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USE OF ARTIFICIAL INTELLIGENCE IN THE IMPLEMENTATION OF PUBLIC HIGHER EDUCATIONAL ACADEMIC PROGRAMS IN KENYA: CHALLENGES AND OPPORTUNITIES

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Abstract

Artificial Intelligence (AI) is a current technological approach towards implementation of programs including education in an efficient practice. However, in Kenyan higher educational institutions it appears scanty. The purpose of this study therefore is to Assess the use of AI in the implementation of public universities' academic programs in Kenya. Specifically, the study seeks to determine whether there are AI policy frameworks for the universities; to establish the extent of universities' investment in AI in regard to running their programs; to establish universities' extent of integration of AI in running their academic programs and to determine the way forward on integration of AI on university programs in Kenya.The study used survey design to collect primary data of which three Public universities were sampled, out of which 3 deputy vice chancellor academics,15 chairs of departments 5 from each of the selected universities,3 university directors of ICT and 45 undergraduate students drawn from the various faculties of the three universities selected for the study. The study will be underpinned by Technology Acceptance Model by Davis (1989). The findings of the study showed that in all the three universities surveyed there existed AI policy frameworks. However, there were minimal levels of invested and integration of AI into the mainstream university programs. The findings of the study have implications for all stakeholder engagement and sensitization in regard to the importance of investing into and integrating AI into the university programs as a way being in tandem with the current digitized, efficient, cost-effective, technologically innovative model towards globalized trends.

Keywords: *Artificial intelligence implementation higher education Kenya challenges, Opportunities*

Chapter One: Introduction

Overview of this section

This section will deal with background to the problem, statement of the problem, purpose and objectives of the study and research questions.

Background Literature

Artificial Intelligence technologies have provided a learner centered new model of implementation of educational curricula and services. However, this novel development seems to be not sufficiently embraced especially in the less developed nations. The AI technologies significance in educational delivery cannot be overlooked, given its efficiency,

guaranteeing learning anywhere, anytime and enhancing student-lecturer, student-student, lecturer-student interaction.

Artificial intelligence is a technology enhance approach to service dispensation that encompass educational to all other necessary service deemed appropriate to the modern society. This section deals with background of the study, statement of the problem, purpose of the study, objectives, study questions

Kokhan *et.al.,* (2021) on learning path of distance education in regional universities in Russia,Kygyzstan and Mongolia are cognizant of the transition from the traditional face-to-face model of learning towards online approach on the distance education that is basically at the infancy stage of development bedeviled with multiple challenges including gaps in the faculties' pedagogical orientations towards integration of online programs, gaps in ICT infrastructure for both software and hardware, with extent of ICT integration into the universities' academic programs varying from country to country on the basis of national values, policies and educational goals towards which to work.

Owidi *et.al*, (2023) on assessing the prospects and challenges of learning in Kenya's Public universities: A Case study of Masinde Muliro University of Science and Technology (MMUST) argue that the ever increasing numbers of student enrollment and the widespread inclination towards online learning model as opposed to the traditional face-to-face approach would be effectively operational on clear technological policies held dear by the corporations. Adopting a descriptive survey design, data were collected from 68 faculty staff and technical staff from the aforementioned and selected university for the study.The findings revealed that integration of technology in the modern approach inclined towards AI is at the epicenter of new higher educational dispensation, with varied levels of integration, occasioned by the available organizational policy framework on the same that would guarantee the customization of the online approach to curriculum dispensation. The results from the logistic regression analysis indicate that z=2.767 p=0. 041.That challenges of integration of technology on learning in public universities. Compounded by analysis of data for both faculty and students, fashioned in the ordered logistical regression analysis F (1,358) Z 4.699 p<.05 with one unit in the increase of challenges of learning in the public universities decrease by 101, established to be a significant change t (358) -2.168, p<.05. Most respondents indicated that online learning make learning flexible and widely accessible. That it provides learning opportunities with many options from amongst which to select and that online learning is quite cost-effective because it involves learning anywhere anytime without students incurring the costs of travelling to on campus and that through zoom approach learning through online would essentially reach all the students connected across diverse geospatial locales when compared to the traditional face-to-face approach.

Olumoneji and Ivabado (2022) on Digitization of Tertiary Education Management in Nigeria: Problems and the Way forward adopted empirical literature review .The study finding

demonstrated that there were poor implementation policy framework, gaps in funding the programs from the higher educational institutions, shortage of digital infrastructure both software and hardware and poor internet bandwidth and poor Wi Fi and or internet connectedness that bottlenecks the ICT integration into educational dispensation. That this situation is compounded by the heavy costs associated with the acquisition and operationalization of digital infrastructure. That based on the study findings it was recommended that organizational educational digitization policy framework be put into place and how to quickly guarantee their operationalization and monitoring and evaluation and adoption of ICT best practice and integration of AI as a necessity towards full scale digitization of the university programs. That energy should be supplied to ensure the running of the ICT gadgets towards online work implementation.

Tella and Onyebinama (2022) on advance technology and new approach to teaching and learning in a developing nation context: Challenges and way forward adopted a survey study design in which 5 public universities in Nigeria were purposively sampled and document analysis and literature review were also used to collect the information. The study established that the traditional mode of face-to-face content delivery is still dominantly used in the Nigerian universities. That this approach is complemented with technology tools and platforms including tablets,Google,classroom,team,Moodle,online fora , social media like Face Book,twiter handle,Whats App and X-Space amongst others.However,these technological techniques are still at the infancy stage in the Nigerian universities as both the students and faculty staff are still largely technophobia and moreover quite a number of the instructors suffer from techno-pedagogical gaps integration into academic delivery and hence the bottleneck towards technology driven educational dispensation.

Statement of the Problem

Artificial Intelligence technologies presents a new, efficient and convenient way of educational dispensation, which also draws from governments' policies like that of ICT.However, there is very little integration of AI into higher education and this bottlenecks educational dispensation based on the model. This scenario makes the current study a Use of AI on implementation of university programs in Kenya Worthwhile.

Purpose and objectives of the study

The study purposes to assess the extent of use of AI in the implementation of university programs in Kenya.The specific objectives will include: to determine the universities policy frameworks on AI technologies towards their programs; to establish extent of universities' investment on AI technologies towards operationalization of their programs and to determine the way forward toward integration of and use of AI technologies towards running of the university programs in Kenya.

Research question will be: Are there universities' AI policy framework towards educational dispensation? To what extent has universities invested in AI technologies towards

operationalization of their programs? What are the ways forward in regard to integration of AI technologies towards educational dispensation?

Methods and Materials

The study was underpinned by technology acceptance model by Davis (1989). Literature review was handy in the work. Primary data were collected through survey instruments such as questionnaires, interview guide and also document analysis and observation schedule.

Empirical work review

This section reviews relevant literature guided by the study objectives: To determine universities framework on AI towards educational dispensation; To determine extent of universities' investment on AI technologies towards educational dispensation and to determine the way forward in regard to integration of AI on educational dispensation amongst the Kenyan universities

Report by Global System for Mobile Communications Association (2023) maintain that Kenyan universities and institutions participated in AI research with agriculture being the dominant sector. That in 2023, Kenya received 1.96 billion Kenyan shillings in Artificial Intelligence venture Capital Investments. That institutions leading in AI research in Kenya in 2023 were Jimo Kenyatta University of Agriculture and Technology, University of Nairobi and the Kenya Medical Research Institute (KEMRI). Significance of AI research in realizing solutions has been underscored. For example, it assists in early detection of diseases and improve treatment plans thereby addressing healthcare concerns and quality issues.

OECD: Survey Report,2023

Institution	AI Research Publications
Jimo Kenyatta University of Agriculture and Technology (JKUAT)	
University of Nairobi (UoN)	91
Kenyatta University (KU)	51
Kenya Medical Research Institute (KEMRI)	36
Moi University (MU)	35
Dedan Kimathi University of Science and Technology	24
Stratmore University	19
International Livestock Research Institute (ILRI)	13
World Agroforestry Center	11
Egerton University	8

Ogunode and Ukozor (2023) on Curriculum Trends in higher education: The mighty role of Artificial Intelligence adopted empirical literature meta-analytic approach and delved onto the pivotal role of AI in enhancing curriculum implementation in Nigerian higher educational institutions. The study underscores the AI's multifaceted co

Contribution toward dispensation of higher educational curriculum, encompassing the traditional lecture approach, instructional resource making, students' and faculty preparedness towards AI approach to educational dispensation, script marking, assignment allocation, progress monitoring and selection of optimal teaching techniques. The study established the indispensable impact of AI on higher education and therefore the study recommends judicious deployment of AI to enhance teaching and learning as a platform toward transformative curriculum implementation process fashioned in the current trends in education within the curriculum theory and practice at lens of global scale.

Gawande *et.al*, (2020) on an empirical study on emerging trends in Artificial Intelligence and its impacts on higher education adopted literary review and appreciation and are alive to the significant role of AI in higher educational dispensation including many AI technologies like Hologram that supports ubiquitous teaming, technologies for automated evaluation and grading, Green Computing and Blended Learning techniques, that shapes the future of teaching and learning in an innovated fashion. Opportunities and challenges of AI becomes the focus of the study.

Chowdhury *et.al* (2022) on online higher education I Bangladesh during the COVID-19: Challenges and Prospects adopted a literature review in which newspaper articles, these and other relevant public were give critical analysis while delving into the topic herein. The finding showed that online learning platform in Bangladesh has not gained much popularity and is still at the infancy stage due a number of factors ranging from the existing digital divide amongst the communities, poor ICT infrastructure, lack of clear institutional ICT policy framework that guarantee a structured ICT investment Plan and goals to be attained. However, there is widespread use of mobile phones that is strength worth exploring towards the endeavor towards digitized education. The study recommends aggressive investment in blended learning in Bangladesh higher education sector towards attainment of digitization of education.

Yi and Mandal (2019) on English teaching practice based on Artificial Intelligence Technology adopted a literature review design and are cognizant of technology mileage through scoring of English Composition through computerized technology and AI. That English instruction through AI technology is efficient and would improve access and efficiency of teaching and learning of English. The use of ICT and AI technologies will have profound effects on curriculum implementation and lead to improvement in learner academic performance.

Chen *et.al*, (2020) on Artificial Intelligence in Education: A Review underscore the role of AI on transformative educational curricula delivery and computer related technology like web and AI education and that it enriches learner experience and fashioned in learner centered approach and likely to improve learners' academic performance.

Celik *et.al*.(2022) on the Promises and Challenges of Artificial Intelligence for teachers: A Systematic Review adopted a literary criticism and literary appreciation approach and acknowledges the use of modern technology in pedagogical dispensation and the development of AI technologies and the efficiency that comes with it.Improved access to learners and learning anywhere and anywhere across diverse geospatial locales makes AI and ICT handy in the service dispensation space and greatly acknowledged and appreciated.

Prisca *et.al* (2023) on implementing Artificial Intelligence in Higher Education: Pros and Cons from the perspectives of academics adopted a survey design in which 18 academics from Romanian universities on implementing AI in Higher education were surveyed. Analysis of the pros and cons of AI in higher education (HE). Significance of AI for business and societies. The significance of AI towards implementing academic programs and the efficiency that comes with the technology therein and being learner centered fashion. The negative aspects of revealed lined to psychosocial threats.

Ehemlal,Y.,&Azzouazi,M (2024) on a methodology for evaluating and reporting the integration of AI for sustainability in Higher Education :New Insights and opportunities adopted literature review on implementation of AI for sustainable development as recommended by the UNESCO and fostered by higher education to leverage AI application for innovative engagement ,learning opportunities that promote critical thinking and problem solving, cooperation equipping students with knowledge and abilities expected to create a more sustainable future. The paper adds to the advancement of sustainability within HE by providing insights into the assessment approaches for the incorporation of the AI technologies. The effectiveness of AI implementation in sustainability education tracking, assessment and rating system (STARS).

Ayodeji *et.al*., (2022) on perspectives of librarians on awareness of Academic Librarians to integrate Artificial Intelligence for Library operation and service in Nigeria surveyed 6 geopolitical zones on readiness of academic libraries to integrate AI in their *modus oparendi. An* open ended mailed questionnaire was administered toward data gathering. The gathered data were subjected to thematic analysis that characterize the survey of the magnitude. The study established that the Nigerian Academic libraries were aware of AI Technology systems and their value in the library systems around the world over, save for the Nigerian higher educational libraries. That the librarians had some mixed feelings in regard to in regard to the academic library readiness toward integrating AI into their systems for operations and service delivery. Based on these findings, implications are that if integrated, I would take the library service into a notch ahead by reducing errors due repetition in the library tasks and if care is

not taken then AI could take their job role. The challenges reported that academic librarians in Nigeria may likely face the problem of funding, inadequate AI experts, limited power connectedness, limited budget towards purchase of the AI technology and human resources to be in-charge of AI technology maintenance and operations.

Dec and Lukasz (2022) on Role of academics in transferring knowledge, skills on AI, Internet of things and Edge Computing adopted critical literature rview approach and were alive to the fat that integrating of scientific techniques such Artificial Intelligence (AI) Internet of things (IoT) and Edge Computing (EC) maintain that universities play a pivotal role in preparing human resources for the industry of the future that is more aligned towards technology. The work presents survey results gotten from amongst academicians. The study delved in an assessment of the state of the current state of university courses, regarding level of knowledge and skills provided to students about AI, IoT, and EC. The novelty of the study lay in the i. The work carried out in several European nations, ii.the current curricula for different varsities across the globe, iii.the results presents teachers' perspectives. The study findings recommend further study on university curricula dispensation in the alignment of AI, which is largely at the infancy stage in most universities in the developing nations.

Muhie and Waldio (2020) on Integration of Artificial Intelligence Technologies in teaching and learning in higher education adopted literature review and are alive to the noble contribution of technological influence of educational dispensation into the future by improving the practice of teaching and learning aligned in a technological stint like AI and its significance in higher education, Cloud computing, internet of things, amongst others .However the integration of AI and other modern technologies in higher education is still at the infancy stage, especially in the less developed nations. Many of the 21st century educational institutions are come alive as to the significance of embracing technology towards educational dispensation. There is high capability of AI use on reasoning, teaching, learning and understanding students' feelings and complex decision making processes, visual perceptions, speech recognition, language translation etc. it deals with technology taking center stage behaving like humans like robotics in support of AI towards supporting teaching and learning fashioned in the technological approach. That enhances efficiency and enhanced academic outcomes, while also guaranteeing learning anywhere, anytime, enhanced instructor-student interaction and vice versa, student-student interaction, information retrieval online. This would ensure students' wealthy experiences, operational efficiency, by ensuring real-time, practicable insight into improved student performance.AI is of immense contribution toward curricula dispensation across diverse academic disciplines.

Jia *et.al.,* (2022) on research and application of Artificial Intelligence Based Integrated Teaching and Learning Modules approach in colleges and universities utilizes literature review technique and are cognizant of the pivotal position of AI in educational settings and how it improves curricula delivery and steering learner academic performance. The technology

aligned curriculum implementation is not only cost effect in human resources but too on curricula resources that would be readily retrieved online. That integrated Teacher Student Learning model approach has been proposed for its efficiency and convenience and delivery in real-time, involving speedy entry, automation, leading to achievement of education targets by reducing barriers to entry and management practices leading to maximized learning performance.

Spivakovsky *et.al.,* (2023) on institutional policies on Artificial Intelligence in University Learning, Teaching and Research adopted critical literature review and are alive to the fact that generative AI is rapidly transforming the educational process and scientific work of students, lecturers, researchers and administrators of higher educational institutions. Institutional policy framework in regard to the use of AI into the programs is held high by stakeholders in the higher educational enterprises and therefore the scope of integration with all focus on digital transformation of administration and academic dispensation in the universities. An assessment of the policy frameworks on matters AI and its impacts on AI integration into service dispensation in higher educational institutions.

Babu and Wooden (2023) on Managing the strategic transformation of higher education through Artificial Intelligence adopted literature review while underscoring the significance of the rapid advancement in AI technologies and their potential implication for higher education sector. The focus is on strategic adoption of AI in the framework 'Smart Universities' in which it is envisaged the innovative institutions as the imminent evolution in higher education harnessing AI quantum technologies to reorient academic and the processes .The core presumption is that such integrative universities has the potentials of achieving accessibility of the programs ,economic and cost effectiveness and boost a paradigmatic shift towards technological model/inclined educational dispensation with all the conveniences therein. Negatively since technology driven approach to education would lead to cost saving on human resources recruitment, it would have potential of some people losing their jobs to pave way for technologically inclined practice in education. So in as much as AI and other related technologies have trajectories of driving education to higher levels, there is possibility of job losses to those already in service to pave way for mechanized operations and or reduced hiring of new manpower whose opportunities could otherwise have been conveniently taken by the new technologies.

Wu *et.al.,* (2021) on an AI and Muti-Media teaching platform and Innovation and Enterprise Education (IEE) in colleges and Universities adopted literature review and appreciate the rapidity with which technologies have revolutionized educational delivery through AI, and internal multi-media environments as innovative scheme. This provides a great platform for educational transformation with all the advantages and challenges therein.

Data Analysis

Data analysis in regard to the primary information collected were guided by the research objectives namely: To determine whether there are public universities' policy frameworks for AI into the mainstream university programs; to determine the extent of investment of universities into AI and to find out the extent of universities' integration of AI into their mainstream program running.

This section looks at study design, area of the study, study population and sampling procedures, instrumentation, data gathering will consist of questionnaires, interviews, and observation schedules. data analysis will be either don quantitatively suing SPSS computer software program version XXVI and qualitative data will be presented thematically. The respondents will consist of 3 purposively sampled public universities in Kenya, three universities' ICT directors,3 DVC academics, and 15 Chair persons of an academic departments. In regard to the question as to whether universities have policies towards AI, all the 3 DVCs (100%) responded by affirmative answer 'yes'. All the 3 ICT directors were also in agreement that their universities had AI policies (100%).While 12 heads of Academic department out the total off 15 (80%) were also in agreement that their existed university policies on AI, and 3 HoDs (20%) responded by saying they were uncertain as to whether such a policy existed. This could imply lack of awareness of certain essentials towards service dispensation by the universities. Of the 45 undergraduate students surveyed, the responses were distributed as follows 25 (55.56%) said they were not sure this is quite common behavior of undergraduate students who many a times tend not to be aware of what is happening in their universities…that calls for proper orientation by the respective varsities on the services on services. While the remaining 20 (4.44%) responded by affirmative answer yes this is in agreement with those of the DVCs, director's ICT, and the majority of the HoDs academics. In regard to the questions as the extent of investment into AI the DVCs responded by stating there is minimal investment, the same response was echoed by the director's ICT and all the 15 HoDs academics. Whereas all the 45 undergraduate students' respondents were not sure of extent of investment into AI by their respective universities. This could be true because matters patterning investment could only be known to the key university policy makers and finance division.

On the question as to extent of universities' integration of AI into their mainstream service dispensation,

responses were as follows: All the three DVC academics,3 ICT directors,15 HoDs responded by starting they were not sure. This could be so because certain information of that nature could only be known to a few people directly responsible for such planning and procuring the AI gadgets, based on the budget apportionment by the universities. While the students' surveyed expressed their uncertainty on the matter.

Findings through document analysis show that some level of investment through procurement of AI infrastructure were evident. Observation schedule findings showed that there evidence of ICT gadgets available in the laboratories demonstrating some level of investment into the AI towards teaching/learning, research and other services in the universities.

Implications of the study findings

The survey study of this magnitude has implications for universities stakeholders towards need for sensitization of service providers of the significance of AI on the modus operandi in discharge of essential universities' services, including teaching and research which forms the core functions of the universities.

Conclusions

That there are university AI policies, however it seems little resources are channeled towards their operationalization. That the extent of integration of AI into university programs remain uncertain and also minimal implying that the efficiency attached toward AI may not be achieved. That AI field is basically a new area and hence still at the infancy stages in the Kenyan universities

Recommendations

That a similar study should be repeated in focus to all public universities in Kenya on AI and service dispensation. An on AI integration into main stream Private University services in Kenya is also worthwhile.

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