



Adoption of Digital Literacy Strategy on Academic Progress of Private University Education in Kenya: A Survey of Umma University, Garissa Campus

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors designed the study, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript, managed the analyses of the study and managed the literature searches. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJEBA/2020/v19i230300

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Complete Peer review History: <http://www.sdiarticle4.com/review-history/62723>

Original Research Article

Received 22 October 2020
Accepted 11 November 2020
Published 13 November 2020

ABSTRACT

The global higher education landscape has dramatically changed over the last couple of months as a result of the spread of coronavirus. The motion of learners and teachers has been reduced drastically due to the outspread the pandemic. In Kenya, the close up of universities by the government to prevent the spread of this disease has been a big blow to education sector. Resultantly, the government encouraged university managements to embrace digital literacy strategy through virtual academic platforms. The success of this strategy has not been uniform to all universities in Kenya. Academic programs in most universities have stagnated following the close up. This study was purposely conducted to assess the adoption of COVID-19 digital literacy strategy on academic progress of private university education in Kenya. The objective of this study was to find out the effects of e-learning mode of delivery on academic progress of private university education in Kenya. This research utilized a descriptive research design to collect data in order to

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test the research questions and hypothesis about the relationship between the study variables. The target population of the study comprised all 207 students in Umma University in Garissa Campus. A sample size of 137 respondents was then chosen using systematic sampling. Primary data was collected by use of structured self-administered questionnaires phrased on a 5 likert scale. Data collected was analyzed according to the objectives of the study. SPSS version 24 was used to conduct both descriptive and inferential statistics analysis. Analysis of Variance and Linear Regression analysis were conducted to establish the correlation between the study's variables. The hypothesis of this study was tested at a confidence level of 0.05. The study established a positive significant relationship between e-learning and academic progress of university education. The findings of this study will guide management of universities to formulate strategies that would strengthen virtual learning in all centers of higher learning. The study recommends adoption of digital literacy programs by all universities in order to ensure continuity of learning with or without a pandemic in the country.

Keywords: Online learning; e-learning; digital literacy; remote learning; COVID-19 virtual learning.

1. INTRODUCTION

The effects of coronavirus pandemic have hit most sectors especially learning in the whole world. From the period this disease was declared a global pandemic, its effects have been magnificent to the life of mankind globally. Each nation of the globe has mitigated measures to fight down the disease. Offline classes have been muted in many nations to curb the spread of the virus amongst people. The reports from UNESCO indicate that about one and half billion students have been impacted by lockdowns of learning institutions. This has forced many universities to change to remote learning as substitute of face to face instructional method. Private centers of education have adopted several platforms like seesaw, schoology and google classrooms Osman, [1].

A survey by Bacow [2] shows that many universities have adopted strategies to control the spread of COVID-19 and consequently this has affected transmission of learning. Equally, a study by Blumenstyk [3] established that the spread of the pandemic would compel higher institutions of learning to adopt measures that would not make the distinction between offline and online learning programs. A research by OECD has shown that COVID-19 pandemic has affected people regardless of nationality, level of education, income or gender. Students from privileged backgrounds, supported by their parents and eager to learn, have been able to find their way past closed school doors to alternative learning opportunities. According to this survey, students from disadvantaged backgrounds have often remained shut out following closure of learning institutions, including universities. This pandemic has indeed exposed

many inadequacies and inequities in our education systems— from access to the broadband and computers needed for online education, and the supportive environments needed to focus on learning, up to the misalignment between resources and needs. The study further notes measures embraced to control coronavirus have interfered with normal learning routine programs in many nations of the world for more than three months. The study established that most learners have been compelled to use remote learning hence depending on their own resources. Instructors have been obliged to apply new methods of teaching though majority of them are insufficient of necessary skills. However students from the marginal class don't have accessibility to digital resources to necessitate online learning and lack the ability to institute personal learning making them prone to lagging behind Schleicher, [4].

A survey by Quacquarelli Symonds (QS) Team indicates that many students from various parts of the globe in the higher education sector have been tremendously affected the outbreak of COVID-19 pandemic, from travel restrictions to social distancing, isolation measures, quarantines, campus closures, and border closures. This research observed that as of the 26 March, 58 percent of prospective international students expressed interest in studying their degrees online due to coronavirus restrictions, while only 42 percent said that they had no interest in studying online in preference to offline learning. Additionally, 51 percent of prospective international students surveyed said that they expected universities to move more of their lectures to remote modes. Centers of higher learning globally have been compelled to close down learning and adopt digital literacy to

combat COVID-19 pandemic. Campuses have faced hurdles resulting from this disease. Many are struggling to navigate this crisis while maintaining consistent course delivery, ensuring strong student recruitment numbers, and providing clear communication to staff and learners. Due to these challenges, universities have implemented a range of measures to adapt to this new normal. To help universities across the globe, edtech companies such as Aula, iteach. World provide online lessons QS, [5]. To respond to school close ups, a report by UNESCO has recommended use of remote learning to provide education to students in perpetuation UNESCO, [6].

Many European nations have established measures to revamp education during this pandemic. In Canada, the launch of the Canada Emergency Student Benefit announced in April 2020 which seeks to provide financial support to post-secondary students and recent high school graduates who are unable to find what to do as a result of coronavirus pandemic during the summer months. The Canada Student Service Grant will also provide financial support to students who do national service and serve their communities during the pandemic crisis. The government has also announced plans to double student grants and broaden the eligibility for financial assistance Trudeau, [7] as well as additional support in the form of scholarship funding extensions for students and postdoctoral researchers affected through coronavirus Ministry of Education, [8,9]. In Italy, distance learning support measures announced by the Italian government in March 2020 helped to equip schools with digital platforms and tools for distance learning; assisted to lend digital devices to less well-off students, and decided to train school staff in methodologies and techniques for distance learning Republic of Italy, [10]. In May 2020 Italy announced new measures which sought to provide extra funding to cover costs arising from responses to the pandemic crisis at the school and university level. This extra funding will cover the costs associated with special services, safety equipment and cleaning material needed in schools and universities for the next academic year, among other things Schleicher & Reimers, [11].

In Asia, COVID-19 has made universities to adopt digital learning. Despite this, most learners lack accessibility to internet, and inequalities in digital literacy has been witnessed in many nations. Countries like Malaysia and Singapore

have almost eighty percent access to internet accessibility. Nations like Cambodia and Thailand have around forty percent of people accessible to internet penetration. Inaccessibility to internet is more pronounced as witnessed by reliability, speed, cost, and availability of digital resources. Marginalized students have been mostly affected by this. This has made most nations to provide financial assistance to learners to purchase the required digital tools. Certain centers of higher learning had adopted virtual learning before coronavirus. Some campuses in Malaysia had developed virtual platforms for online classes. Investment in digital literacy has given countries such as South Korea advantages in virtual learning although there are concerns on the skills possessed by both learners and tutors to handle such technology. Countries like Indonesia have exhibited varied response to digital literacy program. In such countries people have doubts on the effectiveness of e-learning as students and tutors struggle to learn virtually. These challenges has been caused by internet failures, lack of familiarity on digital software by the users. This has been established by a survey conducted on 1,045 students in Indonesia, where forty eight percent of them said they required more time to adapt to virtual literacy. These hurdles have forced many nations to develop linkages between universities and private companies hence enabling international learners to participate actively in global education. Digital literacy has therefore seen many universities ready to receive back their lectures and learners. COVID-19 is likely to influence innovativeness largely due to financial challenges, both in the short term and long term basis. In countries such as Vietnam, learners from poor backgrounds and are affected by coronavirus, are getting scholarships to pursue their studies. Many universities have made decisions to refund and/or reduce fees to relieve parents and guardians on financial burden brought by the COVID-19. This has been the case in Philippines and Thailand. Job cuts and resultant loss of revenue have been heightened by the pandemic. The pandemic has really affected international education because foreign students have been unable to move across countries. Examinations and enrolments have been affected to a great extent hence spelling doom on the reopening of institutions Yarrow, [12].

The continent of Africa has been hit hard by coronavirus. Most nations closed down learning institutions to prevent the spread of this disease. Some universities and colleges opted to adopt

remote learning. However majority of them were caught unaware and unprepared to this new dispensation. Immediate closures were instituted by most nations to fight the spread of the virus. The Egyptian government became the first to report this case. The management of universities had no option but to embrace virtual education strategy. Time has come for the institutions of learning to embrace a blended strategy in order to provide continuous quality education to learners. Many African universities have adopted virtual learning by collaborating with platforms such as Telco. Other countries' universities have provided packaged data and portable computers to students. Currently Africa has almost one thousand six hundred and fifty universities. Despite adopting digital platforms, many learners have continued to face a lot of difficulties in accessing remote classes. A survey by UNESCO showed that eighty nine percent of learners in sub Saharan Africa can neither afford laptops nor internet. This implies that most students can not have access to virtual learning. However some universities have struggled to provide recorded lectures and other forms of digital literacy World Economic Forum, [13].

In Kenya, the government considers higher education and training to be significant pillars for national development (RoK, 2010). For this reason the government continues to fund universities so that they can enhance creativity and innovation through research. However these endeavors have been negatively impacted by COVID-19 pandemic. The COVID-19 virus has affected education sector totally resulting to almost complete closures of universities. The government has therefore encouraged the adoption of virtual learning in pursuit to support distance learning and online education delivered through internet modes to replace face to face learning but inaccessibility to ICT infrastructure, and internet have hindered the quality of this education Areba, [14]. Universities in Kenya have been faced with tough conditions of rolling out online learning for thousands of students and finding money to pay salaries and meet their financial obligations with limited sources of revenue. Learning programs have been disrupted severely especially in private universities due to scarcity of resources. Again, although universities have been forced to turn to online learning to ensure students finish their courses on time, lack of preparedness has been an obstacle to many Nganga, Maina & Nakweya, [15]. In most institutions of higher learning in Kenya, virtual lessons are geared towards

postgraduate studies but not for undergraduate students. This has been necessitated by lack of adequate investment in virtual platforms by the universities and colleges Daily Nation, [16]. It against this background that this study sought to assess the impact of digital literacy strategy on academic progress of private university education in Kenya.

1.1 Statement of the Problem

Over a decade now, universities were encouraged by the government of Kenya to adopt digital literacy under the umbrella of its vision 2030 as outlined in the strategic plan. This strategy was intended to expand membership for students wishing to attain higher education in the country. The government of Kenya also intended to promote innovativeness within the universities as centers of research. However, coronavirus has now forced varsities and colleges to temporarily close to prevent the spread of the disease. This has compromised both education standards and accessibility to education. E-learning has substituted offline learning. However not all universities have been able to embrace remote teaching and assessment successfully. Most students in universities prefer a blended method of learning carried out in the regular lecture rooms' atmosphere. Despite much application of computerization in Kenya, there are eminent difficulties in accessing digital platforms for effective learning, for both lecturers and learners. These persistent challenges on online literacy informed the need to carry out this study so as to find out the effectiveness of e-learning mode of delivery adopted by private universities during the period of coronavirus pandemic in Kenya.

1.2 Objective of the Study

The research's objective was to find out the effects of e-learning mode of delivery on academic progress of private university education in Kenya.

1.3 Hypothesis of the Study

The study was based on the null hypothesis.

H₀: There is no significant relationship between effects of e-learning mode of delivery and academic progress of private university education in Kenya.

2. UNDERPINNING THEORY

The focus of this study was built on Facilitation Theory propounded by Rogers in 1980s. The theory views the teacher as role master and facilitator in disseminating knowledge through learning. The facilitation occurs through the teacher's attitudes in his/her personal relationship with the students. Rogers suggested three attitudinal qualities of a teacher necessary for facilitative practice which he termed as core conditions for a teacher. The teacher has to be really self-aware of his/her feelings and be able to communicate them appropriately. The teacher should also care about the student and accept the student's feelings. Finally, the teacher should exercise empathy and be ready to understand, not judge or evaluate Rogers, [17]. The theory of facilitation emphasizes that an individual is not in a position to instruct another directly. This implies that for a teacher to facilitate learning, conducive learning relations must exist between him/her and the student. This theory explains that effective teachers have good association with their learners tend to reap good results in relation to discipline and performance. This theory has however been faulted for putting more emphasis on conducive relationship between a teacher and the student. Consequently, this is demanding too much from a teacher in his/her endeavors to promote learning by changing the behavior of students. Based on this theory, the study will help to find out the role played by lecturers and students in facilitating e-learning process. The theory will help to explore the role of lecturers in facilitating digital literacy and the learner's desire and predisposition to acquire knowledge in this period of COVID-19 in Kenya's universities. These are important components in ensuring successful learning process.

2.1 COVID-19 and Progress of Education

According to UNESCO [18] coronavirus has caused great impact on the education sector globally leading to temporary close ups of learning centers. Many nations have closed-up schools and colleges to limit the widespread of the virus. By the beginning of the last quarter of 2020 almost one billion students were badly affected by temporary closure of educational institutions. Nearly fifty three nations are executing countrywide close ups while twenty seven countries have instituted domestic closures hence affecting nearly sixty two percent of the global student population. On the other hand seventy two nations' schools have not been

closed UNESCO, [19]. The first mission of universities education has inevitably been greatly affected by the lockdown, urging institutions to rapidly develop to online formats and methods. For some institutions, using virtual tools was already in their system and for others, it was a rather unexplored territory. For all of them, it quickly became the daily way of running business. Despite the institutions' immediate adaptation to online teaching, so far universities have been Operating in Emergency Remote Teaching (ERT) mode to minimize disruptions, rather than fully embracing online education. It is therefore important to explore how online teaching and blended learning will evolve in the months and years ahead to ensure that high quality is maintained Hodges, et al. [20].

Reports from Cambridge Examinations International [21] and International Baccalaureate [22] show that COVID-19 has immensely affected examinations in most learning institutions including pre-university examinations in many countries organized by Cambridge and Baccalaureate internationals. The closing of learning centers in respect to widespread of coronavirus, has exposed more information on virtual literacy programs as well as social-economic matters in many nations of the globe UNESCO, [23]; Karp & McGowan [24]. As a mitigation measure against coronavirus UNESCO has suggested the use of virtual literacy programs that can be adopted by institutions to facilitate learning in order to ensure continuous education programs UNESCO, [25]. However the impact on educational integrity has been raised globally Eaton, [26]; Agrba, [27]; Balsamini, & Edelman, [28]. A rise in examination cheating Appiah, [29] has been identified as particularly problematic on e-learning.

A survey by Human Rights Watch (2020) established that majority of the learners have not been able to receive education due to close ups of learning centers since March 2020 in Africa. Face to face learning ceased to take place in many countries of Africa hence signifying poor contact between tutors and students. The research says that many learners were not able to have in depth study through virtual learning. Many schools in Morocco have introduced remote learning though most of the tutors have challenges such as inadequate internet credit and about half of the students attended online classes. In Garissa, Kenya, several students do not have direct accessibility to media platforms and most of them have difficulties to attend

online teaching. Many students continue to face challenges in accessing the internet as a component of online learning. Some of the informal villages like Mathare in Nairobi, learners have been hampered from online lessons because they lack telecommunication devices. A few students in the area have telephones that can enable them to communicate effectively in learning. Despite this, digital learning in Kenya involved use of smartphones for the internet, YouTube and Google research.

A report by OECD [30] shows that nations have developed several telecommunication devices to enhance online education during the period of school closures. Many platforms have been utilized to provide remote learning. In most OECD member states virtual devices have been introduced to promote attaining of knowledge Schleicher & Reimers, [11]. In these countries, remote learning has enabled learners to access education independently at their convenience under the guidance of their tutors. In countries such as Estonia, been close cooperation with the private organizations has been initiated purposely to provide free content to learners in this period when many schools have been closed. Equally virtual education has been enhanced in France hence assisting many students to study from home, both in primary and secondary schools. In Greece, teachers conducted virtual real-time classes in conjunction with other online learning tools (Ministry of Education and Religious Affairs, [8,9]; Schleicher and Reimers, [11]. Teachers have reported high need for acquiring knowledge on how to make use of digital technology.

Studies have shown many recommendations by UNESCO on the usage of remote learning. Teachers and students must be ready to select only relevant devices depending on their availability as well as skills needed to operate them. Inclusivity in the use of virtual education should be considered to ensure that learners with special needs are catered for. There is need to devolve digital literacy programs to homes that have adequate supply of internet. The use of virtual platforms must maintain data security for the users. Such devices should be interactive in order to eliminate isolation of users. Additionally, a convenient schedule should be in place and ought to be convenient to tutors, learners and guardians. While meditating on adopting digital literacy platforms it is necessary to ensure that good methodology is in place to facilitate offline communication. Brief trainings should be given to

tutors, learners and even parents for better monitoring and evaluation of virtual programs. Blended learning is appreciated in order to ensure synchronization of learning activities. Furthermore, there is need to have clear established regulations on remote education, especially on time and skills. There is every need to establish communities of tutors, parents and institutional management UNESCO, [31].

With travel restrictions and closed borders, universities are coming to terms with the fact that this revenue may be significantly reduced in the next financial period. Open and distance learning programs have become so vital in this period of the pandemic in perpetuating learning digitally. Asked for their thoughts about the role of education during the pandemic, most learners spoke highly on the significance of open learning. At such unique circumstances, higher institutions of learning can continuously strive to deliver high quality teaching and consistent communication to students. To do so, it's imperative that institutions listen to students' needs and concerns and leverage the latest technological tools QS, [5]. A survey by European Union Committee for Education [32] established that in Europe, most tutors have been encouraged to provide learning continuously through open platforms. Audio and audial visual media have used to transmit education using remote methodologies. As such tutors and educational managers have been attempting to provide open learning but there have been challenges in adapting to these new modes of digital literacy. This Report has shown that teachers require adequate resources to conduct online education successfully.

Daily Nation reports [16] have shown that in Kenya despite the adoption of digital literacy, many tutors have not been given adequate skills and learners have deficiencies of resources including inadequate data in many parts. Virtual learning in the country is mainly geared towards postgraduate studies ignoring most students undertaking bachelor programs. It has been realized that remote learning has therefore promoted inequality in acquiring literacy. Many parents lack direct access to the internet. A few higher institutions of learning have adopted remote learning following government's directive to contain the spread of COVID-19. Digital literacy has been the only option of attaining education to replace face to face learning. Some universities had to some tutors and learners to embrace virtual literacy, though a few of them. The main drawback has been resistance from

some learners who prefer offline literacy programs upon getting announcement by the university that lessons would continue online. Some of the students cited inaccessibility to internet to be barrier to open literacy programs. A good number of learners have cited lack of inclusivity in using technological modes of education since the new methods favor inequality education. As a result dependence on remote education would be subjective and ineffective. Some students claim that online classes are effective in regaining lost time out of the classroom. In spite of this importance, imposition of these modes of delivery in areas without adequate infrastructure is not effective. Some universities in Kenya have established guidelines on teaching and administering examinations virtually, especially the University of Nairobi and Mount Kenya university. Remote learning has been noted to easier when teaching social sciences but not science subjects that require practical sessions. This challenge has been experienced both in developed and developing countries Nganga, Maina & Nakweya, [15].

3. RESEARCH METHODOLOGY

3.1 Research Design

A quantitative research approach produces figurative data which can be easily analyzed Kothari, [33]. Based on this study, a quantitative research approach was used to maintain objectivity of data. According to Kumar [34] a descriptive research design is able to study information to attain important facts concerning the cases under study and consequently draw conclusions from the facts obtained. This study adopted a descriptive research design to collect and analyze the opinions of students on their experience on adoption of digital literacy during the COVID-19 period. The target population of the study constituted all 207 students of Umma University from Garissa Campus. Students from private university were purposively selected because these institutions are independent, flexible to change and have better learning infrastructure. The university has adopted e-learning during the coronavirus to facilitate continuous education. From the target population of 207 students, a sample size of 137 was selected using Yamane [35] formulae as shown below:

$$n = \frac{N}{1 + Ne^2}$$

Systematic random sampling of students was used to select respondents for the study. Primary data was collected by use of structured self-administered questionnaires from the respondents while secondary data was obtained from various sources of literature review. Structured questionnaires are research tools used to collect information from the study population Mugenda & Mugenda, [36]. This study used questionnaires with closed ended questions that were simple to analyze and aided in obtaining quantitative data. A Likert scale with 5 response categories was used to measure research variables. Self-administered structured questionnaires were used to collect views from students through online responses. The filled up questionnaires were collected from the respondents in a period of one week. Piloting of the research instruments was done to ensure content validity, correct wording, clarity of expression and understandability. Piloting was done on a sample of 10% of the respondents that were excluded from the final study. Cronbach alpha coefficient method was used to test the reliability of the research tools. The research tools were administered twice to the same group of respondents in an interval of two weeks. The questionnaires that were used in the pilot study were coded, and their responses tested to generate reliability coefficient by use of SPSS Version 24. A reliability of 0.89 was obtained. This was considered significant for this study. The research instruments were tested and pretested on the randomly selected respondents to ensure that the research tools were accurate. Content validity was used for this purpose. Collected data in this study was edited, coded and categorized into different themes according to the research objectives.

The researcher endeavored to maintain ethics while conducting out this study. The researcher sought permission and approval from the relevant authorities. The researcher did not reveal details and identities of the informants. All the participants were therefore assured of their anonymity.

4. RESULTS

The findings were obtained from descriptive and inferential statistical analysis. The study's objective was to find out the effects of e-learning mode of delivery on academic progress of private university education in Kenya.

4.1 Descriptive Analysis of the Effects of E-Learning Mode of Delivery on Academic Progress of Private University Education in Kenya

This section provides an analysis of the effects of e-learning mode of delivery on academic progress of private university education in Kenya. To establish the effects of e-learning on academic progress of university education, respondents were asked to answer a set of questions framed on a likert scale of 5.

The results are shown in Table 1. The first question enquired on whether e-learning is efficient mode of learning in the university. The feedback indicates that 60.1% of the respondents agreed to the statement, 8.6% were not sure while 31.3% disagreed with the statement. This is reflected by a mean of 2.6293 and standard deviation of 1.35474. The respondents were also asked whether e-learning has improved your academic performance. The results shows that 39.2% of the respondents agreed, 19.8% were not sure while 41% disagreed to the statement. This is reflected by a mean of 2.8879 and a standard deviation of 1.47896. The third question enquired whether e-learning is normally interrupted by failure of internet. The results show that 60.3% of the respondents agreed to the statement, 8.6 were not sure, whereas 31.1% of the respondents disagreed to the statement. This is reflected by a mean of 2.6638 and a standard deviation of 1.31178. The respondents were also asked whether computer hardware/laptops are available for e-learning. The results obtained show that 32.7% of the respondents agreed to this statement, 13.8% were not sure, while 53.7 disagreed to this question. This is explained by a mean of 3.2414 and a standard deviation of 1.41188. Asked on whether there is electricity failure during online lessons, 43.1% agreed to the statement, 19.8 were not sure while 37.1% disagreed to the statement. This is reflected by a mean of 2.9483 and a standard deviation of 1.27071.

The respondents were asked whether students have enough bundles to facilitate e-learning. The feedback obtained from this study established that 21.6% of the respondents agreed to the statement, 19% were not sure while 59.4% of them disagreed to it. This is reflected by a mean of 3.7759 and a standard deviation of 1.28595. Asked whether the students have adequate

computer skills to adopt e-learning, 27.6% agreed to the statement, 19% were not sure whereas 53.4% disagreed to this statement. This is reflected by a mean of 3.3966 and a standard deviation of 1.26408. The respondents were further asked on whether adequate content is provided using online learning. The findings of this study established that 45.7% of the respondents agreed to the statement, 14.7% were not sure while 39.6% disagreed to it. This is reflected by a mean of 3.0259 and a standard deviation of 1.30191. Asked on whether the course outline is covered fast compared to face to face lectures, 47.7% of the respondents agreed to this statement, 16% were not sure of the response while 36.3% disagreed. This is reflected by a mean of 2.8276 and a standard deviation of 1.3531.

The respondents were also asked whether there are delays in accessing learning materials using online mode of learning. The results of this study established that 53.5% of the respondents agreed to the statement, 14.6% were not sure while 31.9% disagreed to the statement. This is reflected by a mean of 2.7500 and a standard deviation of 1.19328. Again, the respondents were asked whether online assignments are satisfactory, 59.5% of the respondents agreed to the question, 9.5 were not sure while 31% disagreed to it. This is reflected by a mean of 2.6207 and a standard deviation of 1.19895. The respondents were also asked whether online learning resources are self-explanatory. The results show that 43.2% agreed to the statement, 15.8 were not sure while 41% disagreed to the statement. This is reflected by a mean of 2.9569 and a standard deviation of 1.31169.

The respondents were also asked whether online examinations are effective than lecture room examinations. The results show that 46.8 agreed to the statement, 6.9% were not sure while 46.3% disagreed to the statement. This is reflected by a mean of 2.9569 and a standard deviation of 1.3663. The respondents were also asked whether e-learning has improved academic performance of university students. The results show that 37.9% agreed to the statement, while 39.7% disagreed to the statement. This is reflected by a mean of 3.0172 and a standard deviation of 1.33828. The respondents were also asked whether e-learning is cost effective (cheap) to students. The results show that 32.8% agreed to the statement, 6.0% were not sure while 61.2% % disagreed to the

statement. This is reflected by a mean of 3.4310 and a standard deviation of 1.46391.

The respondents were also asked whether online examination questions meet the required standards. The results show that 54.7% agreed to the statement, 20.9% were not sure while 24.4% disagreed to the statement. This is reflected by a mean of 2.5776 and a standard deviation of 1.23112.

The respondents were also asked whether the marks from online assessments are provided very fast. The results show that 38.8% agreed to the statement, 20.7% were not sure while 40.5% disagreed to the statement. This is reflected by a mean of 3.1034 and a standard deviation of 1.25372.

The respondents were also asked whether university examinations are properly supervised without any cases of cheating. The results show that 67.6% agreed to the statement, 16.9% were not sure while 15.5% respondents disagreed to the statement. This is reflected by a mean of 2.2759 and a standard deviation of 1.16160.

The respondents were also asked whether 19 student portal are safe for e-learning. The results show that 76.7% agreed to the statement, 9.5% were not sure while 13.8% disagreed to the statement. This is reflected by a mean of 2.1810 and a standard deviation of 1.13136.

4.2 Regression Analysis of the Effects of E-Learning on Academic Progress of Private University Education

The model $y = \alpha + \beta_1 X_1 + u$ was subjected to a test using linear regression to establish whether resource utilization was a predictor of management of schools. Algebraically the model is follows:

$$y = \alpha + \beta_1 X_1 + u$$

Where

y = Dependent variable (Management of Schools)
 X_1 = independent variable (Resource Utilization)
 α = constant
 β_1 = the coefficient of the independent variable
 u = the error term

Table 2 shows level of significance of various indicators of the effects of e-learning on academic progress during the COVID-19 period. As can be seen from the results only four variables have P values less than the critical value of 0.05. This implies that e-learning mode, content coverage, delays in accessing online materials and improved academic performance have a significant relationship with academic progress. All the other indicators of the independent variable have no significant relationship with academic progress of university education.

Table 3 represents a regression model of the effects e-learning on academic progress of university education. The results indicate that, the coefficient of determination R square is 0.929 and R is 0.964, at significance level of 0.05. The coefficient of determination indicates that 91.6% of the variation on e-learning influences academic progress of university education. It means that 91.6%% of the variation in the academic progress is explained by e-learning.

4.2.1 ANOVA computation of the effects of e-learning on academic progress of university education

The ANOVA results in Table 4 confirms further the appropriateness of the model fit for this data. The calculated P value of 0.00 is less than the critical value of 0.05. This computation implies a significant relationship between effects of e-learning and academic progress of university education. The F-statistics of 71.066, shows that the results are significant ($P < 0.001$) and it is very unlikely that they are computed by chance.

4.2.2 Hypothesis testing

To determine whether e-learning influences academic progress of university education during the COVID-19 period, the null hypothesis was tested.

H_0 : There is no significant relationship between effects of e-learning and academic progress of university education.

Decision rule: The rejection of the null hypothesis if calculated P value is smaller than the table value of 0.05 and vice versa.

Table 1. Respondents' opinions on effects of e-learning on academic progress of university education

	SA		A		NS		D		SD		Mean	Std dev
	f	%	f	%	f	%	f	%	f	%		
1. e-learning is efficient mode of learning	13	15.3%	52	44.8%	10	8.6%	22	19.0%	14	12.3%	2.6293	1.35474
2. e-learning has improved your academic performance	20	17.2%	23	19.8%	23	19.8%	25	21.6%	20	17.2%	2.8879	1.47896
3. e-learning is normally interrupted by failure of internet	20	17.2%	50	43.1%	10	8.6%	21	18.2%	15	12.9%	2.6638	1.31178
4. Hardware/laptops are available for e-learning	16	14.8%	20	17.5%	16	13.8%	38	32.8%	24	20.9%	3.2414	1.41188
5. There is electricity failure during online lessons	12	10.3%	38	32.8%	22	19.8%	27	23.3%	16	13.8%	2.9483	1.27071
6. Students have enough bundles to facilitate e-learning	10	8.6%	8	6.9%	17	14.7%	39	33.6%	41	35.3%	3.7759	1.28595
7. Students have adequate computer skills to adopt e-learning	10	8.6%	22	19.0%	22	19.0%	36	31.0%	26	22.4%	3.3966	1.26408
8. Adequate content is provided using online learning	11	9.5%	42	36.2%	17	14.7%	25	21.6%	21	18.1%	3.0259	1.30191
9. The course outline is covered fast compared to face to face lectures	17	14.8%	38	32.9%	17	16%	26	22.5%	16	13.8%	2.8276	1.35310
10. There are delays in accessing learning materials using online mode of learning	14	12.1%	48	41.4%	17	14.6%	27	23.3%	10	8.6%	2.7500	1.19328
11. Online assignments are satisfactory	15	12.9%	54	46.6%	11	9.5%	27	24.1%	8	6.9%	2.6207	1.19895
12. Online learning resources are self-explanatory	12	11.3%	37	31.9%	18	15.8%	31	27.2%	16	13.8%	2.9655	1.31169
13. Online examinations are effective than lecture room examinations	17	14.9%	37	31.9%	8	6.9%	37	31.9%	16	14.4%	2.9569	1.36663

	SA		A		NS		D		SD		Mean	Std dev
	f	%	f	%	f	%	f	%	f	%		
14. e-learning has improved academic performance of university students	17	14.7%	26	22.4%	26	22.4%	27	23.3%	19	16.4%	3.0172	1.33828
15. e-learning is cost effective (cheap) to students	18	15.6%	20	17.2%	7	6.0%	36	31.0%	35	30.2%	3.4310	1.46391
16. Online examination questions meet the required standards	19	16.4%	43	38.3%	24	20.9%	18	15.5%	10	8.9%	2.5776	1.23112
17. Marks from online assessments are provided very fast	10	8.6%	35	30.2%	24	20.7%	27	23.3%	20	17.2%	3.1034	1.25372
18. University examinations are properly supervised without any cases of cheating	29	25.0%	49	42.6%	19	16.9%	10	8.6%	8	6.9%	2.2759	1.16160
19. Student portal are safe for e-learning	31	26.7%	58	50.0%	11	9.5%	7	6.0%	9	7.8%	2.1810	1.13136

Field Data (2020)

Table 2. Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	E-learning is efficient mode of learning	.369	.106	.337	3.493	.001
	e-learning is normally interrupted by failure of internet	.022	.083	.020	.267	.790
	Hardware/laptops are available for e-learning	.025	.074	.027	.334	.739
	There is electricity failure during online lessons	.078	.076	.077	1.016	.312
	Students have enough bundles to facilitate e-learning	-.101	.088	-.125	-1.155	.251
	Students have adequate computer skills to adopt e-learning	.138	.092	.155	1.502	.136
	Adequate content is provided using online learning	.218	.100	.221	2.175	.032
	The course outline is covered fast compared to face to face lectures	.038	.089	.036	.420	.675
	There are delays in accessing learning materials using online mode of learning	-.175	.082	-.161	-2.130	.036
	Online assignments are satisfactory	-.040	.107	-.035	-.370	.712
	Online learning resources are self-explanatory	-.073	.094	-.073	-.774	.441
	Online examinations are effective than lecture room examinations	.108	.094	.109	1.147	.254
	e-learning has improved academic performance of university students]	.284	.109	.289	2.611	.010
	e-learning is cost effective (cheap) to students	.108	.092	.124	1.176	.242

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Online examination questions meet the required standards]	.039	.095	.034	.406	.686
Marks from online assessments are provided very fast	-.054	.096	-.056	-.566	.573
University examinations are properly supervised without any cases of cheating]	.053	.103	.042	.514	.609
Student portal are safe for e-learning	-.042	.110	-.032	-.380	.704

a. Dependent Variable: Academic Progress
 b. Independent Variable: Effects of e-learning
 Source: Field Data (2020)

Table 3. Model summary

Model	R	R Square ^b	Adjusted R Square	Std. Error of the Estimate
1	.964 ^a	.929	.916	.94082

a. Dependent Variable: Academic Progress
 b. Independent Variable: effects of e-learning
 Source: Field Data (2020)

Table 4. ANOVA^{a,b}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1132.257	18	62.903	71.066	.000 ^c
	Residual	86.743	98	.885		
	Total	1219.000 ^d	116			

a. Dependent Variable: 2 [e-learning has improved your academic performance]
 b. Linear Regression through the Origin

ANOVA results indicated in Table 4 confirm the appropriateness of the model fit for this data since the computed P value of 0.000 is less compared to the critical value 0.05. These findings imply that there is significant relationship between effects of e-learning and academic progress of university education. This led to acceptance of the alternate hypothesis which states that, “There is significant relationship between effects of e-learning and academic progress of university education. Consequently the alternate hypothesis was rejected.

4.3 Discussion of Findings

The findings of this research concur with a survey by Human Rights Watch (2020) which established that in some countries some offered online classes but users faced difficulties such as inadequate internet credit and several students lack of access to computers, internet, and data hence making many students unable to engage in remote learning. Some students, especially from poor families, lack access to internet-enabled smartphones. The findings of this study are also in line with a report by the Nation Media Group that noted that despite the adoption of digital learning, many tutors have not been given skills on digital literacy while students don’t have adequate resources to facilitate virtual literacy programs. Most universities in developing countries lack investment in online resources. The obvious drawback for e-learning is the digital divide whereby most families have limited or no access to the internet Daily Nation, [16]. The study findings are also in agreement with a survey by European Union Committee for Education [32] which found out that most tutors and educational managers have been trying to

adopt virtual literacy with challenges, including lack of infrastructure and poor technology in embracing open methodologies.

5. CONCLUSION

The coronavirus pandemic has indeed hit universities globally. It is evident that most of these institution have attempted to embrace digital literacy without much success due to lack of adequate planning and preparations. However in regions where virtual literacy has been adopted well, continuous learning has been implemented. Universities must invest heavily on remote learning to be able to substitute offline teaching and learning process. A blended learning approach can facilitate learning with or without the occurrence of a pandemic [37,38,39].

6. RECOMMENDATIONS

This study recommends that students should have equal access to e-learning environments. It is essential that students’ needs and technical profiles be carefully assessed in advance. For the universities, they should adopt a blend of online and live interactions to cater for scientific lessons. It is important for the universities to incorporate various types of alternative assessment methods and relevant online rubrics to ensure good balance in assessment of practical skills, technical competencies and teaching practicum. It is also fundamental for the universities to develop effective and efficient faculty training in instructional design. This can be provided in a form of embedded electronic support systems in a form of readymade templates. The universities should transform digital infrastructure toward a more agile and

flexible system for digital pedagogy, investing in learning science, and training of faculty. They should develop a basket of low-tech innovations to reach disadvantaged students with the same learning opportunities. The universities should also invest in public-private partnerships to address challenges to accessing innovative technologies, infrastructure, and digital skills training. The universities must introduce more aspects of flexible learning into regular face-to-face courses. The government on the hand should. Develop and implement quality assurance regulations for flexible learning, with focus on accountability and transparency. The government should be ready to tackle the digital divide in order for the students from poorer families, living in rural areas, or who are marginalized in other ways, to have access to innovations.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/62723>