Journal of Social Science and Humanities, 3 (6): 01-09, 2020
e-ISSN: 2600 - 9056
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DOI: 10.26666/rmp.jssh.2020.6.1

Prospects of Harnessing Technology for E-Learning in Higher Education in the Kingdom of Eswatini

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Abstract: In the Kingdom of Eswatini, the need to provide quality education to all without any discrimination is a concern for Government and all affected parties. Available statistics have revealed that there are young and adult Emaswati who do not have access to quality education due to a shortage of resources. Availability of Information Communication and Technology (ICT) has opened up opportunities to explore ways of providing education to young and old who have not been absorbed into conventional institutions. The purpose of this paper is to discuss prospects of harnessing ICT for e-learning to enhance access to Higher education in Eswatini. Desk review of relevant literature and documents were used to compile the paper. The discussion paper unpacks higher education context in Eswatini and the concept of education as a human right. The paper further explores the use of the Learning Management System (LMS), challenges associated with technology use in education and proposes a model for the implementation of e-learning in Eswatini. The access and quality education could be improved through ICT usage to provide e-learning opportunities to those who are not catered for in traditional classrooms. A policy framework on ICT integration in teaching and learning should be developed.

Key words: *Technology. Technology integration. Higher Education. E-learning. Education access. Eswatini.*

INTRODUCTION

The growth in Information and Communication Technologies (ICTs) has opened up opportunities to education to improve the quality of education and use different modes of learning such as blended learning, where there is a combination of face-to-face and online learning, or fully online learning. Online learning, also referred to as e learning, depends on the availability of the internet and electronic gadgets such as desktop computers, laptops, tablets, and smartphones. The harnessing of computer technologies for e learning has increased access to education and improved the quality of education. Education is a human right for every child and adult through lifelong learning. Thus, increasing access to education increases chances for many people who could have been otherwise denied this right. The adoption of e learning has become mandatory particularly in the era of the COVID-19 pandemic, which has pushed institutions of learning to offer remote learning.

The harnessing of technology for education has, however, been met with several challenges particularly in developing countries both at school and higher education levels. The existing research literature suggests that to effectively benefit from what technology can offer for education, certain prerequisites such as having supporting policies in place at country and institutional levels should be met. The acceptance of e-learning should be reflected by strategic commitment among leaders [1].

The purpose of this paper is to discuss the prospects of harnessing ICT for e learning in order to enhance access to Higher education in Eswatini. The paper discusses the context of Eswatini in light of the availability of ICT and its integration in education; the concept of education as a human right; the use of e-learning platforms such as the Learning Management System (LMS), and challenges associated with the use of technology in education. The paper further proposes a context-relevant model for the implementation of e learning in Eswatini.

ESWATINI HIGHER EDUCATION CONTEXT

Eswatini was previously known as Swaziland and renamed "Eswatini" in April 2018 by His Majesty King Mswati III. Higher education in the country is regulated and accredited by the Eswatini Higher Education Council. This body was established in 2015 and mandated to ensure that post-secondary education creates high-level knowledge workers necessary for stimulating the economy [2]. Post-secondary institutions in Eswatini include skills centers, vocational centers, teacher training, and nursing colleges, and universities. This paper focuses on the higher education sector.

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According to the [3], Eswatini has four universities which are supported by the Government namely University of Eswatini (UNESWA), Limkokwing University of Creative Technology, Southern Africa Nazarene University and Swaziland Christian University. Three of the universities are private and UNESWA is a public institution. According to [3], UNESWA is the main provider of higher education and training in the country with the largest enrolment at post-secondary level accounting for 61% in 2015 and 47% in 2017 [4].

Nonetheless, access to higher education in the country's institutions is limited [5]. In addition, there is insufficient reliable data on the number of secondary schools' graduates who eventually access higher education. Even so, an unpublished report of an analysis of the ministry's statistics showed that 'The general education system, overall, is very inefficient and ineffective; of the 100% of learners starting Grade 1, only 30% survive until Form 5; and of the 100% of learners starting Grade 1, only 10% come out of Form 5 with a grade C or better" [5]. Anecdotal evidence suggests that of this 10% that qualify to enter higher education not everyone is admitted due to, inter alia, limited resources within and without the institutions of higher learning. This paper argues that harnessing technology by institutions of higher learning can improve the numbers of Emaswati accessing higher education.

The Eswatini communication infrastructure

The utilization of technology for learning in any country seems to be partly affected by technological infrastructure in that particular country or context. The [6] states that Eswatini should attain first world status by the year 2022. It challenges the "cableway and telecommunications" sector to: allow competition in the telecommunications industry within a conducive supervisory environment; coordinate implementation of communications infrastructure with national development agents; and ensure that the telecommunications network is in line with new technological development abroad, among other things [6]. [7] reported that in Swaziland "the telecom sector featured an old-style posts and telecom monopoly operator for fixed services but with private participation in mobile and internet services". However, [7] also pointed out that compared with other countries in the region, the fixed and mobile penetration was relatively high; and internet usage was growing reasonably fast, but the level of penetration was below international standards, even though about average in the region.

The country's communication infrastructure is crucial in determining whether or not institutions of higher learning can harness technology for education. [8] argues that what educational institutions can offer learners depends ultimately on whether or not the right ICT infrastructure is available. The author posits that effective infrastructure is an essential prerequisite to realising all that ICT can offer. Technology will be reliable when it is carefully designed and well managed as part of the whole institution's strategic plan. Good ICT infrastructure can help higher education to better research, deliver more online courses and improve teaching and learning. In support of students having access to good ICT infrastructure, the Council of Higher Education in South Africa [9] states that higher education institutions should assess availability of ICT infrastructure and Internet access in the locations where their target students live as well as the opportunities and barriers to effective use of these. The Institute encourages institutions to be spell out technical requirements and assumptions (hardware, software, connectivity, and skills) before registration for students. Students do not only need the device but also the connectivity. Moreover, some content may not be accessible and compatible with all devices and other content such as video and graphics require both high bandwidth and continuous access.

According to Swaziland, Multiple Indicator Cluster Survey (MICS) conducted in 2014 indicators for the use of information/communication technology include the use of computers and the use of the internet. The results of the MICS showed that the percentage of young people aged 15-24 years who used a computer during the last 12 months was 42.7% women and 48.8% men. For the use of the internet, the percentage of young people aged 15-24 years who used the internet during the last 12 months was 39.8% women and 55.6% men [10]. This age bracket includes young people enrolled in higher education.

HIGHER EDUCATION AND THE USE OF TECHNOLOGY

The use of technology in education should be backed by national policies. In 2006, a draft national ICT policy was introduced in the country. The [11] recommended that government should "develop a sector-specific ICTs policy that is anchored in the national ICTs policy". The ICT policy for the Ministry of Education and Training was then drafted in 2012. The National Education Sector Policy [12] acknowledges "social and economic development can be powerfully stimulated by investment in knowledge, especially science and technology". Technology in higher education can be used to enhance curriculum design, teaching and learning, and quality assurance [13]. This view is supported by [12] as one of the Higher Education policy objectives is "To develop and impart research skills linked to the world of work and entrepreneurial development, including the use of ICT". This demand could be achieved by ensuring that higher education programs respond to labor market needs.

While the ministry supports the use of ICT in education, institutions of higher learning have not been fully integrating technology as reported by the [14]. For example, the World Bank found that UNISWA "Study programs are traditional, dominated by lectures and hardly using the potential offered by ICTs in facilitating teaching and learning". It further noted that the Institute of Distance Education (IDE) at the university could enhance the use of ICTs to plan and deliver their programs." The Institute itself does not seem to be using ICTs much in its delivery of programs and this constitutes a lost opportunity". This was as of 2010, at present the Institute has made significant inroads in technology use. The university has introduced blended learning and adopted the Moodle Learning Management system even though there are teething problems [15].

While the lack of technology integration in higher education can be partly attributed to a weak policy environment, [16] argue that in some sub-Saharan Africa countries policy documents exist but there is a disparity in what they advocate such as twenty-first-century learning and what they can support. There are no comprehensive and enabling telecommunications to support Educational technology policies.

EDUCATION AS A HUMAN RIGHT

The Universal Declaration of Human Rights (UDHR) of 1948 declared education as a human right. Article 26 of the said declaration state that:

Education shall be directed to the full development of the human personality and the strengthening of respect for human rights and fundamental freedoms. It shall promote understanding, tolerance, and friendship among ... racial or religious groups.

This declaration alludes to the provision of quality education and this is based on the understanding that education plays a pivotal role in the emancipation of people, especially those from lower social classes. [17] notes that if children receive quality basic education;

… they will likely be literate and numerate and will have the basic social and life skills necessary to secure a job, to be an active member of a peaceful community, and to have a fulfilling life.

The need to develop numeracy and literacy skills in children are important and with a sound education base, such children would possess important skills for employability and job creation thereby beating the poverty cycle. Several other international treaties support the notion of quality universal education. There are treaties such as the International Covenant on Economic, Social and Cultural Rights (ICESCR) and the Convention on the Rights of the Child (CRC). Of importance in the mentioned treaties is the provision of equal educational opportunities to enable all children to develop to their full potential regardless of gender, race, ethnicity, religion, and social class.

Article 28 (1) of the Convention on the Rights of the Child (CRC) recognizes the right of every child to education and urges member states to make primary education free and compulsory. It further calls for the provision of accessible higher education, including vocational and technical education. Despite the ratification of the said treaties by many African countries, the issue of quality education for all remains elusive. The current Covid-19 pandemic, which has made remote and online learning mandatory, has further exposed inequalities in access to education in African countries. [18] note the inequalities in societies that have resulted in children from lower social classes' inability to access electronic learning due to lack of required electronic resources. In such instances, while education is deemed a right, it becomes a commodity to be afforded by those with the means.

HIGHER EDUCATION CHALLENGES IN AFRICA

The low participation in higher education observed in Eswatini is not unique. The participation rates in higher education in sub-Saharan Africa countries are quite low compared to middle and high-income countries. The [19] states, "only 6 percent of young people in sub-Saharan Africa are enrolled in higher education institutions compared to the global average of 26 percent". The realization of the low participation rates in higher education in African countries calls for concerted efforts to widen access to higher education. [20] note that there is a high demand for access to higher education in most African universities and conventional universities often fail to meet the demand. [21] observes that the high demand for higher education in Africa cannot be met by traditional face-to-face delivery alone.

The other challenge of higher education in Africa is associated with differential and unequal utilization of technology. African societies are unequal in terms of access to resources and this results in the digital divide. [22] defines the digital divide as "the gap between those who do and do not have access to computers and the Internet." The current Covid-19 pandemic has badly exposed the digital divide in African countries, as remote learning could not be implemented well due to unequal access to electronic devices and internet connectivity. The issue of technological devices and internet connectivity are prerequisites for the effective implementation of any remote learning endeavours. [23] found that most students in the historically disadvantaged universities in South Africa had serious challenges in accessing the required electronic devices for online learning.

USE OF LEARNING MANAGEMENT SYSTEMS

Learning management systems (LMS) is defined as a "web-based software application that is designed to handle learning content, student interaction, assessment tools and reports learning progress and student activities" [24]. Using LMS assures an efficient learning environment in teaching and learning [25]. The nature of features in LMS further improves class administration issues or assessment issues in education. Generally, LMS ensures the customization of courses to the needs of learners [26]. Furthermore, the attractive feature of LMS is its ability to integrate with other systems. For example, LMS were integrated with social media networks such as Facebook [27]. Each system or application has attributes that can be integrated into teaching and learning. To get the most of these technologies LMS can be used as a base technology.

LMS can generate analytical reports that can assist institutions in providing accurate information about the learning behaviour of students [28]. Furthermore, the authors explain that the education domain can benefit more from using LMS to reduce inefficiencies by streamlining the delivery of learning. This is achieved by using the mobile version of LMS that can be accessed anytime, anywhere, and make learning content access location-independent [29]. Therefore, students can study using their desktop computers and mobile devices from any place, even while being in another country. Also, LMS is used to assess students' progress and instructors adjust their teaching strategies accordingly then ultimately achieve intended learning outcomes. However, adding content and administration requires additional effort on the part of the instructor. In that regard, support is of paramount importance.

Another virtue of LMS is that they contain features that facilitate centralisation of information. After creating a course on LMS, using e-learning standards [30] the course can be migrated to another platform or shared among colleagues. One of the greatest features of LMS is that it makes blended learning possible [31]. Moreover, enhancing the ability to deliver engaging and motivating learning experiences are two advantages achieved by the use of LMS. Storing all course information in one place where it is accessible by one or more instructors and learners, increases convenience. LMS helps to make use of providing students' activity records as well as students' performance information through learning analytics [32]. Additionally, LMS assure technology to leverage for the benefit of instructors and learners.

Although LMS have shown potential usefulness in the higher education sectors, there are challenges that Eswatini needs to consider when employing LMS in Higher education institutions. LMS do not guarantee learning. There is a need to appreciate the notion that with or without technology, learning is about teaching [33] educators should be informed of the blended learning tools available and make use of them to complement, not replace, their existing teaching practices. Educators are therefore encouraged to view technology integration from a wider perspective and be reflective in their teaching as they use technology to support and facilitate teaching.

MOBILE LEARNING

Mobile learning is defined as "learning that occurs when learners have access to information anytime and anywhere via mobile technologies to perform authentic activities in the context of their learning" [34]. New technology has enhanced our learning capacity through smart mobile phones. Now, users can access the content they need anywhere without limitations. Freedom of time and space can improve students' interest in the learning content resulting in better retention [35]. Besides, mobile learning supports a myriad of pedagogies, of which many of them are constructivist. Depending on how they are set up, mobile learning projects promote problem-based learning, peer learning, just-in-time learning, and active learning [36]. From a constructivist viewpoint, mobile learning is a social approach to learning [37]. As a result, students can be more self-directed in their learning.

Mobile learning implication to teaching and learning include the mobility of learners wherein learners are engaged in the process without limitations of physical location. Furthermore, mobile devices are becoming lightweight making them easy to carry around. Mobile learning supports a wide range of knowledge-construction activities which include audio recording, video recording, podcasting, and vodcasting not leaving out the traditional image capturing [38].

Mobile learning has brought benefits to teaching and learning. Research indicates that some university lecturers are yet to adopt mobile technology as part of teaching and learning as they view the devices as distractors [39]. However, with the increase in the use of online learning platforms due to COVID-19 lockdown, perceptions are beginning to change and technology is adopted quickly. Mobile technology continues to offer new opportunities to integrate face-to-face learning and online learning methods. Blended learning facilitates combining various forms of learning and integrating a variety of ways to access content using mobile technology. It is important to note that lecturers need to be trained in applications that go along with the use of mobile devices such as Facebook, LinkedIn, Whatsapp to spruce up their teaching in higher education [40].

In blended learning settings, students may have the freedom to show their skills without meeting face-to-face. This can be achieved with e-portfolios. An e-portfolio is one of the media for students and lecturers to share their knowledge online [41]. E-portfolios could

be used to support technical and complex modules under a controlled environment [42]. This ensures that students do not lose focus from their most important part of their studies. The technology equips students with a skill set that prepares them for the workplace.

PRE-REQUISITES FOR EFFECTIVE IMPLEMENTATION OF E-LEARNING IN ESWATINI

Given that the world has become a global village due to advancements in information and technology, Eswatini has not been left behind in terms of online learning. When introducing improvements in the educational process, institutions of higher education should identify problems and make a step-by-step action plan to resolve the identified problems [43].E-learning readiness preparation when conducted at the institutional level, influences administrators beliefs about matching teaching and learning strategies with existing methods of teaching. Institutions are assessed based on psychological, social, environmental, human resources, and technological e-readiness. One of the aspects of psychological readiness is the attitude of academic staff and top management towards e-learning. [44] state that social readiness deals with the interpersonal aspects of the environment in which the learning will be implemented. Assess how social and interactive learners are with each other. Environmental readiness assesses the institution's internal and external factors that can influence e-learning.

Human resource readiness assesses the availability of staff, both internal and external that will impact the success of e-learning. This includes supporting professional development. Instructors should receive training in online pedagogy this includes instructional design training for developing online learning materials as part of their professional development training [45]. There is a need to support learners with different needs. To identify e-learning needs, you must have a formal process of collecting and documenting the training needs. Specific survey forms completed by staff and the management will help in identifying training needs and views on e-learning.[46], describe technological readiness as the technical skills of academic and non-academic staff for example their ability to handle e-learning content and institutional infrastructure.

Institutional barriers refer to the cost implications of e-learning compared to traditional teaching methods [47]. Content barriers include factors such as high prospects from the course, inappropriate course material, poor quality, and inadequate information, and poorly designed assignments. Situational barriers are learners' environments and situations that influence their ability to undertake the course. Technological barriers refer to the quality of the LMS, Internet connectivity, and navigation challenges could be some potential barriers.

CHALLENGES IN HARNESSING TECHNOLOGY FOR E-LEARNING

The harnessing of technology for online learning and technology-enabled learning has been met with some challenges [48]. The challenges hinder full exploration and exploitation of technology opportunities. What appears to be common challenges across countries is infrastructure, costs, lack of technology knowledge, and skills for both the Instructor and students. The same author asserted that poor infrastructure is common in public institutions that have poor physical facilities and infrastructure. [49] in their study on the use of ICT in Higher Education in India listed the key challenges as ICT infrastructure, language, and content, lack of finances, lack of competent professional educators as the majority were not experts in the use of technology. They explained that there is a high cost incurred for acquiring, installing, and replacement of software with the latest. For India for example, they stated that many areas were still without a reliable supply of electricity, Internet service for online learning and the nearby telephones were miles away and non-availability of suitable rooms or buildings to house the technology and access to computers in universities, communities.

Concerning language, the authors averred that the language used in the Internet is mostly English and most educational software produced in the world market is in English. In areas where English language proficiency is not high, this poses a barrier in exploiting the educational benefits of the World Wide Web. [50] point out that lack of readiness is a major challenge facing technology use in education in sub-Saharan Africa. There is generally lack of physical, human, technical, systems, and policy readiness. About a decade ago, [51] identified some factors inhibiting the harnessing of technology in tertiary education in small states. These include a lack of awareness from top-level leadership. This leads to inadequate investments and maintenance of monopolies. Other factors include lack of adequate connectivity and its high price because of strong monopolies in the telecommunications sectors; inadequate financing due to governments not budgeting for ICT development; lack of national up-take from 'pockets of excellence'; lack of adequate secondary infrastructures such as electricity, landlines, and fiber-optic networks; inadequate ICT technical manpower such as programmers, education technologists, content creators, and ICT technicians; ICT-illiterate teachers; and lack of connectivity is the single most important impediment to effectively harnessing technology.

Other challenges in harnessing technology include learners getting distracted, limited understanding of the interrelationship between using

technology in school for learning and using technology outside the school for a wide range of learning. Further to that, the danger of social divides about technology provision, technology access, and engagement as well as family support, could be divisive and increase the gap between those who reach their full potential and those who do not [52].

Proposed model for ICT integration in education.In proposing the possible harnessing of technology for the enhancement of teaching and learning in Eswatini, the model below is suggested.

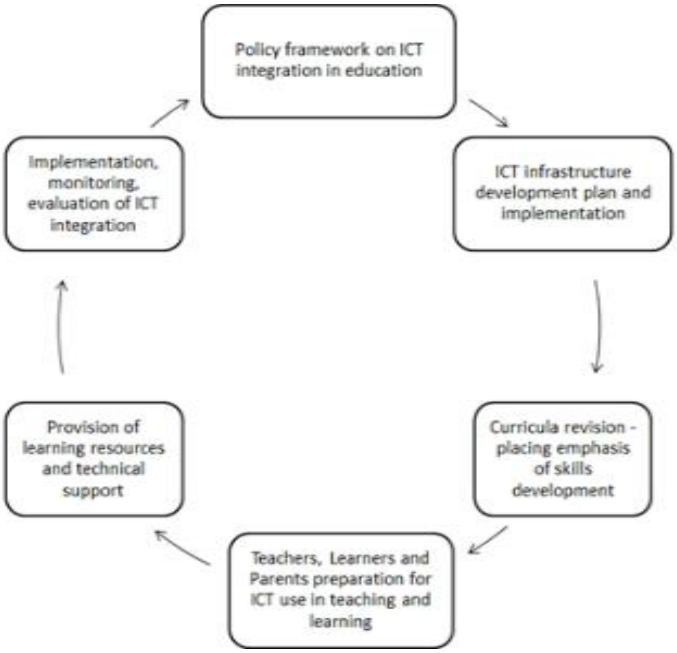

Figure 1 Proposed Model for ICT Integration

The starting point is for the country to have an ICT integration in education policy. Such a policy should be developed with wide stakeholder consultation. The policy should spell out how the integration of ICTS should be done at all levels of education delivery and specific roles and functions being defined in the implementation of the integration exercise. There should be an ICT infrastructure development plan and implementation of the plan. The plan should address issues of the internet bandwidth, connectivity, and availability of electronic devices to bridge the digital divide. Curricula at different levels should be repackaged to align with technology. The heart of the repackaging is to see how technology assists in driving the learner-centered and collaborative pedagogical practices. All major stakeholders in education namely lecturers, teachers, learners, and parents should be prepared adequately for technology integration. Lecturers and teachers require training online course design, online facilitation, and online material development. Electronic resources for technology should be made available and technical support should be offered. Once the technology integration programme is rolled out, there is a need to monitor and evaluate the implementation to achieve the desired goal of enhanced teaching and learning.

CONCLUSION

There are challenges and opportunities in harnessing technologies and integrating them in teaching and learning in Eswatini. The current Covid-19 pandemic has made technology integration in teaching and learning an imperative. The 'new normal' dictates that learners learn online at all levels of the education system. However, there are still realities of unequal access to technological devices and internet connectivity across the country. There is a need for concerted efforts to leverage on what obtains on the ground and build better technological infrastructure and human resource capacity to drive the online learning agenda.

RECOMMENDATIONS

In the light of the foregoing discussion, the following recommendations are made;

a) A policy framework on ICT integration of teaching and learning should be developed as a matter of urgency.

b) There should be a government-industry partnership in developing the technological infrastructure of the country.
c) There should be enhanced utilisation of digital learning platforms in all institutions of learning, at all levels.
d) Institutions with budget challenges should adopt open-source LMS because it is cost-effective.
e) There is a need to continuously train and support lecturers in technology integration in teaching and learning by empowering them in online pedagogies.

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