Journal of STEAM Education
Journal of Science, Technology, Engineering, Mathematicsand Art Education
2022, July (Issue: 2, Volume: 5)

Addressing Virtual Learning Challenges in Higher Institutions of Learning: A Systematic Review and Meta-analysis

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Article History

Received: 22 Feb. 2022

Received in revised form:
26 April 2022

Accepted: 28 April 2022

Published: 1 July 2022

ABSTRACT

Many universities across the globe are set to keep lectures online, more especially in this era of COVID-19 and yet there is an increased spotlight on the challenges faced by learners. Some of these challenges include; issues related to communications, assessments and scheduling of lectures. Teaching and learning in an e-learning environment is said to happen differently as opposed to the traditional classroom and this can present new challenges to instructors and learners. The purpose of this study was to review the various ways of addressing virtual challenges in higher institutions of learning. Literature Search of databases of Google Scholar, PubMed, SCOPUS and ResearchGate using the keywords "Addressing virtual learning challenges" was done. Additional inputs were taken from blogs and relevant reports. The results varied; some learners reported that "It's difficult to share our points as online discussions can move swiftly from one topic to another. Engaging a big class in a live forum can be challenging too." Other learners asserted that by regulating who can speak up at one time, the moderator can ensure that no one is left behind. However, it is also reported that there is a growing concern of plagiarism surrounding online examination and thus stringent plagiarism checks must be enhanced to curtail such vice. Conclusively, a lot is still needed to address virtual learning challenges. No single measure is exhaustive enough and more vigilance is required to sustain the adopted measures and improve the quality of virtual learning.

Keywords: Virtual learning, Higher Institutions of Learning, Challenges, Lecturers, Learners, Instructors

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Omona, K. (2022). Addressing virtual learning challenges in higher institutions of learning: A systematic review and meta-analysis. *Journal of STEAM Education, 5* (2), 104-116. https://doi.org/10.55290/steam.1076766

INTRODUCTION

Online learning, also called virtual learning, is defined as "learning that takes place partially or entirely over the Internet" (US Department of Education, 2010). Online or virtual learning is appealing to a number of learners and is becoming a more common form of teaching and learning for many universities across the globe.

In the wake of COVID-19 pandemic, changes in the process of teaching-learning in higher education institutions became inevitable and this greatly influenced the interaction between teachers and students. The end result of the pandemic constrained many universities to carry out their activity with students exclusively online (Claudiu et al., 2020). In Uganda, many universities had to shift to e-learning in order to ensure continuity of studies/learning following the indefinite closure of education institutions in the country. The National Council for Higher Education (NCHE) released immediate guidelines for e-learning in institutions of higher learning across the country. This was in order to commence remote teaching and learning activities during the ongoing Covid-19 lockdown (Anon., 2020).

Thus, now days, the higher education system is in a continuous process of change. This is because universities have to keep pace with the needs, desires and requirements of their students (Claudiu et al., 2020). Therefore, to carry out the university activities, information technologies and virtual learning systems are seen as very essential. As a consequence, many of these institutions have decided to invest more and more in online systems and devices (Popovici & Mironov, 2015). Meanwhile, in this technology era, integration of innovative virtual learning systems with intent to reinforce and support both teaching and learning processes has remained one of the main challenges of many universities (Fischer et al., 2014).

As shown in previous studies, virtual learning offers many benefits for students as it involves student-centeredness, more flexible (Dhawan, 2020). It can also improve interaction with students by providing asynchronous and synchronous tools, alongside other benefits (Marinoni et al., 2020). The said asynchronous and synchronous tools include e-mail, forums, chats, videoconferences, zoom and others (Adnan & Anwar, 2020). Again, internet technologies facilitate the distribution of content to a large number of users; E-learning platforms offer many advantages to learners such as control over the content and control over the time spent while learning. This is a huge advantage. In this way, learning process can be easily adapted according to the needs of the learner and objectives of learning (Claudiu et al., 2020). In another scholarly debate, it is argued that for centuries, education has relied on classroom methods and yet technology-enhanced learning can potentially bring about a revolution in learning, making high-quality, cost-effective education available to a greater number of people. The basic advantages of e-learning include anytime-anywhere access to learning, cost reductions, ability to reach larger markets, more effective learning with personalized instructions as well as flexibility (Yusuf & Al-Banawi, 2013).

However, when using virtual learning platforms there are also so many challenges that impede learning. These include; decreased motivation in students, delayed feedback from lecturers as they will not always be available online and due to lack of physical presence of classmates, there is feeling of isolation, which compromise learner for some learners. In another scholarly debate, it was argued that higher education institutions faced different challenges in their teaching-learning activities as a result of the unprecedented COVID-19 incident. Following lack of preparation superimposed with the inherent problems of remote assessment, conducting

assessments remotely during virtual learning posed extraordinary challenges for higher education institutions (Fiseha et al., 2020; Claudiu et al., 2020).
Nonetheless, with the help of teachers who adapt their teaching strategies to the needs of students, these obstacles can be overcome with time, however slow it may be. For this to be more of a success, experience and knowledge about teaching in the online environment are highly necessary, without relaxation. Other scholars (Fiseha et al., 2020) asserted that in recent years, online learning was adopted in many higher institutions of learning and as a result remote assessment of students has become challenging. This is most especially when it comes to ensuring academic integrity. Lecturers are therefore, forced to devise strategies for appropriate remote assessment.

Objective
The objective of this study is to review the various ways of addressing virtual learning challenges in higher Institutions of Learning

MATERIALS & METHODS

The author followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and conducted a systematic review using PubMed, Google Scholar, Web of Science and other sources between 2011 and 2022.

Framing questions
The author identified the particular problem to be addressed by the review and specified it in the form of clear, unambiguous and structured question before beginning the review (Khan, et al., 2003).

Identifying relevant publications
The author made an extensive search for a number of studies. Multiple resources were searched without language restrictions both electronically and physically. Literature Search of databases of Google Scholar, PubMed, SCOPUS and ResearchGate using the keywords “How COVID-19 affected schools that opened or partially opened during the Pandemic in Africa” or “School closure in COVID-19 era in Africa” and “COVID-19” was made. Other additional inputs were taken from blogs and relevant reports (Linares-Espinós, et al., 2018; Khan, et al., 2003).

Furthermore, various internet engines were searched for web pages that might provide references. This effort resulted in 781 papers from which relevant studies were selected for the review. The potential relevance was examined and 763 papers were excluded as irrelevant. The full papers of the remaining 18 studies were assessed to select those primary studies of interest. These criteria excluded 763 studies and left 7 in the review. They came from different countries, published mainly in English language between 2011 and 2022. See **figure 1** for details of the selection process.

Assessment of the quality of studies
Assessment of study quality was done. Question formulation and study selection criteria above described the minimum acceptable level of design. Selected studies were subjected to a more refined quality assessment by the use of general critical appraisal (Linares-Espinós, et al., 2018). See figure 1.

Summarizing the evidence

Data synthesis consisted of appraisal of study characteristics, quality and effects as well as use of statistical methods for exploring differences between studies and combining their effects (meta-analysis). Exploration of heterogeneity and its sources was planned in advance. Where an overall meta-analysis could not be done, subgroup meta-analysis was considered (Linares-Espinós, et al., 2018).

Interpreting the findings

In order to interpret findings, the issues highlighted in each of the sub-sections above had to be met. The risk of publication bias and related biases was explored. Exploration for heterogeneity helped to determine whether the overall summary could be trusted, and, if not, the effects observed in high-quality studies was used for generating inferences. See **figure 1** for details of selection of paper with outcome of interest.

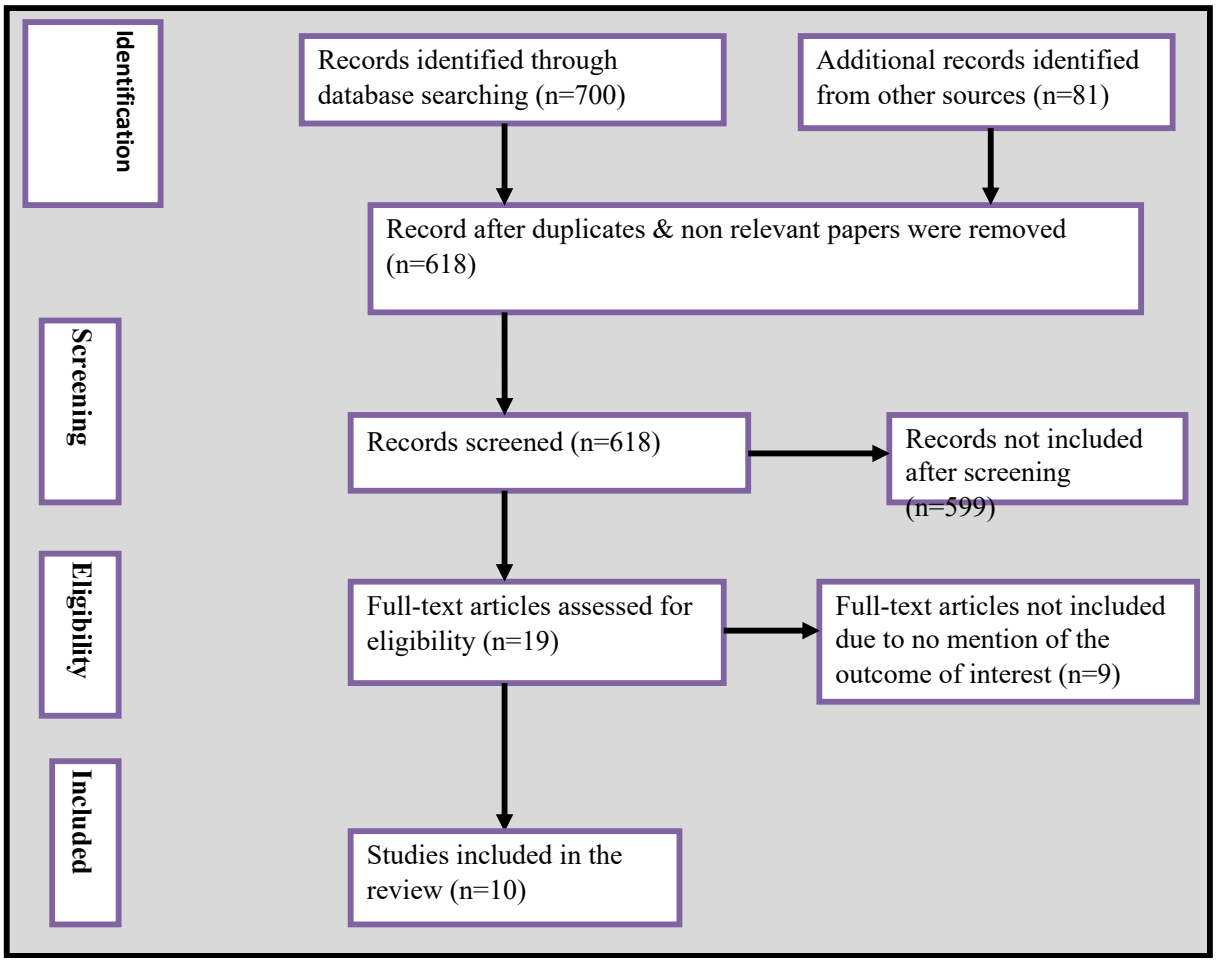

Figure 1: *Flowchart Showing the Selection of Studies for the Meta-Analysis of Ways of Addressing Virtual Learning Challenges in Higher Institutions of Learning*

Background Results

To answer the objective of the study, a thorough review of published materials was made to objectively analyze ways to address virtual learning challenges in higher institutions of learning (Figure 1). A total of ten (10) studies, most of which were retrospective and all of high quality, between 2011 and 2022 was used to examine virtual learning challenges in higher institutions of learning. See table 1 for summary of studies identified.

Table 1. Summary of Identified Factors for Addressing Learners' Engagement in Higher Education Learning

Identified Factors for Addressing Virtual Learning Challenges	Description	Research
Interpersonal interaction	**1)** Learner-to-instructor (such as sending announcements or e-mails, providing feedback, holding counseling hours and having instructors present in online learning) **2)**Learner-to-learner (such as, participation in online discussions, collaborative working & providing feedback)	Klawitter, 2022; Kearns, 2012; Suskie, 2009; Reddy & Andrade, 2010
Curriculum & learning design	**1)**Authentic learning activities **2)** Active learning **3)**Course resources (such as clear learning objectives and instruction, a wide variety of resource formats and difficulty levels, interactive digital content, multimedia)	Fiseha et al., 2020; Rutgers, n.d; University of Florida, 2020; Durfee, 2010; Baker, 2011; Reddy & Andrade, 2010
Achievement motivation	**1)**Learners' self-belief and inner desire to acquire knowledge **2)** Work autonomously **3)** Achieve self-learning goals	Fischer et al., 2014; Klawitter, 2022
High expectations	Set by learners and others such as high standards for acceptable academic work, high and clear academic expectations, and difficulty level of assessments	Durfee, 2010; Reddy & Andrade, 2010
Supportive environment	**1)** Instructor support such as, instructors' accessibility, presence and passion **2)**Infrastructure support (such as welcome and diverse learning environment, various support services, devices and internet accessibility)	Klawitter, 2022; Fiseha et al., 2020

Virtual Learning Challenges and their Solutions

There are a number of drawbacks and potential issues face by both students and educators while engaging each other in virtual learning (Brittany, 2015). In a recent study it was reported that recent polling from College Reaction showed that 77% of students surveyed said they felt distance learning was worse or much worse than in-person classes. This study was in more than 800 college students (Klawitter, 2022; Suskie, 2009). Thus, the list of challenges is endless. This review highlights only a few to mention;

Distractions everywhere

Distractions have become a reality of remote learning. Many distractions around the learner can be disruptive for everyone involved in the virtual learning platform, especially if you are in the middle of a virtual classroom session (Klawitter, 2022). As a result, these distractions have become more challenging to manage.

Solution: The solution to distraction is to aggressively look for better environment to learn. This lies in the hand of the learner

Time management

Poor time management on the part of learners or educators has always affected quality of virtual learning (Klawitter, 2022). Time management is one of the most difficult challenges for students to overcome. This is because time management depends entirely on self-motivation.

Solution: The solution is that students need to be serious with their education. As they get serious, they must learn how to manage time and set their daily schedules, and then learn to study amidst the constant distractions.

Staying motivated

Finding the motivation to get started on coursework can be extremely difficult, especially, given the fact that students may not be attending class at a set time on a physical campus environment.

Solution: Creating a daily schedule and finding a productive workspace is the best way to solve this. This can help to focus on the ultimate goal of studying. It helps to keep the learner's reason for pursuing his or her degree at the top of his or her mind. Similarly, students need to stay in touch with their classmates, in addition to reaching out to faculty or academic staff. This, also, is self-motivating (Fischer et al., 2014). The more involved one is with his or her distance education, the more it is on top of his or her mind. On daily basis, the students need to log in to see the course updates, class discussions and also to connect with other students and share questions or perspectives (Klawitter, 2022).

Technical issues

Unexpectedly, it is unfortunate that in online environment, technical issues are likely to occur. Even if this may appear too obvious, such technical issues grossly add to the frustrations of online environments, and hence, interrupt home learning. Computers may unexpectedly shut down couple with the fact that there are also moments when the internet or wifi becomes spotty and weak. This contributes to the difficulty in keeping up with one's virtual classmates (Klawitter, 2022).

The solution; again, **t**he most important step is for the learner to stay in touch with his or her lecturers and inform them about what is happening. They should understand and be flexible

about the situation, perhaps even recording class sessions as a backup. Technical support services can be a valuable resource for virtual learning if the university has it for students.

Some Students being left behind

Normally, in the classroom, lecturer can monitor the students and adjust their pace to accommodate anyone who needs extra time. Meanwhile in a virtual environment, it's may be somewhat difficult. Virtually it is harder to read body language and thus learners may stay silent or put on a brave face and then leave the class feeling frustrated and having learned nothing at all without the lecturer noticing it (Klawitter, 2022).

Solution: Again, the solution here also lies with the learner; He or she needs to set up for success by asking for information on any relevant apps he or she may not understand or how to access the classes. The learners must be sure to know how to raise concerns to their lecturers, be it during the online classes, through e-mail or on a different form of communication.

Diminished social aspects

Of the many challenges of online learning system, another spot in the list of challenges goes to the loss of many social aspects with the online route. As requirement for completion of many degree programs in universities, there are certainly many aspect allotted to social interaction with peers online. Among these interactions are; classroom activities or even "social lounges" set outside of the digital classroom. Despite all the advantages of the online platform of learning, they are still not the same or a replacement of physical environment and or in-person relations. Interacting in person creates more considerable bonds and many other supportive attributes for the students. This indeed is a challenge harder to face for some learners than others. The adjustment can be particularly difficult for students taking classes that are better suited for the face-to-face format, such as those with science practical components, for example first aid course in health sciences (Klawitter, 2022).

Frustrations due to the lack of human contact, physical absence of lecturers, and an inability to discuss problems with classmates can easily creep in and disrupt learning process. Sometimes, the online world, no matter how enriching it may be, can become too small and the learner will need a physical space where he or she can resolve his or her queries and practice with real tools.

Solution; Should this is the case; one solution is to foster personal interaction within the online world as much as possible. The lecturers can organize and plan for webinars, group work or forums where students can discuss and resolve their queries.

Remote assessment

Many higher education institutions across the globe have faced different challenges in their virtual teaching-learning environment, which can be unique to individual institutions or cross-cutting among many institutions. In particular, remotely conducting assessments in the wake of COVID-19 posed extraordinary challenges for many higher education institutions. This was aggravated by lack of preparation superimposed with the inherently known problems of remote assessments. Thus, as online learning became adopted in many higher institutions, remote assessment of students became a very huge challenging, especially in ensuring academic integrity (Fischer et al., 2014). It is also reported that there is a growing concern of plagiarism surrounding online examination and thus stringent plagiarism checks must be enhanced to curtail such vice.

Solutions;

A number of remote assessments methods are available to evaluate the online learning of students (Kearns, 2012). Concerning plagiarism, stringent plagiarism checks must be enhanced before further assessments are made. The assessments are broadly classified into; (1) remotely proctored exams and (2) open-ended assessments.

1) Proctored exams

A Proctor is someone who watches candidates for examination to prevent cheating or someone who supervises an examination. This examination is time-bounded and proctored, as well. By using various learning management systems such as Canvas and Sakai, proctored exams can also be done remotely (Fiseha et al., 2020).

2) Quizzes

In order to demonstrate their understanding on the materials provided, series of quizzes provide low-stake opportunities for students. Quizzes also give ongoing information about the understanding of the students and can, thus, serve as means for feedback for improvement. Randomization of questions is easier for quizzes. Various applications software such as Canvas and Sakai to make cheating more difficult can be used, thus providing remedy for virtual assessment (Fiseha et al., 2020).

3) Open-book and take-home assessments

Open-book and take-home assessment provide, yet another alternatives, in remote assessment of students in higher institution of learning. These kinds of assessments are conventional and used under the traditional teaching-learning process. In the event that, there is no possibility of proctored exam, take-home exam can exclusively serve as the main method of assessment to cover the outcomes of learning by the learners (Fiseha et al., 2020).. The major challenge of using take-home-exam as assessment method lies in the preparation of more conceptual questions that cannot be found directly or easily in any type of sources, such as the internet and textbooks. The students will have to apply knowledge learned in order to complete the task; short of that, the students run the risks of failing the assessment (Fischer et al., 2014).

4) Professional presentations or demonstrations

Professional presentations and/or demonstrations can be done in audiovisual. These assessment methods are good in demonstration of the understanding of the learners, especially when presentation is conducted online. The presentation can be done using any web based online conferencing system, such as ZOOM, MS Team, and google meet, among others (Fiseha et al., 2020).

5) Annotated bibliography

An annotated bibliography is a summarization of essential ideas contained in a document, thesis, research article, and others and the learner discusses how they relate to his or her own ideas or thesis (Fiseha et al., 2020). An evaluative annotation adds to the judgments of the lecturer about the quality of ideas of the student. This method gives students a choice in selecting works while assessing their higher-order abilities to evaluate sources, compare multiple perspectives and provide rationales for their choices (Rutgers, n.d).

6) Fact sheet

By definition, a fact sheet provides information to the readers (lecturer) in a clear and concise format. The learner provides a fact sheet presented on a piece of paper or digitally. This informs readers (lecturer) about the business, organization, product, service, campaign or event on the topic under investigation, for which the lecturer intends to assess the learners' knowledge (Kearns, 2012). Fact sheets should centered around one issue or topic. It should not be more than one page with a clear, easy-to-read layout; otherwise, mix up of information will ensue, thus causing confusion to the reader, thus making assessment even more difficult. Sometimes, learners can also create fact sheets in a single page on various topics, works, or companies; subject to the requirement by the lecturer. In this case, students may select their own topic, or it can be assigned to them by the instructor (Fiseha et al., 2020).

7) E-portfolio

E-portfolio is considered a learning tool as well as tool for assessment. Learners are expected to compile their best or representative work from the semester. They write critical introduction to the portfolio and a brief introduction to each piece (Fiseha et al., 2020). Achievement of learners can then be evaluated collectively for a module improvement (Kearns, 2012). The lecturer can use this to organize, sample and assess how much a learner has what gained out of it. Therefore, E-portfolios enable lecturers not only to observe what learners know and can do, but also to indicate how much they learn through their personal reflections on the subject being assessed (Rutgers, n.d).

8) Use of Rubrics

Rubric is a scoring guide used to evaluate performance or product or a project. There are distinctively three parts: 1) performance criteria; 2) rating scale; and 3) indicators. Rubric defines what is expected and what will be assessed for both the lecturer and the learner (University of Texas, 2017; Reddy & Andrade, 2010). It is an invaluable addition to any assignment. This is because it promotes learner's success while also benefiting instructor at the same time. Therefore, a well-designed rubric sets a clear blueprint for an assignment by defining and clarifying expectations and demonstrating the importance of the individual components of the assignment at hand. It encourages authentic self-assessment of learners (University of Florida, 2020). Rubrics are important tools in teaching learners about their own learning. Because rubrics provide specific and consistent feedback on work submitted, the use of rubrics can be used as a tool for providing feedback during self-assessment and peer review of submitted assignment. Faster grading of assignments and providing greater consistency over time and amongst graders is enhanced because rubrics give room for predetermining expectations. Rubrics also allow instructors to easily identify weak points and re-teaching opportunities, while offering powerful feedback (University of Florida, 2020; Durfee, 2010).
A sample assessment rubric (University of Texas, 2017) is shown in table 1 below;

Table 2. A modified Student assessment rubric

		Grades & Scores			
		4	**3**	**2**	**1**
		5points	**3points**	**1point**	**0point**
Assessment areas	1)Task required	All	Most	Some	Very few or none
	2)Frequency of attendance	Always	Usually	Some of the time	Rare or not at all
	3) Accuracy	No errors	Few errors	Some errors	Frequent errors
	4)Content covered	Full	Adequate	Partial	Minimal

Many times rubrics were mentioned more than once as being an effective way to highlight the important features of a large assignment, communicate target performance to students and also simplify grading for the lecturer (Kearns, 2012). Another scholar asserted that a rubric is a scoring guide that lists criteria against which assignment submissions will be evaluated (Suskie, 2009). Several instructors used rubrics to guide online discussion to specify how long discussion posts should be, how often students should post, and the level of critique and analysis they were looking for in each post (Kearns, 2012). Many other examples exist in the literature describing effective use of rubrics for assessing online discussion (Baker, 2011).

DISCUSSION

Way back in 2010, nearly 30% of U.S college and university students were already engaged in at least one online course, thus, online learning enrollments continued to grow at a much faster rate than overall enrollments in higher education (Allen & Seaman, 2010).
It is very clear that online learning faces many challenges which range from learners' issues, educators' issues and content issues. It is a huge challenge for many institutions of higher learning to engage students and make them participate in the teaching–learning process. Likewise, it is a challenge for teachers to move from Physical offline mode of teaching to online mode of teaching. This may bring about changing their teaching philosophies and managing their time (Dhawan, 2020). It is also very challenging to develop learning contents which do not only cover the curriculum but also engage the students during learning process. This is a skill which can be gained individually over time (Kebritchi et al., 2017).

LIMITATION OF THE STUDY

The results of this meta-analysis should be interpreted with caution. This is based on the observational and retrospective nature of the selected studies which limited my ability to draw causal inferences. Therefore, the results may be affected by reverse causality bias or other unknown confounders that were not adjusted for in these studies. Despite this limitation, the study has important strengths. An extensive database searches was performed to ensure that all relevant and published studies were identified.

CONCLUSION

Whereas virtual learning has numerous advantages, the quality of e-learning programs is a real challenge. There is no clear stipulation by the many governments in their educational policies about e-learning programs. There is a lack of standards for quality, quality control, development

of e-resources and e-content delivery. Thus, these problems need to be tackled immediately so that everyone can enjoy the benefits of quality education via e-learning mode.

RECOMMENDATIONS

Based on the findings from the reviewed literature, the author proposes the following recommendations for instructors;

1) In the case of complex written assignments that require synthesis of material from the entire semester, divide the assignment into phases and have students submit interim deliverables for feedback.
2) Use of rubrics to guide student activity on the discussion as well as in written assignments may be of great benefit to learners. A rubric may be as simple as a checklist that specifies target performance criteria for an assignment. This rubric must be developed ahead of time to help you clarify your own thinking about the objectives of the assignment.
3) In case of courses that require dense, technical material, self-check quizzes are encouraged as this can be very effective for students to complete the required reading and help the instructors to gauge their understanding of the material.
4) Instructors must make use of synchronous technologies, where appropriate and as much as possible. Asynchronous nature of most online learning is only to complement the synchronous learning. Zoom meeting, google meet and other are very vital synchronous tools.
5) Instructors should explore the use of peer-assessment strategies to foster community development and give students chances to learn through analyzing and critiquing the work of others.
6) Instructors need to look for appropriate opportunities to address the entire class so as to reduce the time spent giving the same feedback to multiple students.

ACKNOWLEDGEMENT

The author acknowledges and appreciates support of colleagues from the department of health sciences of Uganda Martyrs University.

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OK is a medical doctor and lecturer in the faculty of health sciences of Uganda Martyrs University. He is a researcher in the areas of public health, teaching and learning in higher education institutions, health services management and child focused research. He holds a PhD in Management (Healthcare Management) and Master of Science in Health services management, among other qualifications.

DECLARATIONS

Funding

No external funding was granted for this study.

Conflict of Interest Disclosure

The author declares no conflict of interest.

Consent for Publication

The authors do consent for publication of this work.

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