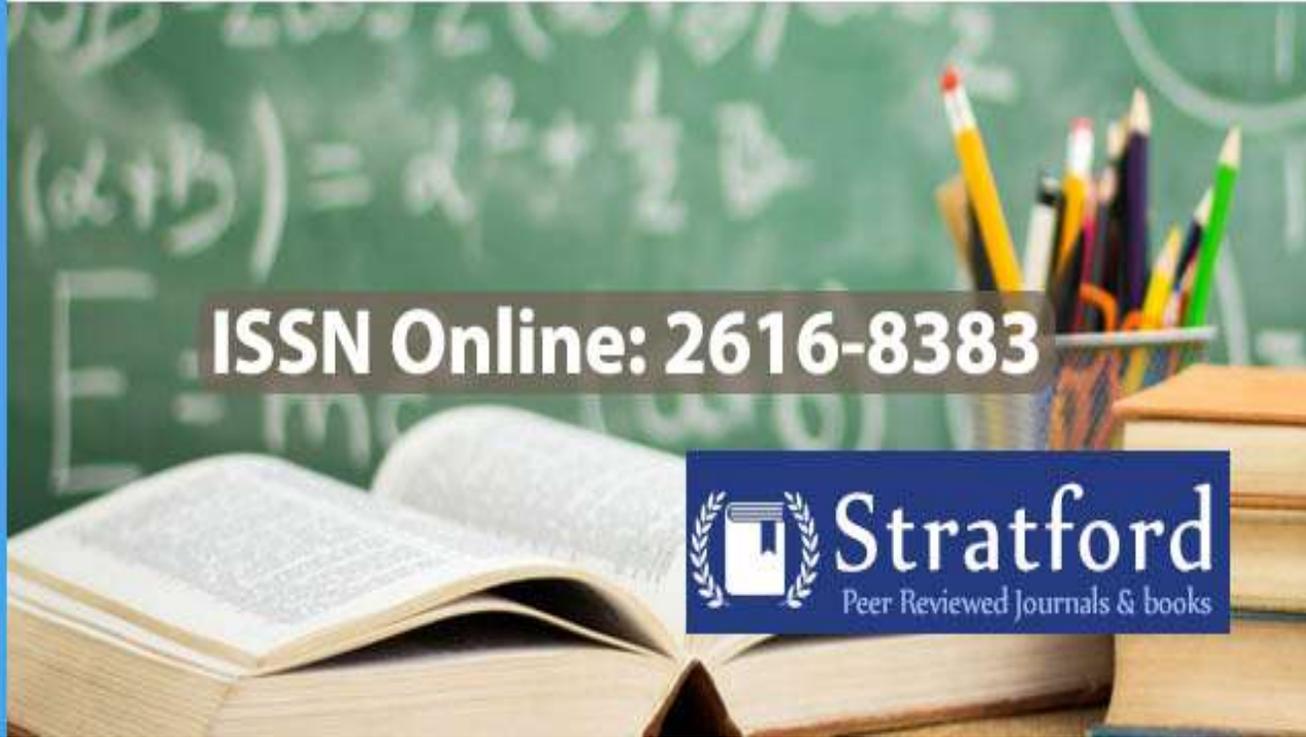


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Abstract

When the government of Kenya ordered all schools and Universities to close by 20 March, 2020 as part of Covid-19 disease containment measures, majority of local Universities quickly moved to implement e-learning initiatives for students. Some of the Universities were at the time, administering their end-of-semester examinations online to ensure students complete their studies on time. However, most of the Universities were not ready to fully adopt online learning system, as less than half of students enrolled in distance learning programmes accessed course materials through their University's online platforms while the rest either received them through email or in hard copy. Therefore, by conducting a literature based study the researcher investigated how technology was shaping the classroom of the future for Universities in Kenya. The study was anchored on technology acceptance theory. The findings revealed that Universities across the world have generally been quick to adopt new technologies, often even before their educational value has been proven. The study found that Kenyan Universities were being compelled by the government to introduce e-learning and blended learning as an alternative delivery system. There is clear evidence that most of the Universities in Kenya are already using e-learning but mostly in blended mode with face to face teaching. The study concludes that the future technology will change how teachers and students receive and send information. There will be a shift from the traditional system of using books and pen in classroom to digital. Based on the findings and conclusion the study recommends that the government of Kenya and managements of Universities must therefore develop online platforms that promote active learning and broader interaction. The study also recommends that even though platforms for e-Learning already exist in some Universities however in blended form, there is need to have them enhanced by adding voice and video components to complete the online classroom experience.

Keywords: *Technology, Classroom, Universities, Kenya.*

1.1 Background of the Study

The advancement of technology has presented a new paradigm shift in the state of educational system and is changing the perspective as we look to some alternative learning delivery systems (Espino-Díaz et al., 2020). There is almost no aspect of life that has not been fundamentally changed and re-ordered over the past 100 years through new technology and innovation (Yadav, Gupta & Khetrpal, 2018). According to Raja and Nagasubramani (2018), the 21st Century era is often regarded as an era of technology and technology today plays a very important role in our life as it is viewed as a basis of growth of an economy. Chakpitak, et al. (2018) posit that an economy which is poor in technology can never grow in today's scenario because technology makes our work much easier and less time consuming. The impact of technology can be felt in every possible field such as communication, business, education, manufacturing and banking. Technology has certainly changed the way we live; it has impacted different facets of life and redefined living (Selwyn, 2016). Technology has revolutionized the field of education, the importance of technology in schools cannot be ignored (Collins, et al., 2018). When the government of Kenya ordered all schools and Universities to close by 20 March as part of disease containment measures, a majority of local Universities quickly moved to implement e-learning initiatives for students. Some of the Universities were at the time, administering their end-of-semester examinations online to ensure students complete their studies on time (Kibuku, Ochieng & Wausi, 2020).

Colleges and Universities have generally been quick to adopt new technologies, often even before their educational value has been proven. Throughout its history, higher education has experimented with technological advances as diverse as the blackboard and the personal computer, some technologies have become permanent parts of the higher education enterprise (Zorn, Haywood & Glachant, 2018). Others, such as the slide rule and the 16-millimeter movie projector, have been replaced as more sophisticated or more cost-effective technologies have emerged to take their place. Hakan (2020) argue that at the dawn of the twenty-first century, new and rapidly improving technologies are in the process of transforming higher education and that each year since 1994, there has been increased use in college classrooms of technology-dependent resources such as e-mail, the Internet, course web pages, and computer simulations (Manichander, 2020).

According to Singh (2021), technology has the potential to revolutionize the traditional teaching and learning process and it can eliminate the barriers to education imposed by space and time and dramatically expand access to lifelong learning. Students no longer have to meet in the same place at the same time to learn together from an instructor fundamentally modern technologies have the ability to change the conception of a higher education institution (Lortie, 2020). Gone are the days when a higher education institution was necessarily a physical place with classrooms and residence halls where students had to come to pursue an advanced education. Most higher education institutions have developed policies, with varying related nomenclature, that pertain to the acceptable use of electronic devices with the focus of these policies commonly ranging from acceptable use of social media (Facebook, Twitter, Tumbler, Desire MySpace, or of the institution's preferred social media forum), to acceptable use of information technology (smartphones, tablets, laptops, online mail and internet browsing), and also includes computing practice, and use of institutional computers (Wu, Yen & Chen).

When online and distance learning started evolving, many Universities hesitated to embrace online learning; although overtime, prestigious institutions globally have begun offering courses, professional certificates, and college degrees online via LMSs (Ohliati & Abbas, 2019). Ortiz and Green (2019) state that higher education colleges and Universities have been utilizing online learning platforms with the expectation of offering the best education delivery services to learners in the online environment. In some countries, the traditional physical classroom settings are declining when compared to online education's increased enrolment, especially owing to the supply and demand for online teaching and learning (Holmes & Prieto-Rodriguez, 2018). Many learners, especially adult learners, across the world are exploring and embracing online learning gradually through LMS platforms (Garotte & Petterson, 2015). These online learning platforms were designed to facilitate online learning, and now instructors are embracing and appreciating knowledge sharing in the classroom, that is educating and preparing learners to complete their higher education irrespective of where they are located (Rathnayake, De Silva & Senavirathne, 2020).

Oktalia *et al.* (2018) argue that there are four basic issues in the use of ICT in education in the 21st century; their effectiveness, cost, equality and sustainability. They point out that, in recent years, there has been an upsurge of interest in how ICT, most importantly computers and the internet, can be best harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings. In the 21st century, schools use a diverse set of ICT tools to communicate, create, disseminate, store and manage information (Jamieson-Proctor, 2018). In some contexts, ICT has also become integral to the teaching-learning interaction through such approaches as replacing chalkboards with interactive digital whiteboards, using students' own smart phones or other devices for learning during class time, and the flipped classroom model where students watch lectures at home on the computer and use classroom time for more interactive exercises. According to Claro *et al.* (2018), when teachers are digitally literate and trained to use ICT, they can lead their learners to higher order thinking skills, provide creative and individualized options for students to express their understandings, and leave them better prepared to deal with ongoing technological change in the society and workplace.

Technology has really revolutionized learning in the 21st century; today, by using the Internet or software tools, students can create online groups, Web pages, and virtual communities that connect them in real time with students and teachers anywhere around the world (Mishra & Mehta, 2017). Students can now receive feedback from their teachers and share questions and concerns about their lessons without having to be physically present in the classroom. By listening to and reading about others' opinions and feedback, students refine their thinking, reaching higher levels of comprehension and deeper understanding (Fatimah & Santiana, 2017). Online communities also present the opportunity for students to interact with others around the world, simulation software helps to bring to the classroom real activities that would be impossible to see without technology (Fatimah & Santiana, 2017). Technology is interactive, and students learn by doing, researching, and receiving feedback. This helps students become passionate about what they are learning. For example, they may study geography using interactive software such as Google Maps or Google Earth, instead of looking at a picture. The development and quickly emerging technology of interactive adaptive software holds the potential to dramatically change how we think about and deliver education (Lee, Suh, Roy & Baucus, 2019). Adaptive learning software tailors the learning

experience to individual students in terms of both their strengths and weaknesses, this enables students to individually progress through material at a pace commensurate with their understanding and aptitude in a particular subject matter rather than the current situation where some students are left behind while others are bored because the lessons are delivered in a one-size-fits-all format (Lee, Suh, Roy & Baucus, 2019). The key to this individual education is the adaptive nature of the technology. As students work through problems, material, and even game-like simulations, the software monitors and assesses their answers and response times. It determines when students are ready to proceed to the next section and equally as important, when more time is needed on existing material. In addition, such systems constantly provide teachers with real-time results for each student. This allows teachers to more frequently monitor how students are progressing and intervene when needed. It allows teachers to become more effective individual coaches for students. Using such technology, teachers can now engage their students in a more personalized, individual manner rather than the traditional, one-size-fits-all approach (Rapanta *et al.*, 2020).

Social aspects of the internet become more and more relevant and notions such as ‘humans-with-media’ emphasize that if media are changed, the entire knowledge-acquiring process may change (Borba *et al.* 2018). In this development process, the classroom, as we know it, may change entirely from a physical area with defined boundaries to a virtual environment including various components that will probably be determined by the student rather than only by the teacher. Mobile technology, personal learning environments, digital learning objects and other artefacts are ‘stretching’ the classroom, transforming the classroom, to the extent that it can hardly be recognized as such. Currently it seems clear that digital technology is ‘deconstructing’ the notion of the classroom (Engelbrecht, Llinares & Borba, 2020). Flipped classrooms change the notion of what is in and outside of the classroom, and also change the roles of students and teachers. There is a profusion of online resources (e.g., widgets, videos), designed with respect to specific mathematical content, which transforms the presentation of content and allows students access to solving mathematical tasks and sharing their mathematical explorations (Engelbrecht, Llinares & Borba, 2020).

In light of the rising concerns about the spread of COVID-19 and calls to contain the Corona Virus, a growing number of tertiary institutions shut down in regards to face-to-face classes globally. The Corona virus revealed emerging vulnerabilities in education systems around the world especially in Kenya. It is now clear that society needs flexible and resilient education systems as we face unpredictable futures. Universities worldwide are moving more and more towards online learning or E- Learning. Findings also reveal that apart from resources, staff readiness, confidence, student accessibility and motivation play important function in ICT integrated learning. Social distancing measures and the subsequent shift to remote working, socializing and school led to questions about the technology available to use, namely Zoom (Favale, Soro, Trevisan, Drago & Mellia, 2020). For many, the future of technology in education does not rely solely on creating new, exciting and innovative tools, but in thinking about how technology can make digital learning safe, accessible and equal for all (Favale *et al.*, 2020). Students of today are known by many names, like digital natives (Prensky, 2018), millennial (Howe & Strauss, 2018), net generation (Tapscott, 2018) and digital generation (Wahab Ali, 2018). Their entry in the world was at a time when technological expansion was ubiquitous and widely adopted throughout the world.

The Covid-19 crisis has demonstrated how important technology can be in times of change and uncertainty. The next test for educators and technology companies will be utilizing and shaping digital tools to make the opportunities that they offer equally available to all, inside as well as outside the classroom. The whole educational system from elementary to tertiary level has been collapsed during the lockdown period of the novel coronavirus disease 2019 (COVID-19) not only in Kenya but world over. The worldwide lockdown increased the rate of change of using digital technology in education but at the same time it created an awareness of the need to feel connected to each other. The current study therefore examined the classroom of the future for Universities in Kenya with regards to the incorporation of technology in learning (Dhawan, 2020). The study sought study is a portrayal of online teaching-learning modes adopted by Universities today and in the future for the teaching-learning process. This study was focused on an intellectually enriched opportunity for further future academic decision-making during any adversity. The investigated how existing resources of educational institutions effectively transform formal education into online education with the help of virtual classes and other pivotal online tools in this continually shifting educational landscape.

1.2 Statement of the Problem

In spite of technology's promise, its integration throughout higher education has not been rapid or seamless (Tanjung, 2019). Many barriers to technology-based innovations exist within Universities. Academic traditions, such as the faculty-centered lecture, make many professors reluctant to adopt alternative instructional strategies using the computer or telecommunication devices. Now that technology has become an essential and recurring investment, most Universities must locate additional funds to meet their increasing needs for technology resources (Almajalid, 2017). Limited support to help faculty and staff members learn how to take full advantage of technology is another factor inhibiting more widespread use of technology in Universities (Cunningham, 2015). While infrastructure has improved and students state a preference for blended learning, there are few eLearning courses provided by Kenyan Higher Education Institutions (Cunningham, 2015). According to Cunningham (2015), it is unclear what factors impact on the adoption of Technology-enhanced Learning (TEL) techniques in Nairobi Universities. Wider adoption of TEL is the way forward, but this requires addressing current challenges and factors currently limiting uptake such as infrastructure challenges, need for training to up-skill faculty members; institutional policies; insufficient leadership and need to develop a strategic plan for eContent development (Mutisya & Makokha, 2016).

Due to the emergence of COVID-19 pandemic, Universities closed and it was not immediately clear how long it would last. E-learning became crucial as lecturers were asked by their respective Universities to complete their syllabi and continue to teach and administer tests remotely. However, a survey conducted by Nyerere (2020) revealed that most Universities were not ready to fully adopt online learning system. The survey indicated that out of 12 public and private Universities in Kenya offering open and distance learning programmes, students preferred face to face or blended methods of teaching and learning, and that only 19,000 out of 500,000 students were enrolled for open and distance learning. The study also showed that less than half of students enrolled in distance learning programmes accessed course materials through their university's online platforms; the rest either received them through email or in hard copy. The COVID-19 pandemic exposed the level of unpreparedness by Kenyan Universities to adopt e-learning fully.

To make matters worse, it was until Covid-19 pandemic struck that most lecturers quickly turned to online courses to learn how to use digital methods, and many could only use meeting platforms like Zoom or Skype that are not very well adapted to large online classes (Nyerere, 2020). The COVID-19 pandemic has laid bare how education in Kenya could evolve and the urgent need to accelerate the Kenyan government's digital learning program. This study therefore sought to investigate how technology is shaping the classroom of the future for Universities in Kenya.

1.3 Research Objectives

To investigate how technology is shaping the classroom of the future for Universities in Kenya.

1.4 Research Question

How is technology shaping the classroom of the future for Universities in Kenya?

2.0 Literature Review

2.1 Theoretical Review

Technology Acceptance theory

This study was underpinned by the Technology Acceptance theory developed by Davis (1989). The theory was discussed on the basis of its evolution, fields of application, strengths, weaknesses and suitability to the study. This is an information systems' theory that models how users come to accept and use technology. The theory suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it (preparedness), notably: Perceived usefulness (PU) is defined by Fred Davis (1989) as the degree to which a person believes that using a particular system would enhance his or her job performance. Perceived ease of use (PEU) is defined by Davis (1989) as the degree to which a person believes that using a particular system would be free from effort.

Davis and Venkatesh (1996) add that the Technology Acceptance Theory (TAT) is influential in predicting user acceptance and users' intentions, as well as the efficient usage of tools in the field of technology. In 1996, Davis and Venkatesh made another adjustment to the Technology Acceptance Theory. Bagozzi (2007) found that PEU and PU had a direct effect on behavioural intention and they concluded that users may perhaps use technology even if they do not have favourable attitudes, and they stated that attitude did not entirely mediate the influence of perceived usefulness on the behaviour intention. Thus, Davis and Venkatesh (1996) excluded attitudes from the Technology Acceptance theory and postulated that attitudes do not play a significant role in users' behavioural intention to use, since attitudes are confined by performance and effort expectancies (Venkatesh *et al.*, 2003).

Keil *et al.* (1995) developed Davis's Technology Acceptance theory into what they called the Usefulness/Ease of Use Grid, which was a Two by two grid where each quadrant represented a different combination of the two attributes. In the context of software use, this provided a mechanism for discussing the current mix of usefulness and Ease of use for particular software packages, and for plotting a different course if a different mix was desired, such as the introduction of even more powerful software. The Technology Acceptance Theory has been used in most technological and geographic contexts. Some of these contexts are in health care, commerce and education. Applied to a learning institution such as a university, the Technology Acceptance

Theory motivates both learners and faculties to adopt, adapt and accommodate emerging technologies to improve their teaching and learning.

2.2 Empirical Review

Nickerson (2020) believe that technology has created and expanded opportunities for communication and collaboration among students at all levels of education. According to Sakhipov and Baygozhanova (2020), traditionally classrooms have been relatively isolated, and collaboration has been limited to other students in the same classroom or building; however, today technology has enabled forms of communication and collaboration undreamt of in the past. Students in a classroom in the rural U.S., for example, can learn about the Arctic by following the expedition of a team of scientists in the region, read scientists' blog posting, view photos, e-mail questions to the scientists, and even talk live with the scientists via a videoconference. Students can share what they are learning with students in other classrooms in other states who are tracking the same expedition (Sakhipov & Baygozhanova, 2020). With the introduction of technology in learning, students today can easily collaborate on group projects using technology-based tools such as wikis and Google docs and the walls of the classrooms are no longer a barrier as technology enables new ways of learning, communicating, and working collaboratively (Nickerson, 2020).

A study conducted by Paz-Albo (2017) in which 1,400 educators were interviewed revealed that the majority of respondents believe that classrooms of the future will be centered on self-paced and personalized learning. They indicated that this student-centric approach would allow children to choose their own pace and learning objectives based on individual interests all of which could be guided by artificial intelligence, chatbots, and video-based learning. According to Perrotta and Selwyn (2020), the AI-powered language learning platform Duolingo is one of the most downloaded education apps globally, with more than 50 million installs in 2018. The platform single-handedly challenges the notion of traditional learning, with a study showing that spending just 34 hours on the app equates to an entire university semester of language education (Perrotta & Selwyn, 2020). AI-driven applications in education are still in their infancy, but Duolingo's success demonstrates the growth potential in the sector. In fact, the nascent market for AI in education is expected to reach \$6 billion by the year 2025. Over half of this will come from China and the U.S., with China leading globally. Although video-based learning may not necessarily be considered as innovative as artificial intelligence or chatbots, 98% of educators view it as a vital component in personalized learning experiences. Most institutions report incorporating video into their curriculums in some way, but even higher demand for video-based learning may come from students in the near future.

Ashour (2020) indicated that in the traditional classroom, the teacher was the primary source of information, and the learners passively receive it. This model has been in education for a long time, and it is still very much in evidence today. But technology has slowly been changing the roles of teachers and learners. As a result of the access to information and educational opportunity that technology has enabled, in many classrooms today and teachers' roles are gradually shifting to the "guide on the side" as students take center stage with more responsibility for their own learning using technology to gather relevant information (Nickerson, 2020). Schools and Universities across the world are beginning to redesign learning spaces to enable this new model of education, foster more interaction and small group work, and use technology as an enabler.

Technology is a powerful tool that can support and transform education in many ways, from making it easier for teachers to create instructional materials to enabling new ways for people to learn and work together (Rapanta, Botturi, Goodyear, Guàrdia & Koole, 2020). With the worldwide reach of the Internet and the ubiquity of smart devices that can connect to it, a new age of anytime anywhere education is dawning. It will be up to instructional designers and educational technologies to make the most of the opportunities provided by technology to change education so that effective and efficient education is available to everyone everywhere.

Kwet and Prinsloo (2020) while evaluating the smart classroom: a new frontier in the age of the smart university indicated that technology is a modern tool that has been constantly evolving, and humans need to adapt just as fast in order to keep up and while it has transformed every aspect of life, its impact on education is just becoming more apparent in recent years. True, educators and Universities have been tapping into the digital revolution trends and adopting modern technologies for decades now. But recent years proved just how significant this development has become. From artificial intelligence to augmented reality machine learning to educational software, there are endless possibilities that can usher in a whole digital revolution for most classrooms all over the world. Some schools are already starting (Kwet & Prinsloo, 2020).

According to Henriksen, Creely, Henderson and Mishra (2021), one of the growing trends is the introduction of e-learning. Until the early 2000s, formal education had always been conducted inside the classroom. But as the internet took off, the transition began. Now, the advancement in technology is significant enough that it can bridge the geographical gap through online tools, sharing all kinds of learning materials in a variety of formats, from videos of lectures and slideshows to word documents and PDFs. Live online classes, often in the form of webinars, have also become increasingly common. Professors also give instructions through chat and message forums. Henriksen *et al.* (2021) believe that learning virtually is no longer a novelty as over 43% of students are currently using online platforms as helping tools while they do their homework. But more and more Universities are introducing distant learning as one of the options for many students. Lessons can be provided on different platforms and applications. They can be accessed from any kind of device too, from desktop computers and tablets to and tablets to smartphones. Other tools and applications like Google Drive and Dropbox make documents easily accessible for students. Most teachers also discovered the power of videos to maximize classroom learning. Students can learn new content through videos, allowing them to absorb the information a lot easier and longer than text-based learning.

According to a study by McElroy (2020), most of the respondents believed that online-collaboration tools and software that supports individually paced learning, and learning-management systems were among the communications technologies most expected to improve academics over the next five years. According to the findings of the study, Web 2.0 technologies such as wikis, instant messaging and social networking which have been influential in improving connectivity in many settings and are in use now at a large number of institutions are expected to decline in use over that period. By contrast, online gaming and simulation software were cited by 54% of higher education respondents and 59% of corporate respondents as an innovation likely to be adopted among Universities over the next five years. Faculty members, administrators and CIOs are also exploring how web applications and freeware such as Google docs can improve efficiency and reduce costs. Collectively, such advances may lead to profound changes in the way courses

are taught in which it is expected that teaching will become more outcome-based and student-centered. The study concluded that respondents foresee an interesting range of possibilities regarding how technology is most likely to affect future academic offerings, spurred by innovative faculty research, student engagement and the pursuit of academic collaboration. Over the next five years, 56% of respondents expected to see a greater number of interdisciplinary majors, combining chemical engineering and environmental studies for instance, and 43% foresee broader inter-university collaboration among students from multiple institutions.

Cabral, Pedro and Gonçalves (2012) analysed the impact of ICT-related training in the adoption of learning management systems (LMSs) for teaching practices by faculties in higher education institutions in Spain. The impact was obtained by the number of LMSs courses created and managed by participants in ICT for teaching workshops and those who had not attended any workshops. Nearly 1320 LMS courses and 265 faculties were involved. The study employed a cross-sectional survey design. The study findings indicated that there was a positive and significant relationship between faculty staff ICT-related training and adoption of LMSs by students. The study pointed that, infusing education resources such as a LMSs may assist faculty courses and organize content to engage students and decrease planning time, thus supporting the process of learning. The study indicated that faculty training best practices are the ones based on the preferences, expertise level and particular needs of faculty members. The study concluded that the majority of the faculties and researchers focused their participation on workshops designed to promote the acquisition and development of basic technical and pedagogical skills for using LMSs courses at elementary level. The study also concluded that participants were mostly focused on developing the essential skills required to use LMSs basic functionalities.

In Pakistan, Habib, Jamal, Khalil and Khan (2021) sought to understand the automation of Higher Education Institutes (HEIs) and to evaluate the automated process from the perspective of developing country in which Pakistan was selected as a unit of analysis. By adopting a mixed methodology the study found that CUSIT had a state-of-the-art automated infrastructure, management information system (MIS) and learning management system (LMS) which facilitated faculty, staff and administration. The university was using LMS which provided an integrated and digital platform to key stakeholders particularly to the teachers for sharing course outlines, lesson plan, assignment generation and submission, announcements and generating assessment reports. Similarly, the students were able to get access to all course material, assignments, assessment report, notices, and other relevant information at any point of time. However, the system lacked some of the major E-learning features with limited support to the large file size, real time learning, online classes, real time feedback and query system etc.

In South Africa, Mhlanga and Moloji (2020) assessed the relationship between COVID-19 and the Digital Transformation of Education. The study sought to gauge the impact of COVID-19 pandemic in unleashing digital transformation in the education sector in South Africa. In order to gauge the impact, the study tracked the rate at which the 4IR tools were used by various institutions during the COVID-19 lockdown. Data were obtained from secondary sources, mainly newspaper articles, magazines and peer-reviewed journals. The findings revealed that, in South Africa during the lockdown, a variety of 4IR tools were unleashed from primary education to higher and tertiary education where educational activities switched to remote learning (online learning). These observations point to the fact that South Africa generally has, some pockets of excellence to drive

the education sector into the 4IR, which has the potential to increase access. Access to education, particularly at a higher education level, has always been a challenge due to a limited number of spaces available. Much as this pandemic has brought with it massive human suffering across the globe, there is an opportunity to assess successes and failures of deployed technologies, costs associated with them, and scaling these technologies to improve access.

In Kenya, studies have shown that there is clear evidence that most of the Universities in Kenya are already using e-learning but mostly in blended mode with face to face teaching (Odero, 2019; Kibuku, Ochieng & Wausi, 2020). Studies show that at the University of Nairobi for instance, implementation of e-learning started in 2004 with a well-tested e-learning platform called Wedusoft (a framework of Chisimba). Additionally, Kenyatta University launched the e-learning mode of teaching in 2005 and currently using Moodle as an e-learning platform. E-learning programmes have also been in operation at Jomo Kenyatta University of Agriculture and Technology since 2006 with Moodle as an e-learning platform. Implementation of e-learning in Moi University started in 2007 with MUSOMI (customized from Chisimba framework) as an e-learning platform. However, according to Commission for University Education (2018), utilization of e-learning in Kenyan Universities is still at the infancy stage; though these Universities have made significant attempts to adopt e-learning as an alternative approach to teaching and learning, little progress has been recorded so far in its implementation. Most Universities in Kenya are using e-learning in blended mode and have lagged behind in full utilization of e-learning.

Kuliya and Usman (2020) examining the perceptions of E-learning among undergraduates and academic staff of higher educational institutions in Nigeria while revealed the slow adoption of e-learning in 18 Universities in Nigeria, a problem he attributed to a low level of investment and lack of commitment in developing e-learning applications. Particularly intriguing was the fact that most of the staff and students in the Universities used Internet e-learning sites mainly for the sake of finding information related to their research, but not for real online learning. The study also found that some of the Universities had web pages that were more often than not used for the advertisement and marketing of the Universities but not for e-learning activities.

Elsewhere, Walimbwa (2018) observed that despite e-learning growing rapidly worldwide, East African Universities were yet to fully maximize their potential; a problem that was blamed on insufficient resources and an indifferent attitude. The study focused on the University of Dar es Salaam (Tanzania), Makerere University (Uganda), and the University of Nairobi (Kenya). It revealed a lack of requisite skills and sufficient human capacity for the meaningful implementation of e-learning in these Universities. Limited Internet bandwidth and no policy harmonization were also significant factors that hindered the rapid adoption of e-learning in these Universities. Kasse and Balunywa (2013) observed a slow adoption of e-learning in Makerere University Kampala; Makerere University Business School; Kampala International University, and Islamic University in Uganda. They found out that e-learning was used mostly as a means of delivering learning material (80%), and minimally used to conduct discussions (12%) and assessment (2%). Infrastructural technical incompetence and attitudinal challenges (by staff and students) were identified as the major factors limiting the full-scale adoption of e-learning in these institutions.

3.0 Research Methodology

The study analyzed how technology would be shaping the classroom of the future for Universities in Kenya. The paper used a desk study review methodology in which relevant empirical literature was reviewed to identify main themes. A critical review of empirical literature was conducted to establish the influence of technology on the classroom of the future for Universities in Kenya.

4.0 Findings and Discussions

The literature review and the findings from the research revealed that introducing technologies into the classroom does not automatically translate into higher academic achievement, hence future quantitative research on the impact of the use of EduTech on student's academic performance are needed to provide the overall relevance of employing technologies in higher education. From the reviewed literature, the study found that Universities across the world have generally been quick to adopt new technologies, often even before their educational value has been proven. Throughout its history, higher education has experimented with technological advances as diverse as the blackboard and the personal computer, some technologies have become permanent parts of the higher education enterprise as indicated by Zorn, Haywood and Glachant (2018). The dawn of twenty-first century, new and rapidly improving technologies are in the process of transforming higher education and that each year since 1994 there has been increased use in college classrooms of technology-dependent resources such as e-mail, the Internet, course web pages, and computer simulations.

Because of the COVID-19 pandemic, Universities have closed and it's not clear how long this will last. E-learning has become crucial. Lecturers have been asked to complete their syllabuses and continue to teach, and administer tests, remotely. But Kenya isn't ready. A recent survey carried out in 12 public and private Universities in Kenya that offer open and distance learning programmes, showed that students preferred face to face or blended methods of teaching and learning. Just 19,000 out of 500,000 students were enrolled for open and distance learning. This points to the challenges that students face in online or distance courses they prefer to enroll in regular programmes. Less than half (about 45%) of students enrolled in distance learning programmes accessed course materials through their university's online platforms; the rest either received them through email or in hard copy. And, to researchers' knowledge, there are no programmes on offer that don't require face to face meetings, for introductory lectures or examinations. This shouldn't be the case for e-learning programmes. All students should be able to access all material on a university portal. Physical meetings shouldn't be necessary.

The study also found that technology has the potential to revolutionize the traditional teaching and learning process and it can eliminate the barriers to education imposed by space and time and dramatically expand access to lifelong learning. Due to technology, students no longer have to meet in the same place at the same time to learn together from an instructor, fundamentally modern technologies have the ability to change the conception of a higher education institution as affirmed by Lortie (2020). Based on the literature, gone are the days when a higher education institution was necessarily a physical place with classrooms and residence halls where students had to come to pursue an advanced education. Most higher education institutions have developed policies, with varying related nomenclature, that pertain to the acceptable use of electronic devices with the focus of these policies commonly ranging from acceptable use of social media (Facebook, Twitter,

Tumblr, Desire MySpace, or of the institution's preferred social media forum), to acceptable use of information technology (smartphones, tablets, laptops, online mail and internet browsing), and also includes computing practice, and use of institutional computers (Wu, Yen & Chen).

The study found that Kenyan Universities were being compelled by the government to introduce e-learning and blended learning as an alternative delivery system (Kenya Vision 2030). Studies have shown that there is clear evidence that most of the Universities in Kenya are already using e-learning but mostly in blended mode with face to face teaching. Studies show that at the University of Nairobi for instance, implementation of e-learning started in 2004 with a well-tested e-learning platform called Wedusoft (a framework of Chisimba). Additionally, Kenyatta University launched the e-learning mode of teaching in 2005 and currently using Moodle as an e-learning platform. E-learning programmes have also been in operation at Jomo Kenyatta University of Agriculture and Technology since 2006 with Moodle as an e-learning platform. Implementation of e-learning in Moi University started in 2007 with MUSOMI (customized from Chisimba framework) as an e-learning platform. However, according to Commission for University Education (2018), utilization of e-learning in Kenyan Universities is still at the infancy stage; though these Universities have made significant attempts to adopt e-learning as an alternative approach to teaching and learning, little progress has been recorded so far in its implementation. Most Universities in Kenya are using e-learning in blended mode and have lagged behind in full utilization of e-learning.

Based on the reviewed literature, despite e-learning growing rapidly worldwide, East African Universities were yet to fully maximize their potential; a problem that was blamed on insufficient resources and an indifferent attitude. Studies have shown that lack of requisite skills and sufficient human capacity for the meaningful implementation of e-learning in these Universities is an impediment. Limited Internet bandwidth and no policy harmonization were also significant factors that hindered the rapid adoption of e-learning in these Universities. Kasse and Balunywa (2013) observed a slow adoption of e-learning in Makerere University Kampala; Makerere University Business School; Kampala International University, and Islamic University in Uganda. They found out that e-learning was used mostly as a means of delivering learning material (80%), and minimally used to conduct discussions (12%) and assessment (2%). Infrastructural technical incompetence and attitudinal challenges (by staff and students) were identified as the major factors limiting the full-scale adoption of e-learning in these institutions.

5.0 Conclusion

Education will experience massive changes in the future because of technology advancements. Teachers will have access to technology that will enable them to teach effectively. Students will also have access to technology that would make learning more effective too. The study concludes that in the future technology will change how teachers and students receive and send information. There will be a shift from the traditional system of using books and pen in classroom to digital. Cloud services which provide a smooth, safe and cost-effective way of storing information will continue to gain relevance. It will become the best option for teachers and students to store data of any size. The advantage of storing and delivering contents digitally besides preservation of trees or reduction of paper waste is that there will be no need for re-printing. And it would be easier to update documents whenever one pleases.

Education Technology is changing the way teachers teach and students learn; in place of the traditional brick-and-mortar classroom, we have witnessed the rise of flipped classrooms leveraging blended online and offline instructions, where students watch video lectures at home and do their homework in class. It offers a chance to get out of boring mug-up classes and offers real life learning opportunities and diminish the gap between what is taught in the classrooms and the real life workplace requirements. Based on the findings, this study concludes that the future of technology in education is to improve communication. In regions that were difficult to reach such as places in sub-Saharan Africa are now starting to be accessible through e-Learning. Tutors can lecture learners over long distances and scholars can achieve their academic papers through e-Learning. Also, students that feel like studying from home can now do it. Advancement of information technology in education has improved research. There are very many online libraries that assist teachers and students with comprehensive reading materials. Teachers and lecturers are also able to post their work online for their students to read.

The study further concludes that there is a wider ICT infrastructure challenge that Kenya faces Kenyan Universities. Kenya has widespread internet access, attributed to the mobile phone: internet penetration stands at about 90%. However, a significant number of students who live in remote areas have no internet access and they are cut off from their Universities. For those who may be able to access the internet, it's at a high cost: about US\$4.90 per GB in Kenya compared to countries like Egypt where it's about \$1.20 per GB. In addition to this, even though 75% of Kenyans have access to grid or off-grid electricity, supply isn't always reliable. Finally the study concluded that lecturers and students need the technical skills to function in this new environment: this means sustained support before, during, and after delivery. The future of learning is likely to become increasingly digital, regardless of the pandemic. Institutions should therefore invest in e-learning not just as a temporary measure to cover the remainder of the syllabus, but as a major component of teaching and learning going forward.

6.0 Recommendation

Since the future of education in Kenyan Universities will be purely digital as there will be a shift from the traditional system of using books and pen in classroom to digital, the government of Kenya and managements of Universities must therefore develop online platforms that promote active learning and broader interaction. These platforms already exist in some Universities however in blended form, including Kenyatta University and the University of Nairobi, and have tools for interactive forums, chats, sharing materials and assessments. They can however be enhanced by adding voice and video components to complete the online classroom experience. Each institution must also have an organizational structure, the necessary expertise through training on online delivery, and a dedicated budget to run these systems efficiently.

The study recommends that the government should strive to invest in or direct Universities to increase their investment, in e-learning resources both physical and human. This investment can be achieved through providing students with data bundles or subsidizing access to online learning resources, such as digital libraries. With increased number of students enrolled in Universities, it is inevitable that the government plans adequately for provision of more ICT resources. The government and managements of Universities should solicit for donor support so that the Universities which are almost being overwhelmed with students cater for as many students as

possible in the provision of online learning to compliment the physical learning. Communication infrastructure should be enhanced so as to improve on network problems especially where internet are not available.

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