
The Impact of the Covid-19 Disruption on Higher Education in Zambia: A Study of Student's Perspectives of Distance Education

Gift Muyunda^{1*}, Cao Zongqing²

¹Faculty of Education, Southwest University, PR. China

² Faculty of Education, Beijing Normal University, PR. China

*muyundagifted@icloud.com/caozongqing1989@163.com

ABSTRACT

In response to the emergency educational of the COVID-19 epidemic, the Ministry of Education in Zambia declared the closure of schools and shifted to distance learning as an effective and alternative way of learning. This study aimed to examine university students' perspectives of distance learning in Zambia. The study results show that students less frequently engaged in their study-related learning activities (e.g., joining live broadcasts of class sessions) having the highest negative impact and social activities (e.g., accessing mail for study purposes) the lowest. This study is the first step towards enhancing our understanding of the engagement of distance learning in developing countries like Zambia, but also campus-based students in emergency distance learning, in online learning activities during the Covid-19 pandemic, and other similar disruptions in Africa.

Keywords

Covid-19; higher education; distance learning; students' perspective; Zambia.

Introduction

The first human case of COVID-19, the disease caused by the novel coronavirus, was detected on March 18, 2020 at Kenneth Kaunda National Airport, according to government statistics verified by the Zambian Ministry of Health (MoH., 2020). COVID-19 has since spread all over the world, leading in a global pandemic. On January 30, 2020, the World Health Organization (WHO) designated the coronavirus epidemic a Global Public Health Emergency. According to the coronavirus resource center at Johns Hopkins University, more than 1 million individuals will have perished as a result of COVID-19 by the end of September 2020. To prevent the spread of the disease and save lives, most governments throughout the world implemented city lockdowns. Colleges and universities were no exception, with many stating that physical education classes would be terminated. As a result of the emergency in schools around the world, the number of online learning classes has constantly increased since then. Prior to the outbreak, online

learning coexisted with traditional classroom instruction. Many physical schools are still closed after more than eight months. Furthermore, Huang et al. (2020) stated that 500 thousands Zambian students have been unable to return to their schools and universities during this epidemic. The situation in almost all the countries in the world is the same. UNESCO (2020) highlighted that over 1.5 billion students around the world were not able to attend school or university due to the COVID-19 outbreak as of April 4th, 2020.

As a result, educational institutions all around the world are exploring how to restructure the entire educational system using information and communication technology (ICT). Governments across the world have begun to build new ways to allow schools to continue during this epidemic season, in addition to providing online education. These newly designed online tools can help students learn more effectively online. However, most countries were not prepared to conduct online courses to such a degree due to the rapid advent of COVID-19. For example, many teachers

not only had to create course content for online teaching, but there were also a lack of learner-friendly interfaces and tools.

Teaching interaction (Rain-Classroom, the Tencent Ketang Chaoxing Learning app, ClassIn, CCTalk, UMOU), social communication (WhatsApp Group, Group), remote office (WeLink, Dingtalk, ZOOM, FEISHU, TED), conversation Online course platforms (iCourse, edX, Coursera, Udacity), and so on are all available for synchronous live teaching. Asynchronous teaching tools include course sharing platforms such as iCourse, edX, Coursera, and Udacity, regional MOOC platforms such as CNMOOC, and local university MOOC platforms, among others [9]. These tools are suitable for live teaching sessions. There are several types of software available to meet specific requirements for interaction, network quality, or convenience [8]. However, some of them are not available in all countries, others lack crucial learning functions, and others have difficult user interfaces. As a result, it is critical to implement an effective and efficient tool to improve schooling systems and continue classes during the epidemic, allowing teachers and students to schedule and join meetings at any time and from any location, eliminating the need for travel and allowing students to be more efficient and productive. Foreign instructors and students are unable to travel from one country to another throughout the semester because of COVID-19. Zambia follows the same guidelines. To minimize long-term teacher-student isolation, Zambian universities have adapted the use of applications (apps) or technologies to keep classes going. Zoom Meeting is one such technology that provides an effective and dependable video conferencing service that is built for collaboration and is powered by Zoom. Zoom has launched a global version of its cloud-based video conferencing application in over 150 countries, including developed and developing countries. The online learning program Zoom meeting, which is accessible for free on the Google Play and Apple app stores, can accommodate up to more than 1000 students at once.

Learning with Zoom platform appears to have relative advantages over traditional learning and is

compatible with cognitive features of learning activities from the standpoint of innovation diffusion in developing countries like Zambia with less infrastructure. Zoom is an easy-to-use, trial-able tool. Different platforms are also supported (i.e., Windows, macOS, tablets and mobile phones, etc.). Before deciding to adopt a new medium, [5,11,914,25,29] claim that one must be able to recognize at least some of its benefits and be willing to deal with its ambiguity. In terms of how content is arranged and presented, Zoom Meeting-based lessons may differ from traditional classrooms. As a result, one of the advantages of Zoom Meeting-based synchronous online classrooms is that it introduces a new medium into students' learning activities. However, no empirical research has been conducted during this epidemic period to determine how individual students perceive system aspects of such new technologies (i.e., Zoom) in developing countries like Zambia with limited resources. When using new tools, certain students may have challenges. It may thus be beneficial to collect and consider students' thoughts and perceptions. Hence, this study aimed to explore the impacts of the Zoom Meeting system characteristics on students' perceptions of Zoom class participation in terms of its ease of use and usefulness. Considering the psychological aspects of learning, and the perception that make the acceptance of technology easy or difficult [18] we claim that there are still some factors that drive people to adopt and sustain continual learning while enhancing their learning performance from the use of such technologies. One's perceived ease of use and perceived usefulness are the very factors which might affect one's learning performance. However, very little research has been conducted to identify the direct influences of these two core constructs on learning performance. During this epidemic, students' perceptions of their learning performance with these new tools remain inconclusive. Thus, another aim of this study was to identify the effects of perceived ease of use and usefulness on students' learning performance

Literature Review

As the demand for higher education in Zambia grows at a faster rate, and issues such as increased costs associated with educational infrastructure, as well as reduced budgets on the part of the government, which is the primary sponsor of higher education, online education is now seen as an immediate solution. While online teaching and learning can provide ease, flexibility, and cost, it is important to recognize that technology use has a number of drawbacks, particularly in Africa.

The benefits of using ICT for online teaching and learning

Around the world, the higher education system is being transformed into one in which tablets and social media are widely used for both teaching and learning. Technology has played and continues to play a crucial part in the development and extension of online education, according to Kim and Bonk [13]. Our usage of technology for teaching and learning has improved our education and has shown to have a favorable impact on the educational process. Because of its flexibility and accessibility, ODL has grown in popularity among students as a result of this technological adoption. Similarly, ODL lecturers also found the usage of the technology can improve the interaction as well as collaboration among learners. As a result, learning through technology may be deemed a cost-effective teaching method at an institutional level when dealing with a large number of students from various regions of the world [3]. Higher education can be transformed in a variety of ways thanks to technological advancements: Fundamental shifts in educational methods, content, and evaluation are possible because to digital technology [22]. The advantages of adopting technology for online teaching and learning have been thoroughly demonstrated. They are some of them.:

Learn within their own schedule: ODL allows students to study at their own pace; students can learn at any time, from any location. Students cite benefits of adopting learning tools such as learning at their own pace, learning independently, and having fun, according to Hegarty [10]. The resources can now be accessible from a computer or a mobile device

attributed to advances in technology for online teaching and learning. This has increased the number of opportunities students are provided.

Promotes interaction: Technology offers the opportunities to promote interaction between learners, learners, lecturers, and experts in ODL. One research shows that interaction can increase learning and lessen the psychological distance involved in ODL [16]. Interactions, therefore, can aid in the achievement of learning outcomes and so assure successful learning; interactions can be enhanced in ODL through good technology use. The utilization of interactive technology with the benefits of two-way communication and multiple representations may allow online learners to engage in more interactions, resulting in improved learning results [12]. Interaction, in turn, can promote students' motivation and can improve the whole learning process. Online courses with high interaction, according to Botham & Mason, [3], as quoted by Croxto [6], result in better levels of student motivation, enhanced learning outcomes, and satisfaction than less interactive learning environments. Students will be given a variety of activities to help them improve their critical thinking skills during discussions [15]. As a result of this action, learners are more motivated and engaged.

Promotes higher-order thinking skills: According to several academics, technology can help students develop critical thinking and problem-solving skills essential in the twenty-first century. Online instructors can employ various tools, such as Google Docs and Blackboard Discussion Forums, which will provide students with a variety of assignments to assist them enhance their critical thinking skills [15].

Instructors may measure their students' reading progress, participation in discussion forums, and even the amount of time spent on virtual learning platforms in real time due to technological advances. Students' reading and video time, receiving electronic resources, and how quickly they understand important ideas can all be tracked using digital technology [22]. As a result, both ODL lecturers and students have embraced the use of technology to improve teaching and learning opportunities.

Africa's challenges in online education and learning

Access to technology is also a problem, particularly in many parts of Africa. Because of insufficient infrastructure, undeveloped communities, like other countries on the African continent, have difficulty accessing information technology [26].

Digital Divide: When compared to other countries around the world, Africa has a significant digital divide. This is a significant impediment to online teaching and learning using technology. Researchers claim that the digital gap is preventing distance learners from realizing their information demands, thus alienating the "info-poor" underclass [17]. Cultural impediments to technology innovation are also a necessity in Africa, according to the report.

Online lecturers' pedagogical abilities are also a challenge in online instruction. Online lecturers must not only learn necessary skills in order to teach online, but they must also build exploratory curricula that engage students in hands-on, inquiry-based learning.

Emerging technologies that can be used for online teaching and learning

Technology has become increasingly important in ODL teaching and learning. Emails and bulletin boards were prominent communication tools in the early days of ODL; these have since been superseded by synchronous technology like mobile and social media. Physical textbooks have been replaced with e-books, tablets, and iPads in the twenty-first century. In ODL, the use of social media for teaching and learning is also becoming more common. In ODL, remote classrooms with video pictures (video conferencing), shared writing and display spaces (smartboards), and feedback methods like polling and text chat (web conferencing) are all quite frequent [27].

Methodology

Participants

A total of 27 second year undergraduate students (13 males, 14 females; 20-22 years old) majoring in Education at the University of Zambia participated in this study. The students were chosen while attending curriculum and instruction course. The research was conducting due to school disruption during the COVID-19 epidemic in 2020.

Table 1. Course activities and grading policy

Course Activities	Weight	Grading Policy
Class attendance and attentiveness	5%	Randomly asked students to check their attendance and attention.
Discussion topics	10%	Asking and answering questions-5% Explanation of assigned topics-5%
Group Presentations	10%	Presentation style- 2% Presentation content quality-4% Group Q&A sessions -4%
Mid-term reports	25%	Content-5% Significance 5% Results and discussion -15%
Oral examination	15%	Students are randomly asked 8 questions, each worth 3 points
Final exam_MCQ test	35%	35 questions each worth 1 point

Instruments

The author has designed a 16-item survey the Zoom Meeting system features: the participants' perceptions of their usefulness and ease of use, and their learning performance. The questionnaire was divided into several sections. For instance, the first section was to capture the respondent's basic information, such as age and gender. Items were developed to identify perceived system features, perceived usefulness and ease of use, and learning performance. The question items of system characteristics were taken from studies by

recognized scholars [1,4,7,9,25,29]. These items have already been used in different formal studies, but they were slightly modified to fit the context of the current study. Each item regarding the Zoom Meeting system features, perceived ease of use and usefulness, and subjective learning performance was rated on a 5-point Likert scale, (agree= 5, somewhat agree=4, neutral=3, somewhat disagree= 2, disagree= 1). (See Table 2). The psychometric assessment for the instrument was achieved, internal consistency reliability (Cronbach's alpha = .85), and there was evidence for concurrent validity ($r = .30$ with Bernard effectiveness of online learning). Utilizing Pearson product moment correlation students' scores correlated significantly on the 4 factors ($r = .579, p > .001$).

Evaluation of Reliability and Validity

Cronbach's alpha reliability was used in this study to determine the consistency of the Zoom Meeting system features, perceived usefulness, perceived ease of use, and learning performance. Cronbach's alpha (i.e., internal consistency) showed system features, perceived ease of use, perceived usefulness, and learning performance of .813, .894, .914, and .787, respectively. With principal component analysis as the extraction method and varimax as the rotation method, data were tested to achieve structural validity. At a cut-off load of .50 and an eigenvalue greater than 1.0, no entries were deleted. The Cronbach's alpha value of each factor, the factor load, and the descriptive statistical results are shown in Table 2.

Data Analysis

The data was collected from participants of the Zoom Meeting classroom for quantitative analysis. In order to account for the effects of Zoom Meeting system features on PEOU and PU, regression analysis was conducted. Regression was used to investigate the impact of PEOU and PU on learning performance (both subjective and

objective) in the Zoom Meeting-based online course.

Discussions and Results

The Influence of Zoom Meeting System Characteristics on Perceived Ease of Use (PEOU) and Perceived Usefulness (PU)

A linear regression analysis was performed, with the Zoom Meeting system characteristics as the independent variable and the students' PEOU and PU as the dependent variables. The findings of the regression analysis are presented in Tables 3 and 4. Zoom Meeting system characteristics were a significant predictor of PEOU ($F[1, 25] = 30.65, p < .001$) as shown in Table 3. It was found that the Zoom Meeting system characteristics significantly predicted PEOU ($\beta = .74, p < .01$). The squared multiple correlation coefficient, R^2 , was 55.1%, which means the Zoom Meeting system characteristics could account for 55.1% of PEOU.

The Zoom Meeting system characteristics were a significant predictor of PU ($F[1, 25] = 16.29, p < .001$) as shown in Table 4. It was found that the Zoom Meeting system characteristics significantly predicted PU ($\beta = .62, p < .01$). The squared multiple correlation coefficient, R^2 , was 40%, which means the Zoom Meeting system characteristics could account for 40% of PU.

Table 2. The regression results of Zoom Meeting system characteristics on PEO

Model	SS	Df	MS	F	Sig.
Regression	5.281	1	5.281	30.655	.000
Residual	4.307	25	.172		
Total	9.588	26			

IV= Zoom Meeting system features, DV=PEOU

Table 3. The regression results of Zoom Meeting system characteristics on PU

Model	SS	Df	MS	F	Sig.
Regression	4.994	1	4.994	16.293	.000
Residual	7.663	25	.307		
Total	12.657	26			

IV= Zoom Meeting system features, DV=PU

significantly predicted subjective learning performance ($\beta=.582$, $p < .01$).

The results of the current study are consistent with what has been reported in several previous studies, namely that students' PEOU and PU could be promoted if they feel that they actually benefit from the learning support mechanisms [2,3,15]. For example, Wu and Chen's [15] study identified that MOOC system features, including openness and reputation, positively affected the PEOU and PU of MOOCs. In another study, Fennema [5] found that social media significantly affected PEOU and PU. Aubry [1] mentioned that social networking media are vital for teaching and learning and should be used extensively for learning. In another study, Aubry [1] found that technology's user interface has a positive relationship with PEOU. The results of this study are similar to the results of Bahati [2] and Chen's [3] studies. It was found in the current study that perceived system characteristics significantly predicted students' PEOU, which aligned with previous studies. As Bahati [2] found, User Interface (UI) had a positive effect on PEOU. In another study, Chen [3] found that IT infrastructure had a significant effect on PU.

The Influence of PEOU and PU of Zoom Meeting on Learning Performance (Subjective)

A linear regression analysis was performed, with PEOU and PU as the independent variables and students' learning performance (subjective) as the dependent variable.

Model	SS	Df	MS	F	Sig.
Regression	1.771	1	1.771	12.830	.001
Residual	3.452	25	.138		
Total	5.223	26			

IV= PEOU, DV=Learning performance

The findings of the regression analysis are presented in Table 5. PEOU is a significant predictor of learning performance ($F[1, 25] = 12.83$, $p < .01$). The results show that PEOU

The squared multiple correlation coefficient, R^2 , was 33.9%, which means the PEOU could account for 33.9% of learning performance. The results of the regression analysis are presented in Table 6. show PU to be significant predictor of learning performance ($F[1, 25] = 15.80$, $p < .01$) the results show that PU significantly predicted the subjective learning performance ($\beta=.622$, $p < .01$). The squared multiple correlation coefficient, R^2 , was 38.7%, which means PU could account for 38.7% of learning performance.

The Influence of PEOU and PU of Zoom Meeting on Learning Performance (Objective)

A multiple regression analysis was performed, with PEOU and PU as the independent variables and students' learning performance (objective) as the dependent variable.

Table 4. The regression results of PEOU on learning performance

Table 5. The regression results of PU on learning performance

Model	SS	Df	MS	F	Sig.
Regression	2.023	1	4.994	15.808	.001
Residual	3.200	25	.307		
Total	5.223	26			

IV= PU, DV=Learning performance

Table 6. The regression results of PEOU and PU on learning performance

Model	SS	Df	MS	F	Sig.
Regression	228.404	2	114.202	4.857	.017
Residual	564.263	24	23.511		
Total	792.667	26			

IV= PU, DV=Learning performance

The results of the regression analysis are presented in Table 6. PEOU and PU are significant predictors of learning performance, ($F[2, 24] = 4.85, p < .05$) and . It was found that PEOU and PU significantly predicted the objective learning performance respectively, ($\beta=.014, p < .01$) and ($\beta=-.011, p < .05$).

The squared multiple correlation coefficient, R^2 , was 29%, which means the PEOU and PU could account for 29% of objective learning performance.

The results of the current study are similar to the other previous study results of [9,19,21] but in a different context. For example, in the e-learning context, perceived ease of use can affect students' learning performance [9] due to the easiness of using the information system. The easier the learning system is to use, the better the performance [19]. In another study, Hashim et al. [9] analyzed the role of PU in a video-based learning context and indicated that video usage had a significant effect on learning performance. The same concept was found in Sham's [20] study that perceived ease of use and perceived usefulness had a positive influence on students' satisfaction with the K-MOOC

course. They mentioned that PEOU and PU, mediated

by satisfaction, had indirect effects on the continuance intention to use K-MOOCs, which is the purpose of self-development and life-long learning, going beyond a means to earn credit hours. In addition, Sentamu [19]

[found that the PU of an online English listening system

which was integrated with an attention-promoting mechanism had a relation with the students' attitude towards enhancing their learning. There are some other studies which have discussed perceived learning performance and learning ease of use which found that the technology had an indirect effect on learning performance. For example, Tabak and Shams [20] mentioned that PEOU and PU, mediated by self-regulated learning process, had indirect effects on the overall course performance. Sentamu [19] found that PEOU and PU, mediated by learning assistance and community building, had indirect effects on learning performance. In another study, Hashim et al. [9] identified that perceived ease of use, mediated by the collaborative learning process, had indirect effects on learning performance; and PU, mediated by social media use and students' satisfaction, had indirect effects on learning performance. However, Vogel et al. [21] found that PEOU and PU had no significant effect on learning performance. The same results were found by Hamdan & Ben-Chabane, [8], namely that perceived ease of use had no significant relation with perceived learning.

Conclusion

This study investigated how do the "Zoom Meeting" learning features influence students' PEOU and PU, and reported the results of the analysis to answer the research question. It was found that the Zoom Meeting system features significantly predicted PEOU and PU. Zoom Meeting system features could account for 55.1% variance of PEOU and 40% variance of PU. This study also investigated how do the students' PEOU and PU influence their learning performance in the Zoom Meeting-based class during the COVID-19 lockdown period. It was found that PEOU and PU significantly predicted the subjective learning performance could respectively account for 33.9% and 38.7% variance of learning performance. The findings of this study suggest that learners' PEOU and PU of "Tencent Meeting" related to the instructional design consists of not only technology-related usefulness but also the usefulness of the learning process.

Moreover, the study developed a Zoom Meeting system feature, PEOU, PU and learning performance scale for "Zoom Meeting based learning" and examined the validity and reliability of the scale. The findings of this study can be a reference to educators regarding how to promote learners' PEOU and PU in online learning with such new tools. Future studies should investigate the relationship of learners, "Zoom Meeting" system features, relative advantages, complexity, compatibility, reliability and acceptance of "Zoom Meeting" according to the diffusion of innovation theory (DOI). Moreover, there are some other perceived factors such as perceived interest, playfulness, and self-efficacy which need to be considered while conducting such kinds of new technology adoption research.

There are some implications for educational institutions, educators and learners. For example, educational institutions could implement any tools, even if they are not

well developed, to avoid wasting time. To optimize the use of such developed tools, educators can partially use social media for learning such as opening classroom groups. For example, a new tool might cause technical difficulties or other difficulties such as the lack of synchronous live discussion with many users. Therefore, it might be more effective if educators can use WhatsApp or other social networking sites together with the new tool. Therefore, based on the empirical evidence provided by the current study, educators can adopt new tools and use them to continue teaching their classes online during this epidemic to ensure that the "stay home, stay safe" slogan might be more effective. Students can participate joyfully when they find that their learning performance is improving. Although a comprehensive study was carried out, a few limitations of the present study should be noted. One of the limitations of the free version of the Zoom Meeting is that can only be used for 30 days; after that a new classroom needs to be opened. Thus, students and teachers might lose their uploaded files and assignments.

Another limitation is that there is no archive of classes for the Zoom system features. Subsequently, there was a small sample size due to the practical constraint of the university elective courses, so the results may not be generalized to other samples. Using different demographics with a wider range of samples from elsewhere is encouraged for future generalization of the study.

References

- [1] Aubry, J. (2013). Facebook-induced motivation shifts in a french online course. *TechTrends: Linking Research and Practice to Improve Learning*, 57(6), 81–87.
- [2] Bahati, B. (2015). Extending student discussions beyond lecture room walls via

- Facebook. *Journal of Education and Practice*, 6(15), 160–171.
- [3] Botham, R., & Mason, C. (2007). *Good Practice in Enterprise Development in UK Higher Education*. Birmingham: National Council for Graduate Entrepreneurship.
- [4] Chen, Y.-c. (2015). Linking learning styles and learning on mobile Facebook. *International Review of Research in Open and Distributed Learning*, 16(2), 94–114.
- [5] Chinazzi, M., Davis, J. T., Ajelli, M., Gioannini, C., Litvinova, M., Merler, S., ... Viboud, C. (2020). The effect of travel restrictions on the spread of the 2019 novel coronavirus (COVID-19) outbreak. *Science*.
<https://doi.org/10.1126/science.aba9757>
- [6] Croxto, R. A. (2014, June). The Role of Interactivity in Student Satisfaction and Persistence in Online Learning. *MERLOT Journal of Online Learning and Teaching*, 10(2).
- [7] Fennema, E., & Sherman, J. A. (1976). Fennema-Sherman mathematics attitudes scales. Instruments designed to measure attitudes toward the learning of mathematics by females and males. *JSAS: Catalog of Selected Documents in Psychology*, 6 (31), (Ms. No. 1225).
- [8] Hamdan, K. and Ben-Chabane, Y. (2013) 'An interactive mobile learning method to measure students' performance', *QScienceProceedings*, 12th World Conference on Mobile and Contextual Learning (mLearn 2013), Qatar
- [9] Hashim, A.S., Ahmad, W.F.W. and Ahmad, R.(2011) 'Mobile learning course content application as a revision tool: The effectiveness and usability', *Pattern Analysis and Intelligent Robotics (ICPAIR)*.Tronoh, Malaysia, 2001.Computer& Informatics Science Department, University of Teknol: pp. 184187
- [10] Hegarty, C. (2006). It's Not an Exact Science: Teaching Entrepreneurship in Northern Ireland. (M. H, Ed.) *Education + Training: Special Issue on Entrepreneurship Education*, 48(5), pp. 322–335.
- [11] Hopman, J., Allegranzi, B., & Mehtar, S. (2020). Managing COVID-19 in Low- and Middle-Income Countries. *JAMA*.
<https://doi.org/10.1001/jama.2020.4169>.
- [12] Hyo-Jeong, S. O. (2010, April). Towards Rigor of Online Interaction Research: Implication For Future Distance Learning Research. *The Turkish Online Journal of Educational Technology*, 9(2).
- [13] Kim, K.-J., & Bonk, C. J. (2006). The Future of Online Teaching and Learning in Higher Education. *EDUCAUSE QUARTERLY*, pp. 22-30.
- [14] Kraemer, M. U., Yang, C. H., Gutierrez, B., Wu, C. H., Klein, B., Piggott, D. M., ... Brownstein, J. S. (2020). The effect of human mobility and control measures on the COVID-19 epidemic in China. *Science*.
<https://doi.org/10.1126/science.abb4218>
- [15] Mansbach, J. (2015, September 14). Using Technology To Develop Students' Critical Thinking Skills. Retrieved September 10, 2016, from <http://dl.sps.northwestern.edu/blog/2015/09/using-technology-to-developstudents-critical-thinking-skills>.
- [16] Mayes, R., Luebeck, J., Ku, H. Y., Akarasriworn, C., & Korkmaz, O. (2011). Themes and strategies for transformative online instruction: A review of literature and practice. *The Quarterly Review of Distance Education*, 12(3), 151-166.
- [17] Oladokun, O., & Aina, L. (2011). ODL and the impact of digital divide on information access in Botswana. *International Review of Research in Open and Distance Learning*, 12(6), 157–177.
- [18] Raaper, R.; Brown, C. The Covid-19 pandemic and the dissolution of the

- university campus: Implications for student support practice. *J. Prof. Cap. Community* 2020. [CrossRef]
- [19] Sentamu, N.P. (2003). School's influence of learning: A case of upper primary schools in Kampala & Wakiso Districts.
- [20] Shams, J. A. (2013) 'M-learning: Factors influencing behavior intentions in distance education', Asian Association of Open Universities (AIOU), 27th Annual Conference. Islamabad, Pakistan. 1 Oct. 2013.
- [21] Vogel, D., Kennedy, D., Kuan, K., Kwok, R. & Lai, J. (2007) 'Do mobile device applications affect learning?', 40th Annual Hawaii International Conference on System Sciences (HICSS'07), IEEE, pp.1–4.
- [22] West, D. M. (2012). *Digital Schools: How technology can transform education*. Washington:DC: Brookings Institution Press.
- [23] Williams, L., Wiebe, E., Yang, K., Ferzli, M., & Miller, C. (2002). In support of paired programming in the introductory computer science course. *Computer Science Education*, 12 (3), 197-212
- [24] Wu, B., & Chen, X. (2017). Continuance intention to use MOOCs: Integrating the technology acceptance model (TAM) and task technology fit (TTF) model. *Computers in Human Behavior*, 67, 221–232. doi:10.1016/j.chb.2016.10.028
- [25] Wu, Z., & McGoogan, J. M. (2020). Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention
- [26] Zambia's 7th National Development Plan (7NDP) (2017-2021).
- [27] Zambia National Education Coalition (ZANEC) 2019 Press Statement.
- [28] Zambia's Vision 2030: Education for All 2015 National Review Report:
- [29] Zu, Z. Y., Jiang, M. D., Xu, P. P., Chen, W., Ni, Q. Q., Lu, G. M., & Zhang, L. J. (2020). Coronavirus disease 2019 (COVID-19): A perspective from China. *Radiology*.