of Artificial intelligence, the impact of Artificial intelligence in higher education and the impact of Artificial intelligence in special needs education among others.

Types of Artificial Intelligence (AI)

According to Benz (2023); and Biswal (2023), there are various types of Artificial intelligence (AI) including artificial narrow intelligence (ANI) which defines AI instruments that are created to perform particular actions or instructions.ANI technologies are made to work and surpass one's intelligence ability and cannot individually attain skills beyond its design. They usually use gadget

learning and neuronal network algorithms to finish particular tasks. Examples of ANI include picture recognition software, autonomous vehicle and AI virtual aides like Siri. Artificial general intelligence (AGI)is a AI can think and do various things. AGI enables one create gadgets that are able to carry out multifaceted activities and act like lifelike aides to people daily. Artificial superintelligence is hypothesized to occur once AI can learn faster than human beings in terms of of information and ability. Another vital form of AI is reactive machines which can reply to instant requests and activities cannot retain memory or learn from the past. The limited memory type of AI can create restricted information base for itself and utilize that information to improve with time. It can be used in various applications like chatbots and automated vehicles. However, this limited memory type cannot understand ecological variations or emotional clues, nor can it have the same amount of human cognition.

According to Benz (2023); and Biswal (2023) there are various theories about advancements that can be made in AI including the theory of mind whereby AI will be able to sense and understand the emotions of others. The theory of mind can bring positive changes to the technological world, but it also has disadvantages. It may take a lot of time for AI gadgets to comprehend emotional cues and thus could lead to large mistakes during the educating stage. Gadgets may work well more than human beings up to ninety percent of the time because they cannot practice common sense. Some individuals have fears that if such a technology is built, it could lead to automation of some careers. There is a level of advancement that can be made in AI that is above the theory of mind that is known as AI level of singularity. It entails AI's ability to recognize feelings of others and themselves; hence will be beyond human control.

PREVALENCE OF ARTIFICIAL INTELLIGENCE (AI) USE IN HIGHER EDUCATION

The prevalence rate of AI use in education may vary depending on the region, institution, and specific applications. The global Artificial Intelligence (AI) in Education market was valued at US$ 1232.1 million in 2023 and is projected to reach US$ 3086.9 million by 2030 at a compound growth rate (CAGR) of 13.4% during the forecast period. According to Global Market Insights (2023), the size of the market for Artificial Intelligence (AI) in Education reached $4 billion in 2022 and is expected to grow at a compound annual growth rate (CAGR) of more than 10% from 2023 to 2032, driven by the increasing preference for personalized learning. According to Buchanan (2023); and Yamin (2023), Copy leaks an AI solutions company, conducted a study comparing nearly a million high school and college assignments submitted globally between February and March 2023. Students were aware that AI content detectors were in use by their institutions. The study's findings suggest a notable reduction in the use of AI-generated content, supporting the idea that the presence of an AI detector serves as an effective deterrent.9.7% of all papers and assignments contained AI-generated content, reflecting a 14.4% decrease. High school student papers with AI-generated content decreased by 68.9%, amounting to 5.9% of submissions. College student papers with AI-generated content decreased by 5.5%, totaling 10.4% of submissions. The study identified that the highest rates of AI-generated content were from US-based career and technical colleges, reporting a total usage of 34.03% in March 2023 which is an increase of 37.3% from February. Conversely, US-based community colleges showed the lowest rates, with a total reported usage of 2.71% in March, marking a 70.63% decrease from the data collected in February.

According to Crompton and Burke (2023); and PRISMA Statement (2023), a review of 138 studies were conducted across 31 countries, spanning six continents (excluding Antarctica). However, the distribution of studies was not uniform across continents. Asia emerged with the highest number of AI in Education (AIEd) studies in higher education, accounting for 41% of the total. Within Asia, 42 out of 58 studies were conducted in Taiwan and China. Europe followed

as the second-largest continent, contributing 30% of the studies, with representation from 15 countries, each conducting one to eight studies. North America ranked third, comprising 21% of the studies, with the USA being the primary contributor, accounting for 21 out of 29 studies in the continent. Despite being the second-largest contributor globally, the USA ranked second to China in the number of studies produced. South America accounted for only 1% of the studies, and Africa contributed 2%.

According to Manyukwe (2023); and Yonda Consulting (2023), a 2023 Global University Student Survey that was designed to explore students' perspectives on challenges in higher education, targeting respondents aged 18-21 across various countries, including Australia, Brazil, Canada, India, Indonesia, Kenya, Malaysia, Mexico, Saudi Arabia, South Africa, South Korea, Spain, Turkey, the United Kingdom, and the United States was done. The survey covered topics such as mental health, finances, skills, and artificial intelligence (AI). According to the findings, up to 40% of participating students globally reported using generative artificial intelligence (GenAI) in their academic pursuits. Notably, this practice seems more prevalent in Kenya than in other 14 countries featured in the report by the impact, research, and advocacy division of the Edtech company.

How Artificial Intelligence is Used in Higher Education

According to Puntillo (2023); and Bowman (2023), education is ever changing area that is constantly evolving.AI can be utilized in ways such as offering personalized feedback to learners, automating administrating activities and recognizing areas where learners may require more assistance. AI consistently varies and adapts to novel challenges offering limitless opportunities. There are particular ways in which AI is utilized in education including planning and creating lesson schedules using tools like Top Hat that offers tutors with accessibility to a bulk of modifiable course information that can be utilized to form interactive classes. Education Copilot is

another AI tool that can be used to create structured lesson schedules and lesson resources. ChatGPT can help in creating quality personalized units and lesson timetables that are personalized to cater to student needs and interests. AI can also be used in differentiated education as it can assist in facilitating instruction to cater to each learner's specific requirements. AI tools like Dream box, Smart Sparrow and Knewton can help analyse learner's information such as examination marks, attendance registers and behavior patterns to determine targeted materials and education tasks that fulfil each learner's requirements.AI can also be utilized in auto grading whereby it can change tutors work by automating the process, thus helping in reducing bias and time. AI grading gadgets like Gradescope helps tutors to analyze and score examinations.

According to Puntillo (2023); and Bowman (2023), AI can also be used in education to help determine students' abilities and information gaps. It can help by creating adiagnostic analysis that can recognize sections where learners may be experiencing challenges. AI tools like Edmentum's Exact Path that utilize adaptive examination to determine sections where learners have challenges and then offer individualized education paths to help them improve. Hence tutors can use this tool to follow up on learners' progress and adapt instruction as required.AI test prep gadgets are also utilized by tutors when making examinations for learners. These tools utilize innate language processing technologies to analyze learners' information and offer focused practice exercises to assist learners ameliorating their exam taking abilities. Test prep tools like Exam Soft uses information analytics to assist tutors in making focused practice exams that concentrate on sections where learners need more assistance. R test is another test prep tool that works by collecting learners' information and using it to determine the learner's scores, establishing their challenges and providing practical insights like test behaviours for standardized examinations like TOIEC and SAT. Class Point's is an AI quiz tool creator that utilizes

tutors teaching material to make exam prep queries.

According to Puntillo (2023); and Bowman (2023), AI tools like Zapier that uses machine education algorithms can also be utilized in learning institutions to perform administrative activities like learner registration and report form generation thus reducing mistakes and increasing efficiency and also assist tutors in automating their everyday tasks and in the process help in saving time while making sure that administrative work is done correctly and effectively. An AI controlled tutoring system like Squirrel AI utilizes adaptive education algorithms to offer individualized support to learners, recognize areas where they have challenges and offer focused practice exams and, in the process, help them improve while enabling them perform at their own rate and be given advice when they require it.AI operated feedback systems can analyze learners work and offer focused feedback. This system assists in removing bias while ensuring that the report is objective and built upon a laid down criteria. In comparison to getting feedback for tutors it can help reduce humiliation and in the process boost learners' self-esteem and ability to accept valuable feedback. An example of a feedback gadget is the Turnitin feedback studio that utilizes machine educating algorithms to evaluate learners' tasks and offer focused feedback on sectors like phonology, spelling and punctuation. Tutors can also offer individualized feedback to learners while assisting them to advance their writing abilities.

According to Puntillo (2023); and Bowman (2023), AI can be used to ensure universally flexible and accessible education whereby it can assist in closing the gap among various learning skills and backgrounds. It can help in offering similar education opportunities to all learners including those with auditory disabilities or those who speak several languages. Whereby AI technologies can change speech to text thus assisting learners comprehending lessons regardless of the tutor's accent or pronunciation and also be able to translate for multilingual learners. An example of an AI gadget that can improve universal accessibility to education is Braina or AI Live Captioning which is a speech recognising software that can translate lessons and conversations.AI is also being utilised to change the manner in which learners learn in this technological era.AI powered gadgets that utilise machine educating recommendation systems can offer individualized education experiences by following up their progress and adapting their activities so as to make them complex or easy. An example of an AI powered gadget that is utilised to advance digital education is the Carnegie Learning MATHia utilizes machine education algorithms to offer individualized arithmetic instruction in order to assist learners at their particular level and be given focused assistance when they require it.AI may also be utilised by tutors in their classes as their virtual smart assistant which can find answers to queries, carryout research, prepping and administrative activities. An AI tool like ChatGPT can be utilized to create lesson schedule ideas and create tasks. It is able to remember data it has been trained about while getting smarter every time thus tutors can train ChatGPT to customize search requests.

Impact of Artificial Intelligence on Higher education

According to Sharma (2023); Kezana (2023); and Tuomi et al (2018) in the current times of technological development artificial intelligence (AI) is changing all areas of our lives including in higher education. A study done on the use of AI in the classroom indicated that 67% of the participants utilised at least one AI technology including AI adaptive lesson transmission. Institutions of higher learning worldwide are incorporating AI based solutions to change the tutoring, learning and performing research. In higher education AI will revolutionalise education in terms of individualized learning whereby algorithms will evaluate information about an individual regarding their academic scores, passions and also their desired educational strategies. Hence AI will have the ability to comprehend learner's strengths and challenges and form an individualised education path. It will

also be able to adjust and develop with the learner as it is able to continuously collect information while changing its comprehension of the learner's abilities, challenges and their education preferences as they learn. AI use in higher education will help in the creation of knowledgeable teaching systems that can be accessed at any time and place so as to direct learners in their education process. These systems will become digital mentors that will help in offering real time individualised feedback and explanations as they will be capable of breaking down difficult theories into understandable concepts hence enhancing better comprehension.

According to Sharma (2023); Kezana (2023); Slimi (2023); and Mahana et al., (2012), AI technologies including natural language processing (NLP) and robotic process automation (RPA) are changing how administration activities in higher education will be done. The NLP is a virtual assistant that is being utilised in institutions of higher learning to help in learners' admissions, unit registration and communication. In higher education RPA technology can be utilised to change manual activities like information recording, transcript assessments and monetary aid facilitation into automated services so as to reduce mistakes while increasing productivity of the administrators as they have adequate time to offer learners support and strategic endeavours.AI is also revolutionizing electronic learning in higher learning via its prediction analysing gadgets like predictive analytics which intends to recognise patterns and make forecasts about learners 'academic scores, participation and general success.AI algorithms can evaluate large amounts of information and hence can offer important insights to facilitate visionary interventions and advance learners outcomes. It can also evaluate real time information like learner's interaction with educating management systems, attendance register and attendance in online interactions. Hence it is able to recognise warning indicators enabling tutors to ameliorate in good time and provide focused support to keep learners on the right path.AI advanced gadgets can also be

utilised in research studies and analysing information. This will help in opening up novel opportunities for innovating, discovering and strategic arrangement in various academic areas.

According to Slimi (2023); Taneri, (2020); Ma and Siau (2018); and Mellul, (2018), AI can affect higher learning in a variety of manners but mostly in two vital sections including admissions and syllabus. It will hasten the reliability and accuracy of syllabus and admissions while also helping to popularize of social sciences and liberal arts as these disciplines are less associated to the AI discipline like accounts and finance. According to Chin (2018); and Yousif (2011), AI is supposed to radically change the process of learning, teaching, working and decision making. The education process is currently more participatory as electronic learning offers the student with artistic and pedagogic characteristics while incorporating and dealing with various kinds of information that caters efficiently to the learners' requirements.AI is capable of catering on language and scholarly integrity matters, connotation, pragmatic and intelligence levels but human mind intercession is required.

According to Wang and Siau (2017); Brad Rose Consulting, (2019); Frey and Osborne (2013); Dizikes, (2020); and Oblinger, (2018), AI will affect future careers that need particular skills whereby it can replace disciplines that usually have repetitive tasks and structures that can be automated unlike in unstructured studies that need complex intelligence intervention. The amount of careers that will be affected by computerisation include evolution of robotics and machine education that caters for about forty-seven percent of employed Americans. A study done at MIT university concluded that one robot could replace about six workers.AI is a highway to future jobs as human beings may be unable to go through all resumes but a customized algorithm can be utilised to shortlist candidates. Computer directed interviews are also used to shortlist candidates whereby AI evaluates facial expressions and phonetic patterns so as to choose a suitable candidate.AI does not have wholesome human

intelligence capability or essential skills like compassion, correspondence, partnership, innovation, analysis, problem solving and administration. Our world is currently becoming revolutionary and AI has reclaimed the world by adding original languages and information by allowing Siri, Netflix, and Facebook among others into everyday life.

According to Holmes (2018); and Drabwell, (2018), the effect of AI on education has led to the issue of embracing ethics since there is a moral gap in terms of lack of protocols, policies, rules or studies that emphasize particular ethical matters raised by AI in learning including accuracy of information, control of information and learner's privacy. In order to mitigate ethical matters, the Open University in the United Kingdom carried out workshops involving scientists globally whereby they found out it was vital to manage systematic biases in education machine models and build impassable algorithm black boxes and ethics associated units. Hence, they started utilising chatbots that were formed to simulate conversations with users by using short messages.

According to Chin (2018); and Tchaikovsky (2018), AI simulates humans in a variety of activities like language interpretation, medical identification and discernment by utilising strong computers, swift internet connections, algorithms and broad real time information. AI does fixed and domain associated activities with matchless learning speed, large scale information, brilliant effectiveness and limitless computing capability. Unlike human beings that gain knowledge resiliently, pose and manage matters inventively, think analytically and radically adapt. It is vital to form barriers to help deter AI from transgressing the human mind as AI was created to assist humans and not replace them.

According to Kezana (2023); and Hanawald (2023), there are various limitations of AI use in institutions of higher learning whereby there are issues on information safety in particular when gathering and evaluating learners' information. The is also the issue of AI being able to take over careers in academia like administration tasks and

some tutoring jobs thus can lead to career loss and hence one will need retraining. AI technologies can also acquire biases that may be available in their instructional information which can lead to discriminatory treatment or opinions thus it is important to reduce bias in educational AI technologies. AI may also objectify learning by limiting the human aspect like one on one correspondence with lecturers. Errors can occur when depending purely on AI to study as it is not reliable and precise unlike peer-analysed and printed sources. Thus it is important to supplement AI with high quality printed information. In order to acquire a variety of high-quality information an important educational platform like Al Manhal can be used in colleges and learning institutions to provide a large collection of Arabic academic information from books and journals particularly to assist researchers in Arabic speaking areas.

According to Okonkwo and Ade-Ibijola (2023); Chatterjee and Bhattacharjee (2020), in the contemporary African society, the prevalence of Artificial Intelligence (AI) is steadily increasing, aiming to encompass various aspects of human activity. Despite this trend, the adoption and utilization of these cutting-edge technologies in the African context remain relatively low due to several emerging challenges. These challenges, if unaddressed, could significantly impact African economic development. The authors delved into the hurdles hindering the widespread adoption of AI technologies in Africa, touching upon issues such as skills acquisition, the absence of a structured data ecosystem, ethical considerations, government policies, inadequate infrastructure and network connectivity, uncertainties, and user attitudes.

According to Fomunyam (2020); and Odora Hoppers (2013), the African higher education sector must swiftly embrace the increasing trend, establishing fresh frameworks that enable students to cultivate the skills essential for success in the digital era. Keeping pace with global advancements involves more than just adopting new innovations to support learning. Africa must

reconsider the content of its curriculum, prioritizing indigenous knowledge and techniques that can be enhanced through technology and remain pertinent to life in Africa. Additionally, the language of instruction in higher education institutions should evolve to inclusively involve the entire African population, eliminating the constraint of relying solely on foreign languages for communication. The curriculum of these institutions needs restructuring to integrate training and the development of problem-solving skills through computerized technologies and methods. Embracing a new curriculum centered around the progress of artificial intelligence and machine learning is crucial, to fostering digital awareness and literacy among African scholars.

Impact of Artificial Intelligence (AI) on Special Needs

According to Han et al (2023); Garg and Sharma (2020), and Kim et al (2010), AI technologies have played a vital role in the education sector and made it more all- inclusive and reachable to learners with visual, auditory, motor and cognitive impairments. The consolidation of AI and neuronal systems can assist learners with visual disabilities to promote visual sensorial activities by gathering, processing and evaluating personal educational information in order to offer a group of education programs customized for a given learner. While connecting brain computer interface technologies to recreate neuronal signals in the occipital lobe to assist learners with visual disabilities learn.

According to Allebee (2017); Roach (2018); and McNeil (2018), learners with communication impairments utilise the brain computer interface gadgets to gather electroencephalogram signals from individual learners for evaluation in order to define if the learner is concentrating or having normal mood swings. Tutors can get up to date data about their attention, interest areas, intelligence level and changes in their emotions and adapt teaching approaches guided by the data gathered to offer focused up to date instruction in order to ameliorate classroom learning outcomes. Learners with specific language disabilities are

screened and diagnosed using a fuzzy cognitive map method. It is able to recognise attention levels in screening exercises by consolidating performance information with user generated information from socialisations and able to produce satisfying results on clinical studies. For students facing physical challenges due to disabilities, the integration of artificial intelligence and rehabilitation robots can provide support for both movement and learning. An illustrative example is a functional surrogate rehabilitation robot which is connected to a Brain-Computer Interface (BCI). This robot assists individuals in performing desired actions by analysing their Electroencephalogram (EEG) signals. Consequently, individuals with physical impairments can independently execute learning movements, fostering increased interest and autonomy in the learning process. Additionally, the use of intelligent speech recognition in education facilitates communication for children with physical disabilities. They can interact with robots or smart educational systems using technologies like speech recognition and natural language understanding. These systems employ natural language to respond to queries, aid students in conducting searches, and perform other tasks, thereby enhancing the overall teaching experience.

According to Drigas and Ioannidou (2012); Itsquiz (2016); and Prentzas. (2013), several computer-based tools have been developed as educational technologies to assist children with dyslexia. One such tool is the "Phonological Awareness Educational Software" (PHAES), designed to enhance readers' phonological awareness. These software programs are user-friendly, featuring simple navigation and comprehensible graphics to prevent cognitive overload. To support children with Autism Spectrum Disorder (ASD), robotic assistance has been introduced to help them learn social skills and understand emotions. For instance, a British Primary school utilized Humanoid Robots for children with ASD, aiming to enhance their comprehension of human emotional states. A game named LIFEisGAME has been created to

aid children with ASD in understanding facial expressions. Another tool, the Smart Tutoring Model, serves as an e-learning tool tailored for children with learning disabilities, offering a simplified and improved learning experience.

According to Allebee (2017); Roach (2018); and McNeill (2018), Microsoft offers an AI tool called Equadex specifically designed for children with learning disabilities, particularly those with Autism. Equadex provides a mobile-friendly environment that facilitates easy communication and understanding through visual presentations (Equadex, Microsoft Cognitive Services, 2017). AI is also employed in the diagnostic process, with a web-based system based on deep learning assessing children with autism and learning disabilities, generating reports for medical officers and parents. According to Zeng (2017); Roach (2018); McNeill (2018), for individuals with hearing impairment Microsoft has introduced the Microsoft Translator as an AI assistive device for learners who are deaf. This device is worn as a headset by the speaker and it translates speech signals into captions visible to learners with hearing impairment. The translator supports translation in 60 different languages, providing deaf learners with enhanced understanding. The Over-the-Counter (OTC) Hearing Aid utilizes deep learning and AI technologies, including virtual and augmented reality, to improve performance even for those with normal hearing. This intelligent hearing aid offers personalized and interactive experiences such as sound scene analysis, sound protection, warnings, and real-time language translation.

Impact of Artificial Intelligence on Education in Kenya

According to Akello (2022); and Wafula (2023), AI has been utilised in education to offer learners with individualised learning materials. In Kenya, artificial intelligence (AI) finds various applications in the education sector. One such example is Angaza Elimu, an eLearning platform funded by UNICEF. This platform relies on AI to offer students a personalized learning experience tailored to their individual needs. Through Angaza Elimu, students gain access to learning materials and assignments designed to suit their unique learning styles, facilitating performance tracking. Moreover, the platform allows tutors to assess students' capabilities and deliver customized learning resources. Another noteworthy application is M-Shule, a short message service-based platform that facilitates organizations in delivering learning, evaluation, and data tools within the education sector.

According to Yusuf (2023); and Marangu (2023), in the Kenyan education system the emergence of Artificial Intelligence tools such as ChatGPT is posing challenges. Some academic assistance providers' express concerns that AI tools are impacting their business, as these technologies offer students alternative means of support. Concurrently, professors are apprehensive about the potential for students to exploit these tools, viewing them as new avenues for academic dishonesty and cheating. Artificial intelligence (AI) is becoming increasingly integral to education, serving as a facilitator of learning. Although its implementation is still a goal for many educational institutions, the imperative to incorporate it is undeniable. This necessitates proactive measures, including the retraining of human resources within the education system and the establishment of essential technical infrastructure. The 2023 Guidance for Generative AI in Education and Research Report, issued by the United Nations Educational, Scientific and Cultural Organisation (UNESCO), emphasizes AI's extensive capabilities in information processing and knowledge production. These capabilities have significant education implications for education, as AI replicates the higher-order thinking essential to human learning. In Kenya, minimal research studies have been conducted on artificial intelligence in higher education.

Regulation of Artificial Intelligence

According to Slimi and Carballido (2023); and Carnegie Mellon University (2023), transparency and explainability are vital elements in the responsible development of AI. This requirement

encompasses transparency in data, system, and business models relevant to an AI system and is closely tied to explicability. Thorough documentation of AI data collection, labelling, and algorithms is crucial for traceability and transparency, aiding in the identification of incorrect decisions and the prevention of future errors. In situations where AI decisions impact human life, it is imperative for them to be explainable and communicated promptly at a level comprehensible to stakeholders. The AI ethics policy of the European Commission addresses guidelines for addressing the potential displacement of human labour caused by AI systems. This policy underscores the importance of responsible AI development and deployment, emphasizing the consideration of potential effects on employment. It also stresses the necessity of retraining programs and social safety nets for workers who may be impacted by automation.

According to Felix, (2020); Pavlik, (2023); Timms (2016); Schiff, (2020); Jarrahi, (2018) and Kolchenko (2018), AI has restrictions whereby it lacks perception and self-consciousness and offers automatic answers without passion. Morals and customs cannot be appraised and converted to algorithms hence humans still outdo AI in terms of communal and emotional features thus human tutors still play a vital capacity. Adaptable education programs are education tools utilised by learners to offer them more training but they can easily be altered by corruption and minimal learner's information. These programs are not knowledgeable on the various pedagogical aspects thus are not able to handle learners who usually avoid learning or those that do not have a positive learning outlook. The learner models formed by the adaptive programs may too simple and are not realistic.

According to Ibrahim (2023); and Lee (2023), the introduction of ChatGPT has ushered in a new era of AI-assisted plagiarism, causing disruptions in traditional assessment methods, particularly in English as a Second Language (ESL)composition. Educators are grappling with the challenge of controlling AI-assisted plagiarism, especially

when conventional detection methods prove ineffective against AI-generated texts. One proposed solution involves the use of fine-tuned AI classifiers like RoBERTa to identify machine-generated content, though the reliability of this approach remains uncertain. To address the issue of AI-assisted plagiarism in ESL contexts, this cross-disciplinary descriptive study explored the potential of two RoBERTa-based classifiers in managing AI-generated content. The analysis of a dataset containing two hundred forty essays, both human-written and ChatGPT-generated, revealed that while both platforms could identify AI-generated texts, their detection accuracy varied inconsistently across the dataset.

According to Akello (2022), DiploFoundation (2021), in 2018 the Kenyan government established the Blockchain and Artificial Intelligence Taskforce to offer guidance on the optimal utilization of AI. Key suggestions put forth by the Taskforce encompassed the creation of policies that advocate for AI promotion and human rights protection, fostering an AI ecosystem conducive to its development, and conducting assessments of potential AI risks along with implementing corresponding mitigation measures. The Kenyan government initiated its exploration of AI potential by establishing the Distributed Ledgers Technology and AI Task Force. This task force was tasked with creating a roadmap to fully leverage these technologies. The 2019 report published by the task force emphasized that AI and other frontier technologies could enhance national competitiveness, spur innovation, and position Kenya as a regional and international ICT leader. To achieve this vision, the report recommended strategic investments in infrastructure and skills development, as well as the formulation of effective regulations balancing citizen protection and private sector innovation. The Digital Master Plan for 2022–2032 extensively incorporates references to AI. Recognizing the growing significance of AI technologies in the next five to ten years, the plan sets an objective to develop an AI master plan. This master plan aims to encourage research, development, and

deployment of AI solutions to address local challenges while exporting these capabilities to other countries. Additionally, the plan envisions establishing robust international partnerships with leading R&D (Research and development) entities in emerging technologies, facilitating technology transfers, and attracting foreign direct investments. The overarching goal is to ensure that Kenya remains at the forefront of AI development and application.

CONCLUSION

In summary, AI is reshaping education through various avenues, encompassing personalized learning, administrative automation, and enhanced virtual learning. The ongoing evolution of AI technology opens up virtually limitless possibilities for its application in education. Integration of AI-powered tools into teaching enables educators to deliver a more efficient and effective learning experience for students. Simultaneously, this incorporation helps reduce the workload on teachers and streamline administrative tasks. AI's overarching potential of AI stands to revolutionize the methods of teaching and learning, fostering accessibility, engagement, and effectiveness in education for all. There is a need to have regulations and policies in the use of AI and educators should also be trained on AI. As a result of the challenges facing AI use in Kenya there is need to embrace AI, improve the infrastructure, ethics among others. Therefore, our institutions of higher learning need to embrace AI and put the necessary measures in order to improve the learner's learning outcomes of the learners.

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