East African Journal of Education Studies
eajes.eanso.org
Volume 8, Issue 1, 2024
Print ISSN: 2707-3939 | Online ISSN: 2707-3947
Title DOI: https://doi.org/10.37284/2707-3947

EAST AFRICAN NATURE & SCIENCE ORGANIZATION

Original Article

An Innovative Way in Education and Training for Sustainable Development through E-Universities for Sustainability in Kenya

Alice Omariba[1*]

[1] Murang'a University of Technology, P. O. Box 75-10200, Murang'a, Kenya.
[*] Author for Correspondence Email: aomariba@mut.ac.ke

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

Date Published:

17 December 2024

Keywords:

Education and Training for Sustainability, Interactive, E-Learning, E- Universities.

ABSTRACT

The importance of education for sustainable development has been anchored in various forms in training and education in both developed and developing countries and acknowledged decades ago. Consequently, by joining several international conventions countries across the world agreed to effectively integrate, and implement education for sustainable development (ESD). The rationale of this study is that ESD must be propagated worldwide in different strata of societies and especially in education and training in order to protect the environmental equilibrium of our planet to curb the negative impacts it is suffering from the present-day consumer habits and the intensification of industrial and agricultural production. It is evident that ESD must be effectively integrated into public education and training, especially at the University level and crucially developed if we really want to reduce the environmental burden caused by human activities. One possibility for this is to develop modern, interactive; ICT-based educational tools at the Universities which may grab the attention of digital-era students. The study adopted exploratory and descriptive research designs whereby the target population was University Lecturers; the study used Slovan's formula for the sample size and both random sampling was used to sample 100 University lecturers and purposive sampling was used to select University lecturers in social media (WhatsApp forums). The findings of the study revealed that the establishment and promotion of E-universities for sustainability in Kenya offer a promising and innovative approach to addressing the challenges of education and training for sustainable development. Based on the findings, the study concluded that embracing digital technologies not only expands access to education but also enhances the quality of learning experiences, fosters global collaboration, and equips learners with the skills and knowledge necessary to contribute meaningfully to sustainable development initiatives whereby E-universities for sustainability in Kenya can be an innovative framework which Universities, lecturers and NGOs across borders will use to collaborate to build interactive e-learning courses for University students.

APA CITATION

Omariba, A. (2024). An Innovative Way in Education and Training for Sustainable Development through E-Universities for Sustainability in Kenya. *East African Journal of Education Studies*, *8*(1), 33-46. https://doi.org/10.37284/eajes.8.1.2525

CHICAGO CITATION

Omariba, Alice. 2024. "An Innovative Way in Education and Training for Sustainable Development through E-Universities for Sustainability in Kenya". *East African Journal of Education Studies* 8 (1), 33-46. https://doi.org/10.37284/eajes.8.1.2525

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

HARVARD CITATION
Omariba, A. (2024) "An Innovative Way in Education and Training for Sustainable Development through E-Universities for Sustainability in Kenya", *East African Journal of Education Studies*, 8(1), pp. 33-46. doi: 10.37284/eajes.8.1.2525

IEEE CITATION
A., Omariba "An Innovative Way in Education and Training for Sustainable Development through E-Universities for Sustainability in Kenya" *EAJES*, vol. 8, no. 1, pp. 33-46, Dec. 2024. doi: 10.37284/eajes.8.1.2525.

MLA CITATION
Omariba, Alice. "An Innovative Way in Education and Training for Sustainable Development through E-Universities for Sustainability in Kenya". *East African Journal of Education Studies*, Vol. 8, no. 1, Dec. 2024, pp. 33-46, doi:10.37284/eajes.8.1.2525

INTRODUCTION

Sustainable development is a global imperative, and education plays a pivotal role in achieving this goal. The internet and the use of network-connected have penetrated traditional teaching and learning methods devices [Vázquez-Cano, et al., 2017; Ozuorcun and Tabak, 2012]. As a result, different educational modalities have arisen, reflecting these changes and raising new scenarios that shape training processes (Barrero Fernández, 2018). Among the new modalities of online education is e-learning, which uses ICT to provide educational content and facilitate learning to multiple segments of the population (Huss, Sela and Eastep, 2015). The advantages of this modality include its flexibility and the possibility that it can be utilized remotely and at different times, thanks to synchronous and asynchronous processes (Racovita-Szilagyi, et al., 2018). Also, its potential for communication and the possibilities for ubiquitous learning (anytime, anywhere) promotes lifelong learning and interactions among participants (Alemán de la Garza, et al.,2019).

According to UNESCO [2020], education for sustainable development aims to give people the skills and knowledge to find solutions to economic, social, and environmental problems. It encourages students to reflect on excess consumption, poverty, the stimulation of solidarity and cooperation, and to recognize that current economic development trends are not sustainable; therefore, programs that promote these are required (Hák, Janoušková & Moldan, 2016). In Kenya, as in many other developing countries, the pursuit of sustainable development is intrinsically linked to addressing socio-economic challenges, environmental preservation, and equitable access to quality education. E-universities, a concept that amalgamates digital technology with higher education, have emerged as a potential solution to advance sustainable development through innovative, accessible, and flexible means (Bester, 2020). Universities also play a central role in digitalization and sustainability. This is where innovations are created, students learn more about sustainable and digital development, and universities have role models (Teixeira et al., 2018; Ugwuozor, 2020). This study explores the innovative ways E-universities in Kenya can foster education and training for sustainable development, addressing the unique challenges and opportunities within the Kenyan context. E-universities are institutions that leverage digital technologies and the internet to deliver education, making knowledge accessible anytime and anywhere (Kimokoti, 2017). They offer a broad spectrum of programs and opportunities for lifelong learning, making them a potent tool for achieving sustainable development goals (SDGs) (UNESCO, 2019). In Kenya, E-universities can act as agents of change, ensuring that education for sustainable development reaches a wider and more diverse population.

Kenya like many African nations, has made significant strides in expanding access to education. However, several challenges persist (Communication Authority of Kenya, 2021). Access to higher education, particularly in remote or underserved areas, remains limited. There are also issues related to the quality of education, which hinders the country's ability to produce a skilled workforce capable of addressing pressing sustainable development challenges. E-universities, which offer online degree programmes and courses, present an innovative solution to these challenges. They provide flexible and accessible learning opportunities for individuals who might otherwise be excluded from higher education due to

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

geographical, financial, or other constraints. The increasing availability of high-speed internet in Kenya makes it feasible to expand E-university offerings (Nabwire and Bulimo, 2019).

Sustainability and sustainable development are critical concerns in Kenya. The country faces numerous environmental, economic, and social challenges, such as climate change, poverty, and inequality (Kombo & Njoroge, 2017; Ngunjiri, 2018). Sustainable development aims to address these issues while ensuring that future generations can meet their needs. Education and training are key components in achieving sustainability by creating a skilled workforce and raising awareness about environmental and social issues. Further, E-universities can act as agents of change, ensuring that education for sustainable development reaches a wider and more diverse population (UNESCO, 2019).

The study aimed to explore how E-universities can contribute to sustainable development in Kenya. This can involve various aspects, such as E-universities incorporating sustainability-focused curricula into their offerings, preparing students to address sustainability challenges in their future careers, E-universities promoting research on sustainable development issues, and encouraging innovative solutions that can be applied in Kenya and beyond, E-universities can bridge the education gap by reaching out to underserved regions, promoting knowledge and skills that contribute to sustainable development and Collaborative efforts between E-universities, governmental bodies, NGOs, and the private sector can create a holistic approach to sustainable development.

Statement of the Problem

Kenya faces significant challenges in aligning its education and training systems with the demands of sustainable development, particularly in light of the global sustainability agenda. Traditional university models are often constrained by limited infrastructure, geographic barriers, and high operational costs, which hinder equitable access to quality education and training. This has resulted in a disparity in educational opportunities, especially for learners in remote areas and marginalized communities. Furthermore, the conventional education system lacks sufficient integration of sustainability principles into the curriculum, limiting the ability of graduates to address the socio-economic and environmental issues critical to the nation's development. Despite advancements in technology, the potential of E-universities to provide innovative, flexible, and sustainable education remains underutilized in Kenya. The lack of a cohesive strategy for integrating e-learning into higher education exacerbates the gap between the country's education system and the United Nations Sustainable Development Goals (SDGs), particularly SDG 4, which emphasizes inclusive and equitable quality education for all. Thus, there is an urgent need to explore the role of E-universities as a transformative approach to education and training for sustainable development, addressing the infrastructure gaps, promoting digital literacy, and fostering green learning environments.

Primary Objective

The specific objective of this study was to advance sustainable development in education and training in Kenya through E-universities for sustainability in Kenya.

LITERATURE REVIEW

The increasing global focus on sustainability has necessitated transformative approaches in education and training, with E-universities emerging as a viable model to foster sustainable development. E-universities leverage digital platforms to deliver flexible, inclusive, and scalable education, which aligns with the principles of sustainable development. In Kenya, the integration of technology into higher education through E-universities offers a unique opportunity to address challenges such as inadequate infrastructure, geographical barriers, and limited access to quality education (Mwangi & Ndung'u, 2021). By embracing e-learning, universities can create more environmentally friendly systems by reducing the need for physical campuses, thereby lowering carbon footprints associated with traditional campus operations (Mutua et al., 2020). E-universities are also equipped to offer interdisciplinary programs that embed sustainability concepts into the

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

curriculum, ensuring that learners acquire the knowledge and skills needed to address the socio-economic and environmental challenges facing the country (Ngugi, 2022).

Previous studies on sustainable development in education have largely emphasized the potential of online learning platforms to reach broader populations and promote environmentally conscious learning practices (Wals, 2020; Tilbury & Mula, 2021). However, many of these studies focus on e-learning's general applicability rather than its specific role in promoting sustainability-focused curricula in Kenya. For instance, Wals (2020) notes the importance of environmental education in digital platforms but does not address local contextual challenges, such as technological infrastructure limitations in Kenya. Another gap is the limited analysis of student engagement in e-university models specifically designed for sustainability. Tilbury and Mula (2021) highlight the potential for digital learning to foster sustainable mindsets but do not explore region-specific educational needs, leaving a gap in understanding how to adapt e-learning practices for sustainability in Kenyan universities.

Furthermore, E-universities in Kenya can contribute to sustainable development by enhancing green learning and digital literacy, which are critical for developing a knowledge-based economy. According to Kamau and Karanja (2023), E-universities play a pivotal role in promoting lifelong learning by providing access to open educational resources (OER) and Massive Open Online Courses (MOOCs), which ensure continuous professional development and skill enhancement. This approach aligns with the United Nations' Sustainable Development Goal 4 (SDG 4) on quality education and emphasizes the importance of inclusive and equitable access to education (United Nations, 2019). Moreover, the use of e-libraries and digital learning platforms reduces the dependency on physical resources, supporting environmental conservation and reducing operational costs (Omondi & Wambugu, 2022).

This study bridges these gaps by focusing on Kenya's unique challenges and opportunities in implementing e-university programmes with a sustainability agenda. It explores infrastructure needs, accessibility, and curriculum design tailored to Kenyan educational contexts, providing actionable insights for integrating sustainable development principles within digital learning environments. Moreover, this research contributes to the limited body of knowledge on student engagement strategies in E-universities, particularly in developing countries, offering practical approaches to fostering sustainability in higher education across Kenya. By addressing local infrastructural challenges and tailoring pedagogical approaches, this study provides a replicable model for other developing nations aiming to achieve sustainability goals through digital education. In conclusion, the development of E-universities in Kenya represents a critical shift towards integrating sustainability in education, fostering innovation, and equipping learners with the competencies required for sustainable development in the 21st century.

METHODOLOGY

The study adopted exploratory and descriptive research designs. The study's adoption of exploratory and descriptive research designs was appropriate for investigating the relatively novel concept of sustainable E-universities in Kenya. Exploratory research was effective in gaining insights into uncharted areas, allowing the study to explore unique factors influencing the implementation of e-learning for sustainability (Creswell & Poth, 2018). Additionally, descriptive research provided a structured approach to gathering detailed information about the current state of e-learning infrastructure, student engagement, and curriculum integration in Kenyan universities (Babbie, 2020). This dual design allowed for both the identification of new patterns and the systematic description of existing conditions, making it possible to derive actionable insights (Saunders, Lewis, & Thornhill, 2019). Overall, the combination of exploratory and descriptive research designs ensured a robust framework that supported both the discovery and documentation of context-specific solutions for sustainable development through digital education. The target population was University Lecturers. Random sampling was used to sample 100 University lecturers. Purposive sampling was used for University lecturers on social media

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

(WhatsApp forums). The study adopted Slovin's formula to determine sample size because the population was known with a specified margin of error. The formula was particularly useful as the study applied a simplified approach to sample size estimation.

Formula:

n=N1+N·e2n = \frac{N}{1 + N \cdot e^2}n=1+N·e2N

n: Sample size needed

N: Total population size

e: Margin of error (expressed as a decimal, e.g., 0.05 for 5%)

Therefore;

N=1,000 with e=0.1e = 0.1e=0.1:

n= $1000/1+1000(0.1)^2$ =1000/1+10=1000/11=90.91

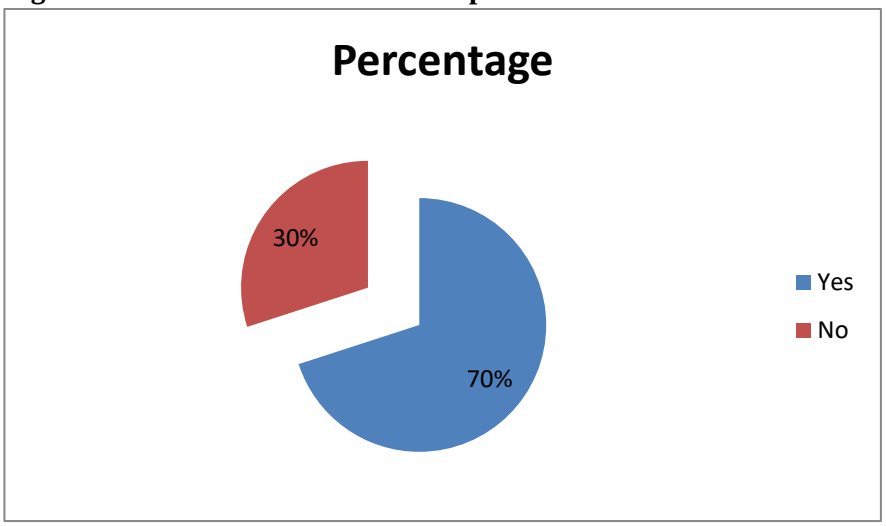
Thus the study rounded off to 100 respondents.

The data was collected using questionnaires. The study's choice of a questionnaire as a data collection tool was appropriate due to its efficiency in gathering data from a large number of respondents within a relatively short timeframe. Questionnaires enable standardized data collection, making it easier to compare and analyze responses systematically (Creswell & Creswell, 2017). Additionally, they provide a cost-effective method for reaching participants across different locations, which was particularly useful for studies focusing on e-learning and sustainability in multiple universities across Kenya (Groves et al., 2009). Using a questionnaire also allowed respondents to answer questions privately, which can enhance the reliability of responses by reducing social desirability bias (Fowler, 2014). Overall, this data collection method aligned well with the study's objectives of collecting quantifiable data on infrastructure, engagement, and curriculum integration for sustainable E-universities. The data was analyzed descriptively. The findings were discussed and recommendations were made to various concerned stakeholders. The study was carried out in the months of August and September 2023. All University lecturers were/are in continuous communication in the forum by the time of data collection and it eased the data collection procedures.

RESULTS AND DISCUSSION

The study sought to establish awareness of the concept of E-universities for sustainability in Kenya. Out of 100 respondents, 70% reported that they were aware of the concept of E-universities whereas 30% reported that they were not aware of the concept as shown in Figure no. 1.

Figure no. 1. Awareness of the Concept of E-universities



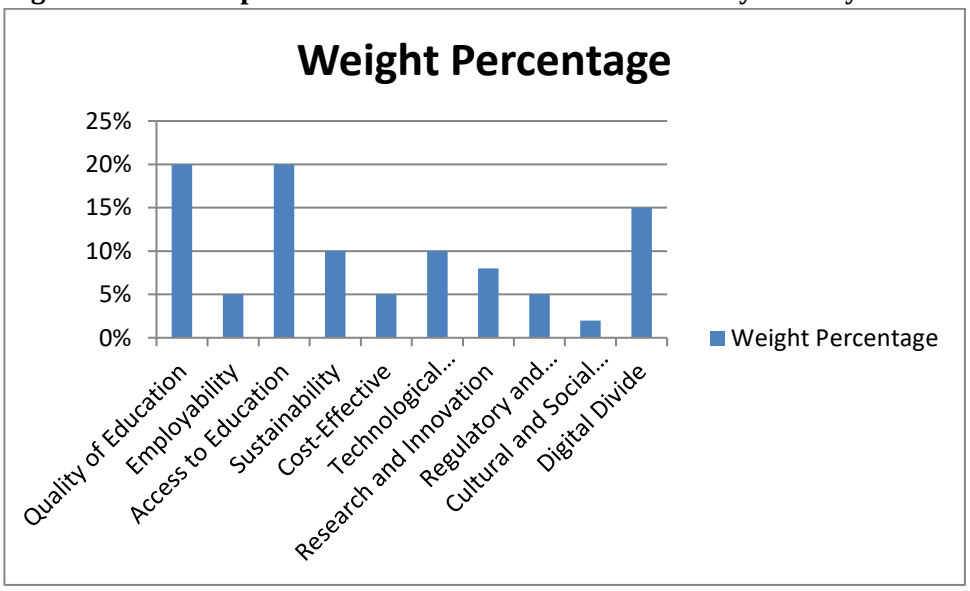
Further, the study sought to establish respondents' opinions about the initial thoughts or perceptions about the idea of E-universities for sustainability in Kenya. The respondents pointed out varied perceptions. Out of 100 respondents, 20% reported that there will be quality education. The quality of education in E-universities is a critical concern. Maintaining high educational standards and

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

ensuring that students receive a comprehensive and engaging learning experience online is vital. Faculty training, technology infrastructure, and content development are key components, 20% reported that there will be quality education whereby they see E-universities can potentially overcome geographical barriers, making education accessible to a broader population in Kenya. This is particularly important in remote or underserved areas where traditional universities might not have a presence, 15% reported that it will lead to a digital divide. That is; Kenya, like many developing countries, faces challenges related to the digital divide. Not everyone has access to reliable internet and technology. Implementing E-universities should be accompanied by measures to bridge this gap, ensuring equitable access, 10% reported that it will lead to technological infrastructure. That E-universities will lead to sustaining a robust technological infrastructure which will include reliable internet access, power supply, and cyber security measures, 10% reported that it will lead to sustainability. E-universities can reduce the carbon footprint associated with physical campuses, like transportation, energy consumption, and waste production.

This aligns with global efforts to combat climate change, 8% reported that it will foster research and innovation, particularly in areas related to sustainability. Online platforms can facilitate collaboration among researchers and students from diverse backgrounds whereas 5% of the respondents reported that it will lead to cost-effectiveness. Online education often reduces the cost of infrastructure and physical resources compared to traditional universities. This could lead to more affordable education options for students, potentially increasing enrollment, 5% of the respondents reported that there will be employability concerns for graduates from E-universities, especially in ensuring that the skills and knowledge acquired through online programs are relevant to the job market is essential, 5% of the respondents reported that there will be Regulatory and Accreditation Challenges as it will be a complex process which is crucial, especially in ensuring that these institutions meet national and international standards for the value of degrees awarded and 2% of the respondents reported Cultural and social aspects whereby they opined that traditional universities often provide a rich cultural and social experience for students. Therefore, E-universities should consider ways to foster community, networking, and extracurricular activities to enhance the overall student experience as shown in Figure no. 1.

Figure no. 1. Perceptions of E-universities for Sustainability in Kenya



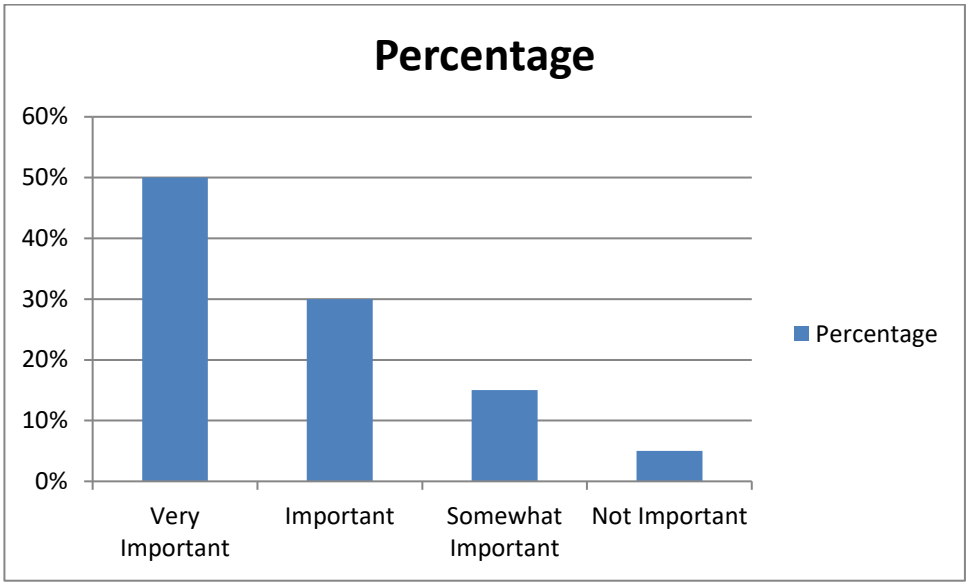
The study concluded that E-universities have the potential to play a significant role in promoting sustainability and expanding access to education in Kenya. However, addressing challenges related to technology access, quality of education, and cultural aspects is essential for their success. Continuous evaluation and adaptation of these initiatives will be crucial to ensure they meet the evolving needs of

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

students and society. The finding concurs with a study by (Fernández, 2018) on 'Challenge Based Learning: Innovative Pedagogy for Sustainability through E-learning in Higher Education'.

Moreover, the study sought opinions on how important sustainable development was for the future of Kenya. Out of 100% of the respondents, 50% opined that sustainable development was very important for the future of Kenya, 30% opined that sustainable development was important for the future of Kenya whereas 15% opined that sustainable development was somewhat important for the future of Kenya and 5% opined that sustainable development was not important for the future of Kenya as shown on Figure no. 2.

Figure no. 2: Opinions on the Importance of Sustainable Development for the Future of Kenya



The study concluded that Sustainable development is generally considered very important for the future of any country, including Kenya. The importance of sustainable development lies in its ability to address current needs without compromising the ability of future generations to meet their own needs. In the context of Kenya, several factors contribute to the significance of sustainable development such as environmental conservation, economic stability, social equity, climate change mitigation and global partnerships. This will concur with (UNESCO, 2019) on Education for Sustainable Development Goals.

Further, the study sought to establish how sustainable development positively impacts the social, economic, and environmental aspects of Kenya. The study established that sustainable development can have numerous positive impacts. Out of 100 respondents, 40% of the respondents reported that it will lead to economic benefits by having diversified economy by promoting sectors such as renewable energy, agriculture, and eco-tourism, reducing dependence on a single industry, increased foreign investment whereby a commitment to sustainability can attract foreign investment, as investors often prefer environmentally and socially responsible projects, job creation through sustainable projects like renewable energy and conservation efforts can create jobs, reducing unemployment rates and improving income distribution and long-term cost savings by adopting sustainable practices related to resource consumption and environmental degradation, 35% of the respondents reported that it will lead to social benefits by leading to improved quality of life through better access to basic services such as clean water, healthcare, and education.

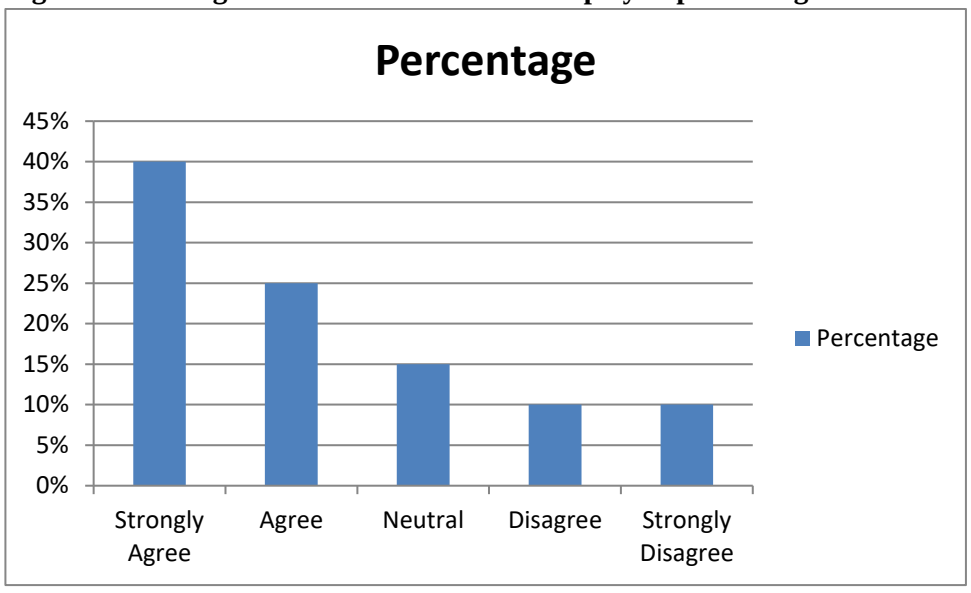
This can enhance the overall quality of life for Kenyan citizens, reduced poverty by creating job opportunities and improve income distribution, reducing poverty levels and increasing the standard of living for many Kenyans, enhanced gender equality whereby sustainable development often includes policies that promote gender equality, leading to increased opportunities for women in education, employment, and decision-making

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

processes, healthier communities whereby sustainable practices will reduce pollution and enhance public health, resulting in healthier communities with lower disease burdens and cultural preservation whereby promoting sustainable tourism and conservation efforts, Kenya will protect its rich cultural heritage and traditional ways of life and 15% of the respondents reported that it will lead environmental benefits through biodiversity conservation whereby sustainable development promotes the conservation of Kenya's unique biodiversity, safeguarding endangered species and preserving critical ecosystems, reduced environmental degradation whereby sustainable practices can help reduce deforestation, soil erosion, and water pollution, leading to improved soil fertility and overall ecosystem health, climate resilience whereby sustainable development will enhance Kenya's resilience to climate change by promoting clean energy, sustainable agriculture, and climate adaptation measures, energy efficiency whereby investing in renewable energy sources like solar and wind power will reduce greenhouse gas emissions and air pollution and water resource management whereby Sustainable development will improve water resource management, ensuring a more stable and reliable water supply for agriculture and domestic use.

In addition, using a Likert scale of 1-5, the study sought to investigate if respondents believe that E-universities will play a significant role in advancing sustainability development in Kenya. Out of 100 respondents, 40% of the respondents strongly agreed that E-universities will play a significant role in advancing sustainability development in Kenya, e-Universities will play a significant role in advancing sustainability development in Kenya, 25% of the respondents agreed that e- Universities will play a significant role in advancing sustainability development in Kenya, 15% of the respondents were neutral that e- Universities will play a significant role in advancing sustainability development in Kenya, whereas 10% of the respondents disagreed that e- Universities will play a significant role in advancing sustainability development in Kenya and 10% of the respondents strongly disagreed that e-Universities will play a significant role in advancing sustainability development in Kenya as shown in Figure no. 3.

Figure no. 3: Significance role E-universities play in promoting sustainable development



From the findings of the study, the research concluded that the majority of the respondents believe that E-universities will play a significant role in promoting sustainable development. The study concurs with the finding of Kombo and Njoroge, (2017) on "E-Learning and Sustainability in Kenya: Opportunities and Challenges."

Moreover, the study sought to investigate opinions on the functions E-universities will have in enhancing sustainability. Out of 100 respondents,

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

15% of the respondents pointed out that e-universities will lead to curriculum development in terms of design and offer specialized sustainability-focused programs, degrees, and courses, ensuring that students receive up-to-date and comprehensive education on sustainability topics, 12% of the respondents pointed out that e- universities will lead to research and innovation by facilitating sustainability research by providing a platform for researchers and students to collaborate on projects, share findings, and access resources and databases related to sustainability, 12% of the respondents pointed out that e- universities will lead to global collaboration by fostering international collaboration and knowledge sharing by connecting students and researchers from different parts of the world, enabling the exchange of diverse perspectives and solutions to global sustainability challenges, 10% of the respondents pointed out that e-universities will lead to sustainability leadership training whereas others in minimal responses pointed out sustainable education for all, skill development, green campus initiatives, partnerships with sustainability organization, lifelong learning, innovation hubs among others.

The study concluded that E-universities can be powerful catalysts for advancing sustainability by providing education, research opportunities, and a platform for global collaboration and advocacy. They can help build a more sustainable future by equipping individuals with the knowledge and skills needed to address pressing environmental and social challenges thus meeting the Education for Sustainable Development Goals (UNESCO, 2019).

Additionally, the study sought to explore the challenges foreseen in implementing E-universities for sustainability in Kenya and how these challenges can be overcome. Out of 100%, 40% of the respondents pointed out limited internet access and infrastructure; that is a significant portion of Kenya's population lacks reliable internet access and the necessary infrastructure. To mitigate this, there is a need to invest in expanding the internet infrastructure, especially in rural and underserved areas, encourage the private sector to provide affordable internet packages and implement mobile-based learning solutions for areas with limited broadband access. 12 % of the respondents pointed out technological barriers whereby many students and educators may not have access to the required technology or lack digital literacy skills. To mitigate this, the government to provide subsidies or incentives for students and teachers to acquire the necessary technology. Offer digital literacy training Programmes to bridge the skills gap and develop user-friendly e-learning platforms with intuitive interfaces. 12 % of the respondents pointed out the digital divide and inclusivity. This is whereby e-learning may exacerbate existing inequalities if it is not accessible to all socio-economic groups. To mitigate this, the government to provide subsidies or scholarships for disadvantaged students to access E-universities Programmes, implement a ''bring your own device'' (BYOD) policy to allow students to use their own devices and offer offline learning options for those without internet access. 10% of the respondents pointed out content development and adaptation where the challenge would be developing high-quality digital content and adapting traditional curriculum to online formats can be resource-intensive.

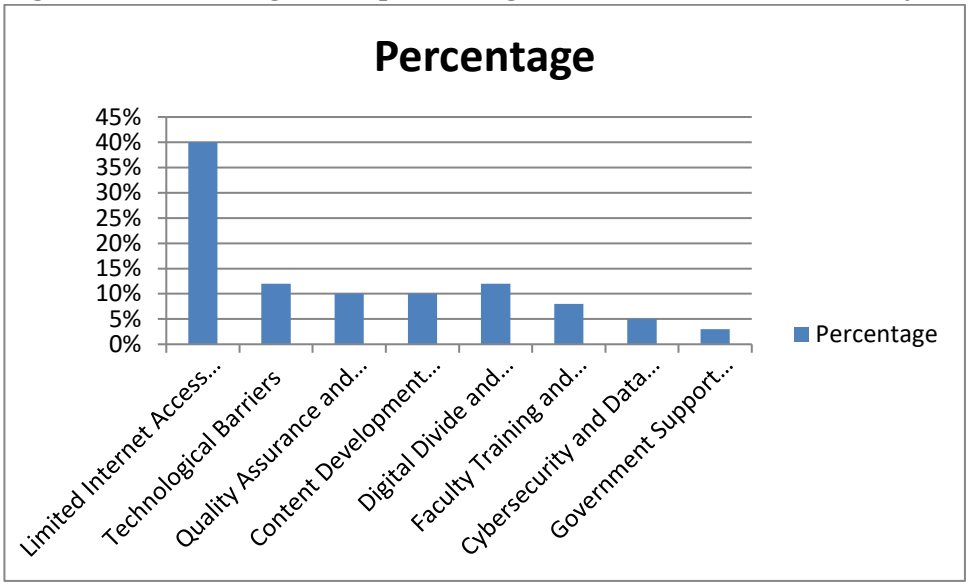
For mitigation, there is a need for the government to encourage Universities to collaborate on content development to reduce duplication of efforts, leverage open educational resources (OERs) to access pre-existing, high-quality content and establish partnerships with ed-tech companies for content development, 10% of the respondents pointed out quality assurance and accreditation whereby ensuring the quality of education in Universities and obtaining accreditation can be a lengthy and complex process. To mitigate this, the Commission for University Education to establish rigorous quality assurance mechanisms for e-learning Programmes, collaborate with international accreditation bodies to streamline the accreditation process and regularly assess and review E-universities Programmes to maintain quality standards. 8% of the respondents pointed out faculty training and support whereby the challenge would be faculty members may need training to effectively teach in an online environment.

To mitigate this, Universities to develop comprehensive faculty development programs for

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

online teaching, Create a community of practice where educators can share best practices and Offer incentives, such as research opportunities or professional development grants, to motivate faculty to embrace e-learning. 5% of the respondents pointed out cyber security and data policy whereby e-learning platforms will; be susceptible to cyber-attacks and data breaches. To mitigate this, E-universities to invest in robust cyber security measures and data encryption protocols, educate students and faculty on best practices for online security and regularly audit and update security measures to stay ahead of evolving threats. 3% of the respondents pointed out government support and policy framework whereby there is inadequate government support and unclear policies can hinder the growth of E-universities as shown in Figure no. 4. To mitigate this, E-universities to develop a comprehensive e-learning policy framework with clear guidelines and regulations, allocate funding and resources to support the implementation of E-universities and establish a dedicated government body to oversee e-learning initiatives and monitor progress.

Figure no. 4. Challenges in implementing E-universities for sustainability in Kenya



The study established that implementing E-universities for sustainability in Kenya, like in many other countries, can be a complex endeavour with several challenges. To successfully address these challenges, it's important to consider a multi-faceted approach involving government support, technological infrastructure, and educational reforms. Further, based on this finding, the study concluded that addressing these challenges will require collaboration between government agencies, educational institutions, private sector partners, and civil society. Continuous monitoring and evaluation of E-university programs will be essential to ensure their long-term sustainability and effectiveness in promoting education and economic development in Kenya. This concurs with Nabwire and Bulimo's (2019) study on "Factors Affecting Digital Literacy Skills in Kenyan Universities: The Case of Selected Public and Private Universities."

The study sought opinions on the types of courses or Programmes to be offered related to sustainability in E-universities. In this, the study received various responses in minimal percentages that E-universities should offer a wide range of courses and programs related to sustainability to address the diverse needs and interests of students and to contribute to a more sustainable future such as Sustainable Development an introductory course covering the principles, goals, and challenges of sustainable development, including economic, social, and environmental dimensions, Environmental Science Courses that delve into topics like ecology, climate science, environmental policy, and conservation biology, Renewable Energy Programmes focusing on solar, wind, hydro, and other renewable energy sources, including their design, implementation, and policy aspects , Green Building and Sustainable Architecture Courses on designing and constructing

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

environmentally friendly buildings and urban spaces , Sustainable Agriculture Programmes that teach sustainable farming practices, agro-ecology, and food systems, Environmental Policy and Law courses Exploring the legal frameworks and policies related to environmental protection and sustainability at local, national, and international levels, Circular Economy Courses on designing products and systems that minimize waste and promote resource efficiency, Sustainable Business and Management Programmes that integrate sustainability principles into business strategies, including sustainable supply chain management and corporate social responsibility, Ethics and Philosophy of Sustainability Programmes examining the ethical and philosophical underpinnings of sustainability principles, Interdisciplinary Sustainability Programmes offering interdisciplinary degrees that combine various aspects of sustainability, allowing students to gain a holistic perspective , Online Certificates and Micro credentials among other Programmes This concurs with Hodges., Moore., Lockee., Trust., and Bond (2020)'s study on' The difference between emergency remote teaching and online learning'

These are just some examples, and the field of sustainability is dynamic and evolving. E-universities should continuously adapt and expand their offerings to address emerging sustainability challenges and opportunities. Additionally, courses should be accessible, flexible, and designed to accommodate learners from diverse backgrounds and levels of expertise as pointed out by Keengwe and Onchwari's (2009) study on 'Technology and literacy in the 21st century: The importance of paying attention to technology literacy'.

Additionally, the study sought to explore how E-universities will ensure that their curriculum aligns with the needs of Kenyan society and environment. The 100 respondents had varied responses. 30% of the respondents pointed to stakeholders' engagement whereby E-universities should actively engage with various stakeholders, including government agencies, industry leaders, community organizations, and local experts. Regular consultations and feedback sessions can help identify evolving needs and trends, 15% of the respondents pointed to industry partnerships with industries and businesses operating in Kenya to gain insights into the skills and knowledge they require from graduates. Industry advisory boards can provide valuable input into curriculum development, 10% of the respondents pointed to regular curriculum review to make Curricula flexible and responsive to changes in society, technology, and the environment. Annual or biennial reviews with input from stakeholders can help keep programs relevant, 10% of the respondents pointed market research identifies emerging job sectors and areas of demand in the Kenyan job market. This information can guide the development of new programs and courses, 10% of the respondents pointed to digital learning tools by leveraging digital learning tools and analytics to monitor student performance, gather data on the effectiveness of courses and use this data to make informed adjustments to the curriculum, 10% of the respondents pointed flexible learning pathways by offering a range of programs and courses with different durations and levels of specialization. This allows students to choose paths that align with their interests and the changing needs of society whereas others in minimal percentages pointed out continuous faculty development, cross-disciplinary approaches, assessment and feedback mechanisms, community involvement, incorporating sift skills environmental consideration, international collaboration and public awareness.

This implies ensuring that E-universities align their curriculum with the needs of Kenyan society and the environment requires a comprehensive approach that involves collaboration, ongoing assessment, and adaptation. By implementing these strategies, E-universities can ensure that their curriculum remains relevant and responsive to the evolving needs of Kenyan society and the environment. Regular monitoring and adaptation are key to achieving this alignment successfully. This concurs with Watson's (2017) study on 'Digital learners in higher education: Generation is not the issue. E-Learning and Digital Media.

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

CONCLUSION

In conclusion, the establishment and promotion of E-universities for sustainability in Kenya offer a promising and innovative approach to addressing the challenges of education and training for sustainable development. Embracing digital technologies not only expands access to education but also enhances the quality of learning experiences, fosters global collaboration, and equips learners with the skills and knowledge necessary to contribute meaningfully to sustainable development initiatives.

Recommendations

To ensure the success of E-universities for sustainability in Kenya, it is essential to consider the following recommendations.

- Investment in Infrastructure. The government and relevant stakeholders should invest in robust digital infrastructure, including high-speed internet access and reliable electricity supply, to ensure seamless online learning experiences for students across the country.
- Curriculum Development. Collaborate with industry experts, educators, and environmentalists to design comprehensive and relevant curricula that incorporate sustainable development principles, environmental conservation, and social responsibility. These curricula should prepare students for the challenges of the future job market while instilling a strong sense of environmental stewardship.
- Teacher Training. Provide training and support for educators to effectively integrate technology into their teaching methods. Teachers should be equipped with the necessary skills to facilitate engaging and interactive online learning experiences, fostering a dynamic learning environment.
- Promote Interdisciplinary Learning. Encourage interdisciplinary approaches in education, where students from various disciplines collaborate on projects related to sustainable development. Interdisciplinary learning fosters creativity, critical thinking, and problem-solving skills, essential for addressing complex sustainability challenges.
- Collaboration and Partnerships. Foster collaborations between E-universities, governmental agencies, non-governmental organizations (NGOs), and private sectors. Partnerships can facilitate research, funding opportunities, and practical experiences for students, creating a holistic approach to sustainable development education.
- Continuous Monitoring and Evaluation. Implement a robust system for monitoring and evaluating the effectiveness of E-universities for sustainability initiatives. Regular assessments should be conducted to measure student outcomes, program relevance, and the overall impact on sustainable development goals.
- Community Engagement. Engage local communities and stakeholders in sustainable development projects and initiatives. Encourage students to participate in community-based projects that address environmental issues, promote renewable energy, and enhance community resilience.
- Promote Lifelong Learning. Emphasize the importance of lifelong learning and continuous skill development. Provide opportunities for professionals and individuals to acquire new knowledge and skills related to sustainable development, encouraging a culture of continuous learning and adaptability.

By embracing these recommendations, E-universities for sustainability in Kenya can pave the way for a brighter, more sustainable future. Through innovative education and training, individuals will be empowered to tackle the challenges of the 21st century, making significant contributions to the achievement of sustainable development goals in Kenya and beyond.

REFERENCES

Alemán de la Garza, L. Gómez Zermeño, M.; Mochizuki, Y.; Bruillard, E.; Anichini, A.; Antal, P.; Beaune, A.; Bruillard, E.; Burke, D.; Henrique Cacique Braga, P.; et al. *Rethinking*

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

Pedagogy. Exploring the Potential of Digital Technology in Achieving Quality Education; UNESCO MGIEP: New Delhi, India, 2019. [Google Scholar

Barrero Fernández, B. (2018). Challenge Based Learning: Innovative Pedagogy for Sustainability through e-Learning in Higher Education, *22*, 1–10. [Google Scholar] [CrossRef]

Babbie, E. (2020). *The Practice of Social Research* (15th ed.). Cengage Learning.

Communication Authority of Kenya. (2021). "Kenya ICT Market Review Report Q4 2020/2021." Retrieved from https://www.ca.go. ke/publications- downloads/research- publicatio ns

Creswell, J. W., & Creswell, J. D. (2017). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th ed.). SAGE Publications.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches* (4th ed.). SAGE Publications.

Fowler, F. J. (2014). *Survey Research Methods* (5th ed.). SAGE Publications.

Groves, R. M., Fowler, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2009). *Survey Methodology* (2nd ed.). Wiley.

Hodges, C. B., Moore, S., Lockee, B. B., Trust, T., & Bond, M. A. (2020). The difference between emergency remote teaching and online learning. Educause Review, 27Hossain, M. S., & Ali, M. M. (2014). Determining sample size with Slovin's formula: An empirical study. *Journal of Biostatistics and Biometric Applications*, *2*(3), 33-36.

Huss, J.A.; Sela, O.; Eastep, S. (2015). A case study of online instructors and their quest for greater interactivity in their courses: Overcoming the distance in distance education. *Aust. J. Teach. Educ. 40*, 72–86. [Google Scholar] [CrossRef][Green Version]

Kamau, P., & Karanja, J. (2023). E-learning and sustainable development in Kenyan universities. *Journal of Educational Innovations*, 14(3), 15-28.

Keengwe, J., & Onchwari, G. (2009). Technology and literacy in the 21st century: The importance of paying attention to technology literacy. TechTrends, 53(5), 535-540

Kombo, D. K., & Njoroge, K. T. (2017). "E-Learning and Sustainability in Kenya: Opportunities and Challenges." International Journal of Humanities and Social Science, 7(4), 196-203

Mwangi, J., & Ndung'u, L. (2021). Technological integration in higher education: A pathway to sustainability in Kenya. *Kenya Journal of Digital Learning*, 5(2), 22-38.

Mutua, R., Wambui, T., & Omondi, J. (2020). Green learning through e-universities: A case for sustainable development in Kenya. *International Journal of Education and Sustainability*, 8(1), 45-57.

Nabwire, B., & Bulimo, W. (2019). "Factors Affecting Digital Literacy Skills in Kenyan Universities: The Case of Selected Public and Private Universities." International Journal of E-Learning and Educational Technologies, 2(3), 8-17

Ngugi, M. (2022). The role of interdisciplinary programs in promoting sustainability education in Kenyan universities. *Sustainable Education Review*, 6(4), 33-49.

Ngunjiri, J. K. (2018). "Quality Assurance in E-Learning Programs: The Kenyan Perspective." International Journal of Educational Technology, 5(1), 26-37

Omondi, J., & Wambugu, T. (2022). Digital learning platforms and their impact on environmental sustainability in Kenyan universities. *Journal of E-Learning and Sustainability*, 7(2), 10-19.

Ozuorcun, N.C.; Tabak, F. (2012). Is M-learning versus E-learning, or are they supporting each

Article DOI: https://doi.org/10.37284/eajes.8.1.2525

other? *Proc. Soc. Behav. Sci. 46*, 299–305. [Google Scholar] [CrossRef][Green Version]

Racovita-Szilagyi, L.; Carbonero Muñoz, D.; Diaconu, M. (2018). Challenges and opportunities to eLearning in social work education: Perspectives from Spain and the United States. *Eur. J. Soc. Work, 21,* 836–849. [Google Scholar] [CrossRef

Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students* (8th ed.). Pearson Education.

Teixeira A., Ferreira M. R., Correia A., Lima V. (2018). Students' perceptions of corporate social responsibility: evidences from a Portuguese higher education institution. *Int. Rev. Public Nonprofit Market.* 15, 235–252. doi: 1007/s12208-018-0199-1 [CrossRef] [Google Scholar]

Tilbury, D., & Mula, I. (2021). Advancing environmental and sustainability education in higher Education: A critical review. *International Journal of Sustainability in Higher Education*, *22*(3), 455-472.

Ugwuozor F. O. (2020). Students' perception of corporate social responsibility: analysing the influence of gender, academic status, and exposure to business ethics education. *Bus. Ethics* 29, 737–747. doi: 10.1111/beer.12306 [CrossRef] [Google Scholar]

UNESCO. (2019). "Education for Sustainable Development Goals: Learning Objectives." Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000366157

UNESCO (2020). https://unesdoc.unesco.org/ark:/48223/pf0000252423/PDF/252423spa.pdf.multi (accessed on 1 April

United Nations. (2019). *Sustainable Development Goal 4: Quality Education*. United Nations.

Wals, A. E. J. (2020). Digital Learning for Sustainable Development: The Future of Online Education. *Journal of Environmental Education*, *51*(2), 129-145.

Watson, J. (2017). Digital learners in higher education: Generation is not the issue. E-Learning and Digital Media, 14(1), 11-28

Vázquez-Cano, E.; López Meneses, E.; Jaén Martínez, A. (2017). The group e-portfolio to improve the teaching-learning process at university. *J. e-Learn. Knowl. Soc, 13,* 65–76. [Google Scholar] [CrossRef]

