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#### Chapter

# Adoption of Online Learning during the Covid19 Pandemic Lockdown by Universities in Garowe

Omer Abdi Hamdi and Tumwebaze Alicon Auf

#### Abstract

In response to the Covid-19 outbreak the world closed and therefore countries like Somalia have not been exceptional. The government of Somalia and all higher education institutions adopted crisis intervention measures on implementation of blended learning approaches like online teaching and learning. In this chapter we explore the process and challenges of adopting online learning in response to the world wide lockdown due to the pandemic. Given that this was an abrupt requirement, the survey was interested in finding out whether universities adopted and adapted easily. Researchers compared findings from previous studies and theoretical inclinations on online learning. Results indicate that the adoption of online learning among universities in Garowe was as a matter of crisis management whereby administration, lecturers and students were all not ready and had no prior grounding in this pedagogical learning platform. Just like previous studies online learning implementers have continued to encounter several challenges like intermittent internet network, cost of gadgets and facilities, inadequate skills of both the instructors and students, aspects of communication and satisfaction from stakeholders. With the research survey in Garowe, results show that this is still pervading and therefore need for more rigorous contextualised research on this subject.

**Keywords:** Online learning, Covid19 Pandemic Lockdown, Process and Challenges of Implementing

#### 1. Introduction

The outbreak of the coronavirus that resulted into the Covid-19 pandemic is a socio-economic crisis that has taken the world by surprise. With too much uncertainty even after over a year in existence, world powers are still betting on a reliable and valid solution but in vain. The virus continues to reign on crippling economic and health systems all over the world. The indiscriminate ravage of the disease has not spared even the developed regions of the world where the health impact seems worse than the underdeveloped and developing world. According to ILO, WB [1] the lockdowns and social distancing measures accruing from the pandemic have disrupted provision of education and all related academic training although creating opportunities for innovation in distance learning. Among the most affected

sectors is education since there was closure of schools and other institutions of learning. These institution of learning tried to adopt to alternative teaching approaches that concur with the World Health Organisation (WHO) Structural Operating Procedures (SOPs) and this seems to have been the most difficult times not only in the underdeveloped but also developed world. The closure of schools and adoption of alternative learning approaches during the Covid-19 was the decision by many governments around the world. For instance the European Union adopted fulltime remote schooling after closure of schools in order to reduce on the spread of the disease [1, 2]. There were of course some schools that could have been prepared for such an abrupt change in operation just as [2] notes that some were prepared according to their study done in Europe. This may not be the case especially in the underdeveloped regions of the world where internet related technology is under developed [3]. Imagining the experience of education in the most remote regions of the world during the Covid-19 pandemic is scary. Since even before the pandemic these regions still experience numerous obstacles to access quality education. Stephanie et al. [2] in their study carried out in selected European countries conclude that schools and teachers were not well prepared to teach using the new approaches of teaching especially using digital approaches. Teachers were found struggling to prepare content using digital methods and appliance, in fact some were found lacking in digital competence. The same challenges were faced by students who were not prepared to learn from home especially that they were isolated from peers. These factors contributed heavily to the success and efficiency of the digital learning approaches adopted during the Covid-19 pandemic lockdown.

Stephanie et al. [2] on lessons learnt from school practices during Covid-19 in Europe concludes that digital competence was crucial for all stakeholder from teachers, students, parents and everyone involved in the education sector. Hence the following policy implications were found to be important if the education sector in Europe was to adopt online and distance learning approaches. Quality digital infrastructure and equipment, exploiting the blended learning approaches, collaboration and exchange, equipping students with digital, social and emotional competences, investment in teachers' competences, guidance of parents and promoting students' and teachers' wellbeing during blended learning should be prioritised.

#### 2. The Covid19 pandemic lockdown

The Covid19 pandemic has ranged on now for more than a year and there is still too much uncertainty on its prognosis. This especially given the contemporary underlying factors around the world like globalisation that eased its spread from one border to another through air, land and sea hence escalating the health, social and economic situation with immeasurable damages on the human cost and the economies of the world [3, 4]. Andreas [3] in a worrying conclusion states that spending on education may be compromised in the near future especially when governments have to divert fund to health and social welfare. There has been short term stimulus packages in some countries but nonetheless there is already a risk on long-term public spending on education because of the damages causes by the pandemic on the health and socio-economic sector. The world has witnessed a checkpoint of the health system to the extreme and up to now there is no possible valid solution. According to Andreas [3], Geof [5] and Pokhrel and Chhetri [6] Covid19 has severely impacted on higher education where by universities had to close due to lockdowns instituted around the world. Many sectors including education have had to swiftly modify their ways of operation given the projected long period of return to normal and recovery. With prediction of economic recession in Africa by Aby

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Toure [7] as early as four months into the pandemic, it was prudent to conclude that organisations had to devise cost effective modes of operation to curb on the cost of production. There has been limited trade of both imports and exports obviously because of the lockdown and this has affected several sectors including education.

Many education institutions have discontinued physical classes as a precaution to prevent spread of the disease and the 2020 academic year has already been lost with 2021 still unpredictable, Pokhrel and Chhetri [6]. Alternative education systems with more convenient and reliable assessment strategies need to be created and innovated. Digital learning has been introduced wit online learning platforms trending all over the world. This was however as a matter of crisis management. There is need for more empirical research on these platforms if they are going to be full incorporated into the education system all over the world and should be contextualised to fit into geographical, social and economic dynamics and disparities. The pandemic has altered university systems and has affected not only students' enrolment but also higher education investment at all levels all over [8, 9]. There has been numerous challenges in adopting online learning around the world and this has exposed the unfairness and injustice in the education sector. From limited access to broadband and computers to limited supportive environments needed to focus on online leaning, the poor allocation of resources, all are signs of wanting education sectors around the world [3]. Drayton and Waltman [9] reports that higher education institutions are encountering losses in a range of investments and sources of income. This has culminated into fatal financial problems and in fact some have been left with reduced net assets and this has increased financing costs hence finding it hard to cope with adverse shocks. Therefore adopting online learning platforms was the most easily affordable approach to allow continuity of learning even during the lockdown. However this was a crisis management approach and hypothetically, it was most likely adopted and adapted under very challenging conditions given the required facilities and equipment.

#### 3. Online learning historical, theoretical and conceptual excerpts

#### 3.1 Historical

Distance learning the father of online learning or education is traced to have evolved in the United States and England over the last three centuries. It is reported by Palvia et al. [10] and Kentnor, [11] that as early as 1728 Caleb Phillipps proposed to teach shorthand via exchanging letters with students throughout the US. After sometime, radio and television course delivery systems followed the parcel post approach and this was consolidated the launch of a federally licenced radio station in 1919 by the University of Wisconsin. The evolution and progression of distance education can be traced over the last 300 years and it has been running parallel with innovations in communications technology. This approach of teaching and learning continues to grow in popularity with great introductions like e-learning that have taken centre stage recently especially during the covid19 pandemic. In the 1990s distance education grew rapidly because of the advance of the online technical revolution. Although it did not gain popularity since very many educationist preferred the physical learning environment.

Kentnor [11] notes that Isaac Pitman is recognised for being the pioneer of distance education when in 1840 he began teaching shorthand by correspondence in Bath, England. He mailed postcards to students and would instruct them to transcribe shorthand passages from the Bible and they would return them to him

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through for him to correct. Three years later Pitman's work is said to have influenced the founding of the Phonographic Correspondence Society in 1843. Later in 1873 Anna Elliot Tichnor founded the Society which Encouraged Studies at Home in Boston, Massachusetts and this was entirely based on the correspondence school model. The Illinois Wesleyan College started offering degree programmes in absentia and it was the first academic institution of this kind. The invention of a spark transmitter in 1894 by Gugliemo Marconi was also a milestone towards strengthening the field of distance education. More establishments followed like in 1906 the university of Wisconsin-Extension was founded and turned into a distance learning unit and these launched an amateur wireless station that was purely dedicated to education broadcasting.

## 3.2 Theoretical

#### 3.2.1 The community of inquiry (2000)

The Community of Inquiry is one model or theory that has tried to elaborate processes and approaches of online learning. Proposed by Garrison and Shale [12], it comprehensive conceptual framework is well designed to capture the dynamics of education in order to guide effectively the study of online learning at especially higher learning institutions. For instance the community of inquiry that comprises the students and teachers is the route to better experience in education if higher order learning outcomes are to be achieved. Conceptually basing on the presence of three components of cognitive, social and teaching, the Community of Inquiry acknowledges that though there is an overlap and relationship among the three – there is need for further independent research of each. Garrison and Shale [12] argue in this model that it is prudent to design online and blended courses for active learning communities or environments. Today an online or blended course is hardly designed without the applying the community of inquiry as a model because it creates a highly interactive engagement among students and instructors since it encourages use of various learning aids and materials like interactive boards, blogs, videoconferencing and other audio visual facilities [13].

#### 3.2.2 Collaborative learning theory (2012)

The theory according to Harasim [14] is centred on collaborative learning, knowledge building and the use of Internet as a means to reshape informal education, formal, and non-formal for the Knowledge era. The theory's emphasis is on the role of peer discourse as a key to learning and therefore defines learning as an intellectual convergence that can be achieved through three progressive stages of group discourse –idea generation the brainstorming phase which involves gathering divergent thoughts, idea organisation which involves comparing, analysing and categorising ideas through the process of discussion and argument and then the intellectual convergence where synthesis and consensus occurs of intellectual ideas is done. This can be through tasks like essays, assignment or any other intellectual tasks [13].

#### 3.2.3 Connectivism

According Picciano [13] connectivism as a learning model acknowledges a major shift in the way knowledge and information flows, grows, and changes and this is attributed to the vast data communications networks. The theory acknowledges that Internet technology has moved learning from internal, individualistic activities to group or even larger crowds.

#### 3.3 Conceptual

Online learning has inevitably become a trend world over with most information technology companies developing user friendly platforms for this pedagogy given the physical closure of education institutions due to the outbreak of the coronavirus. With the world still experiencing intermittent lockdowns, more advancement are needed to improve on the e-learning platforms and some researchers have recommended a combination of this type of learning with traditional teaching methodologies, [15, 16]. With adoption e-learning mechanisms, there emerged the need for more active stakeholders in the education sector at all stages of the teaching-learning process. For instance, the fact that students and teaching were basing at home to play their role, the parents had to fully take part in the process since the teachers' role of classroom management was now tampered with. Parental involvement played a very significant role for online learning to successfully take place [17].

Online learning has been adopted as a crisis management mode of pedagogy across all levels of learning. It is however coming to the notice and realisation of many scholars that there should be suitable pedagogy and platform for different class levels of education, Pokhrel and Chhetri [6]. However it is surrounded by many challenges which seem universal although studies indicate that some challenges are pervading. Some studies have reported issues like cost and accessibility especially in developing countries. For instance Pokhrel and Chhetri [6] concludes that Internet bandwidth is generally low and there are very few access points which is coupled by relatively costly data packages. Therefore in comparison with low income among populations in developing countries, there has been limited accessibility and affordability. This calls for policy level intervention which has not been possible for many of these countries since governments a concentrating on curbing the health impact of the disease. Therefore [6, 18] recommend that developing affordable and accessible tools of online learning should be the key focus of educational tools developers with emphasis on customisation. This should be capitalised by governments investing in professional developing of teachers and this time emphasising a specialised training of blending online and traditional pedagogies. Shibly et al. [18] further concludes that conduct online training programs can be conducted by universities about online teaching and learning tools. In some cases government can provide free or subsidised internet to students. Online learning still faces critical scrutiny by various education stakeholders from students to parents with studies showing that there is still a lot of technical, academic, communication and satisfactory challenges. Learners are not satisfied with continuing with online learning and this is affecting their performance [19]. Much as there is not much trouble of e-learning among students according to evaluations of their experiences, challenges related to technical issues have been reported and this is on addition to poor internet services, cost of data, unreliable power supply, limited access to online library services [20, 21].

#### 4. The general education situation in Somalia during Covid19 lockdown

The outbreak of the coronavirus has affected systems all over the world and this is worse in developing and underdeveloped countries. After health, education has been the other most affected sector with all education institutions closing. Similarly in Somalia schools were closed in order to prevent the spread of the virus as requirement by the world health organisation. Just like any other African country, Somalia faces other pre-existing challenges in its education sector even before the coronavirus pandemic. According to Jamillah [22], Sub-Saharan with more than one fifth of children aged 6–11 years out of school, has the highest rates of education exclusion. In Somalia before the pandemic only 1.5 million children of the 4.5 school going age were in school.

With a history of civil wars since 1991, the outbreak of the coronavirus has escalated the Somalia education situation. The availability and quality of education has been harmed severely by control measures. With previous educational inequalities that negatively affected girls, the rural and poor population have been escalated by the control measures. There is therefore need for more inclusive approach in response to the Covid-19 lockdown impact in the education sector [23]. In a study by Hassan and Abdullahi [24] they found that instructors because having low degree of content, their delivery online with flexibility applications weakened the process of teaching and learning. Therefore they conclude that instructors lacked adequate knowledge on basic ICT knowledge and skills with a very high level of barrier of adaptation on online learning and teaching tools.

Therefore the higher education institutions need to build capacity of their staff especially in the academic section to improve on their ICT literacy and provide a scholarly communication platform to enhance their technology awareness, knowledge and exposure.

# 5. The process and challenges of online learning among universities in Garowe

In response to the Covid-19 outbreak the world has closed business and countries like Somalia have not been exceptional. The government and all higher education institutions adopted crisis intervention measures on implementation of blended learning approaches like online teaching and learning Hassan and Abdullahi [24]. Universities in Somalia encountered significant challenges and were therefore forced to adopt online learning as a measure of crisis management in response to closure of education institutions [23]. The adoption of online learning during the pandemic among universities in Garowe being a problem is premised on all challenges faced by institutions of education all over the world. In a survey research in Garowe with a main objective of exploring the process and challenges of implementing online learning during the Covid19 pandemic in higher education institutions of Garowe, findings indicate that it was not an easy process.

This book chapter therefore intended to document the key findings of this study having reviewed findings from other regions of the world. Implementing online learning during the covid19 pandemic lockdown among Universities in Garowe accruing from a mini survey carried out in May 2021 in comparison to previous studies and possible existing model or theories. The survey employed a qualitative design to analyse the data which was collected from students and lecturers. Interviews were conducted to a total of 12 subjects comprising of 8 students and 4 lecturers from two universities of University of East Africa and Puntland State University in Garowe Puntland state of Somalia.

With regard to prior knowledge on online learning, majority of the students knew about the existence of online learning but were not conversant with particulars of its application and the various platforms. However still the students also emphasised that they preferred physical classrooms. Al-Shalabi [20] and Shibly et al. [18] recommend virtual reality application whereby practical sessions are conducted to provide online learning training programmes for both lecturers and

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students. Given that Covid19 is here to stay, this is sustainability recommendation for educational institutions. Just like Hassan and Abdullahi [24] found that some instructors in Somalia institutions because of having low degree of content, failed to deliver online with the flexibility applications which weakened the process of teaching and learning.

Revelations also indicate that majority of the students would prefer physical classroom learning to online learning. The preference of classroom learning approach is mainly according the students responses due to the continuous interaction between students and lecturers during the lecture. Of course a few students preferred online learning arguing that there is limited disruptions during the lecture on addition to the fact that the spread of covid19 is controlled and that the approach is more flexible. Muhammad [19] concludes in his study that English as a Foreign Language learners in Taibah University Saudi Arabia are not satisfied with experience of online learning. This validates the findings above from the Somali study and therefore justifies the need for more future comprehensive studies on online learning with emphasis on the pedagogy and motivation.

Some subjects also revealed that there were several limitations to online learning and these included accessing resources, hard to adopt and adapt. Other subjects revealed that they found it interesting with numerous materials to refer to for purposes of self-study. Exams were conducted online but according to interview responses, student subjects revealed that exams were difficult because of the nature of online lectures which were not elaborate with limited question and answer sessions. These challenges were supplemented by the high cost of online learning, intermittent internet connection, limited skills of using online learning gadgets and equipment, limited focus and attention hence poor internalisation of content, limited student teacher interaction and sometimes problem of electricity. Jena [15] and Shibly et al. [18] in their studies have recommended that institutions should provide students with free internet connection and maybe gadgets like computers or tablets where possible. Lecturers also revealed that the adoption and adaptation of online learning was so abrupt since it was immediately after the lockdown. Universities according to the lecturers were caught unaware and it was a very difficult situation according to them. This is because most lecturers and students lacked prior skills and knowledge of the various online learning platforms.

Assessment and evaluation during online learning remains a key challenge. If learning outcomes shall be achieved to witness their intended goals especially if competencies and skills are part, then more research on assessment and evaluation processes of online learning is needed yesterday. Lecturers revealed that one of the challenges was assessment and evaluation. The teaching and learning process went on very well save for the examination process. The lecturers from the universities revealed that they resorted to case studies which were administered to students and they submitted after three days. Lecturer also revealed that student-lecturer interaction is limited during online learning, they missed the engagements in discussions, the question and answer which are all not easily realised during online learning.

Additionally the lecturers noted with concern that students were not conversant with the online learning platforms, gadgets since some of them even lacked the basic smart phones. This was further complicated with intermittent internet and sometimes electricity. It was compounded by the difficulty in adopting and adapting to the change and frequent student absenteeism. Lawrence and Fakuade [17] suggests that if students are to be committed when learning from home, parents should synergise with the online learning trend.

Among the solutions Proposed by the lecturers include procurement of online learning equipment, tools and soft wares if it is to be efficient and reliable. They emphasised that lecturers and students should be adequately trained and equipped with skills of online learning plus educating and sensitising all concerned stakeholders like parents. One lecturer proposed that IT skills should be introduced at primary and secondary school level in Puntland and Somalia at large. Then it is also important that students are encouraged to practice use of online learning platforms like zoom, google meet, webex etc. to increase their acquaintance with the platforms [25, 26].

## 6. Conclusions and recommendations

If online education should be globalised, then technology platforms like internet, language and culture diversity, curriculum and processes of evaluation should be standardised. For countries to step up their online education, economy, institutional and student level factors should be given priority. At the country level, the industry and government should ensure that employment of online education graduates is guaranteed. This is in addition to ensuring the enhance capacity of online education through upgrading facilicities plus providing and installing equipment. Institutions should provide support through administration, marketing, technology and also top management. Students should also be motivated, the online learning culture should be well streamlined, the learning style, their IT skills enhriched through training and also enhance their awareness of online education.

It is evident that adoption of online learning among universities in Puntland was a matter of crisis management. Implying that the administration, lecturers and students were all not ready and had no prior grounding in all dimensions surrounding this pedagogical learning platform. Additionally they also lacked the resources to adequately adjust, prepare, plan and implement this type of learning. The outbreak of the coronavirus which culminated into the Covid19 pandemic and lockdown is a learning process for the education sector to modify and adjust accordingly by installing required equipment and facilities plus training staff. This is in addition to reviewing curriculum and pedagogical approaches and techniques since Covid19 is here to stay. It is also prudent to conclude that there is challenge of strategic management in these institution. Otherwise with strategic management an organisation can always have resources that are invested to avert or abate the consequences of such a crisis.

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## References

[1] World Bank & ILO (2021). Skills Development in the Time of COVID-19: Taking Stock of the Initial Responses in Technical and Vocational Education and Training

[2] Stephanie C, Joanna N, Antonis B, Eve M, Agnieszka P, Maria R, et al.
What Did We Learn from Schooling Practices during the COVID-19 Lockdown, EUR 30559 EN.
Luxembourg: Publications Office of the European Union; 2021. DOI: 10.2760/135208

[3] Schleicher A. The Impact of COVID-19 on Education Insights from Education at a Glance 2020. 2020. Available from: https://www.oecd.org/ education/the-impact-of-covid-19-oneducation-insights-education-at-aglance-2020.pdf

[4] Alistair T. The Great Lockdown: Worst Economic Downturn Since The Great Depression. Washington, DC: IMF Communication Department; 2020

[5] Geoff M. Coronavirus: Impacts of School and University Lockdowns. University World News; 2020

[6] Pokhrel S, Chhetri R. A literature review on impact of COVID-19 pandemic on teaching and learning. Higher Education for the Future. 2021;8(1):133-141

[7] Aby Toure. Covid-19 (Coronavirus) Drives Sub-Saharan Africa Toward First Recession in 25 Years. 2020. Available from: worldbank.org

[8] Vedder R. A New Great Depression for Higher Education. 2020. Available from: Forbes.com

[9] Drayton E, Waltman B. Will universities need a bailout to survive the COVID-19 crisis? London: Institute of Fiscal Studies; 2020 [10] Palvia S, Aeron P, Gupta P, Mahapatra D, Parida R, Rosner R, Sindhi S. Online Education: Worldwide Status, Challenges, Trends, and Implications. 2018

[11] Kentnor H. Distance Education and the Evolution of Online Learning in the United States. Denver: University of Denver Digital Commons @ DU; 2015

[12] Garrison DR, Shale D, editors. Education at a Distance: From Issues to Practice. Malabar, FL: RE Krieger Publishing Company; 1990

[13] Picciano AG. Theories and frameworks for online education: Seeking an integrated model. Online Learning. 2017;**21**(3):166-190. DOI: 10.24059/olj.v21i3.1225

[14] Harasim L. Learning theory and online technologies. New York: Routledge/Taylor & Francis; 2017

[15] Jena PK. Online learning during lockdown period for Covid-19 in India. International Journal of Multidisciplinary Educational Research. 2020;**9** 

[16] Peñarrubia-Lozano C,
Segura-Berges M, Lizalde-Gil M,
Bustamante JC. A qualitative analysis of implementing e-learning during the
COVID-19 lockdown. Sustainability.
2021;13(6):3317

[17] Lawrence KC, Fakuade OV. Parental involvement, learning participation and online learning commitment of adolescent learners during the COVID-19 lockdown. Research in Learning Technology. 2021;**29** 

[18] Shibly FHA, Nafrees ACM,
Roshan AMF, Nuzla Baanu AS,
Fathima NM. Awareness of Online
Learning of Undergraduates during
COVID 19 with special reference to
South Eastern University of Sri Lanka.

Journal of Physics: Conference Series. 2020;**1712**(1):012010. DOI: 10.1088/1742-6596/1712/1/012010

[19] Mohammad M. Challenges of e-learning during the COVID-19 pandemic experienced by EFL learners. Arab World English Journal (AWEJ). 2020;**11**:351-362. DOI: 10.24093/awej/ vol11no4.23

[20] Obeidat A, Obeidat R, Al-Shalabi M. The effectiveness of adopting e-learning during COVID-19 at Hashemite University. International Journal of Advanced Computer Science and Applications. 2020:96-104

[21] Olayemi OM, Adamu H, Olayemi KJ. Perception and readiness of students' towards online learning in Nigeria during covid-19 pandemic. Perception. 2021;**3**:4-2021

[22] Jamillah M. Covid-19: School Closures Put Decades of Gains for Somali Children at Risk. Nairobi, Kenya: Save the Children Somalia; 2020

[23] Herring E, Campbell P, Elmi M, Ismail L, McNeill S, Rubac A, et al. COVID-19 Responses and Education in Somalia/Somaliland. Sociology Mind. 2020;**10**:200-221. DOI: 10.4236/ sm.2020.104013

[24] Hassan M, Abdullahi H. Academic Scholars Perception of Online Education Initiatives in Somalia. In: Proceedings of the 13th International Conference on Computer Supported Education (CSEDU 2021). Vol. 2. Setúbal, Portugal: Science and Technology Publications, Lda; 2021. pp. 143-147. DOI: 10.5220/0010366401430147

[25] Pramanik S, Digvijay P, Gabriel AO, Wegayehu E, Marzuk A, Binay KP. COVID-19: A framework for effective delivering of online classes during lockdown. Human Arenas. 2021. DOI: 10.1007/s42087-020-00175-x [26] Siemens G. Connectivism: A learning theory for the digital age. Ekim. 2004;6:2011

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