RESEARCH ARTICLE

STUDENT-LECTURER READINESS FOR ONLINE TEACHING AND LEARNING AMID AND BEYOND COVID-19 IN RURAL SOUTH AFRICAN HIGHER EDUCATION INSTITUTIONS

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Abstract

It is recorded that coronavirus disease (Covid-19) caused massive disruption and significant change in higher education institutions (HEIs), especially in rural-based institutions. The study aims to discuss student-lecturer readiness for online teaching and learning in rural South African HEIs in the midst of Covid-19 and beyond. Critical theory was adopted to support discussions of the study. A systematic literature review (SLR) was conducted to achieve the study's intended goal and to test the research questions. Therefore, the researchers used the "Preferred Reporting Items for Systematic Review and Meta-analysis" (PRISMA) guidelines. Thus, Google Scholar, EBSCOhost, ResearchGate, ScienceDirect, Sabinet, ProQuest, Cambridge Core, and Scopus were used by the researchers to retrieve and analyse information from scholarly documents such as peer-reviewed journal articles and conference papers (n = 12) published between 2002 and 2023. The major findings of the study are based on the literature gathered by the researchers. The study's evidence shows that the pandemic has given rise to learning losses and increases inequality. It was recommended in this study that the government should provide technologies to help students and lecturers adjust to a new mode of teaching and learning.

Keywords: Covid-19, higher education institutions, teaching and learning, technologies, online learning

INTRODUCTION AND BACKGROUND

Due to Covid-19 in South Africa, the learning environment has changed dramatically to maintain the momentum of learning (Gumede & Badriparsad, 2021). Covid-19 is an infectious disease caused by a newly discovered coronavirus. Most people infected with the Covid-19 virus experience mild to moderate respiratory illness and recover without requiring special treatment (World Health Organisation, 2021). Infection with Covid-19 has become a severe public health issue all over the world (Al-Dmour, Masa'deh, Salman, Abuhashesh, & Al-Dmou, 2020).

In their study, Gumede and Badriparsad (2021) explained the learning environment as a learning programme that can be facilitated through contact lectures as well as online and blended learning. Furthermore, Gumede and Badriparsad (2021) explain that online learning was introduced as a means of ensuring that education continues during Covid-19 pandemic. Therefore, online learning can be defined as instruction delivered on a digital device that is intended to support learning. On the other hand, Volchenkova and Bryan (2016) defined blended learning as "a formal education programme in which a student learns, at least in part, through online delivery of content and instruction with some element of student control over time, place, path, and/or pace and, at least in part, at a supervised brick-and-mortar location away from home". Muhuro and Kang'ethe (2021) are concerned that

blended learning is an innovative endeavour that could benefit students in rural-based universities in Southern Africa.

According to Wadood, Mamun, Rafi, Islam, Mohd, Lee, and Hossain (2020), in the history of humankind, Covid-19 has been the worst threat to human existence. In this regard, Bao (2020) strongly emphasised that the emergence of Covid-19 has resulted in educational institutions' having to take the big leap from contact lectures to online remote teaching and learning since the early spring of 2020. The implementation of the movement control order in 2020 to stem a major transmission of Covid-19 saw both lecturers and students scrambling to embrace online teaching and learning (The Star Online, 2020).

In this regard, Dube (2020) is concerned that the outbreak of the Covid-19 has caused a major drawback for rural students, who are taught using a traditional classroom setup, where a lecturer is visible to students, and the lecturer monitors learning at close range. Thus, in the time of Covid-19, the traditional approach to teaching is no longer permissible, and there is a need to invent new ways of teaching, such as online learning and using learning management systems (like Blackboard), which, unfortunately, is new to many students in rural areas.

Further, Dube (2020) emphasised that the new kind of learning leads rural students to fear that education during the time of Covid-19 will serve a few privileged students who are connected to resources. The situation was exacerbated by the South African government's response to Covid-19 by shutting down what is deemed non-essential services, which affected many rural families whose members earn their livelihood by selling vegetables or doing casual labour for wages.

Therefore, since the emergence of Covid-19 has influenced change in the higher education system in South Africa, this study is unique and pivotal in the sense that it aimed to improve online teaching and learning amid and beyond Covid-19 in rural South African HEIs, as most institutions might continue to adopt the new kind of learning. In addition, the outcome of this study will help in the development of a policy roadmap for the successful use of online education by both lecturers and students in the event of a future crisis.

Thus, the study is organised as follows. Next, the study focused on the statement of the research questions, then discussed the theoretical framework. It also dealt with materials and methods, systematic review, and limitations of the study. Lastly, the study focused on the conclusion and future directions of the study.

RESEARCH QUESTIONS

The research questions of this study are as follows:

1.   Is there any readiness of students and lecturers towards online teaching and learning amid Covid-19?

2.   What are the challenges affecting student-lecturer readiness for online teaching and learning amid Covid-19?

3.   What are the strategies that could help to improve student-lecturer readiness for online teaching and learning amid Covid-19 in rural HEIs?

CRITICAL THEORY AS THE LENS OF THE STUDY

In the context of Covid-19, critical theory was used as a theoretical lens to investigate online teaching and learning in rural South African HEIs.

Mazzoleni (2015) defines critical theory as the works of the Frankfurt School, a critical thinking tradition that originated with the works of scholars such as Herbert Marcuse, Max Horkheimer and Theodor W. Adorno. According to Brian (2012), critical theory seeks to expose the domination, control and suppression that hides behind what appears to be neutral, progressive, and necessary by drawing on diverse intellectual traditions.

Thus, in recent years, critical theory has guided how to address societal problems through technology integration in education, according to Otoo, Korang, Alzaid, Otayn, and Cifuentes (2020). Furthermore, Otoo et al. (2020) express concern that critical theory emphasises consciously designed curricula that use technology to address social injustices within societies, providing enlightenment and emancipation to students regardless of their cultures, gender, race, religion, or other factors.

In this study, the theory attempts to encourage lecturers to provide online teaching and learning in Covid-19 in a way that does not negatively affect students based on their settings. As stated in the research problem, social distancing has resulted in the elimination of contact activities from the curriculum in the majority of South African HEIs, including rural universities.

As a result, this theory could assist educational technologists, strategists and policymakers in reconsidering the use of new technologies to implement a systematic and thought-provoking approach to teaching and learning in the face of Covid-19. Given the emphasis on critical theory, it is reasonable to suggest that the aforementioned

specialists analyse and evaluate how students and lecturers can gain equitable access to and use online learning technology to improve teaching and learning in their HEIs.

MATERIALS AND METHODS

The researchers of this study followed the principle of PRISMA process in analysing and selecting scholarly documents such as peer-reviewed journals and conference papers. Therefore, PRISMA was used to investigate the experiences and challenges of blended learning by rural-based institutions of higher learning in South Africa during Covid-19. In this regard, authors such as Moher, Shamseer, Clarke, Ghersi, Liberati, Petticrew, Shekelle and Stewart (2015) explained that PRISMA is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses. According to Siddaway, Wood, and Hedges (2019), a systematic review entails a comprehensive and systematic search to locate all relevant published work that addresses one or more research questions, followed by a systematic presentation and integration of the characteristics and findings of that search. Furthermore, Clarke (2011) noted that the purpose of a systematic review is to provide a meticulous summary of all available primary research in response to a research question. In addition to this, Ahn and Kang (2018) highlighted that systematic reviews and meta-analyses present results by combining and analysing data from different studies conducted on similar research topics.

Thus, the eligibility of articles (materials) selected for the study was determined by the sources covering online teaching and learning and covid-19. The researchers followed the following phrases when conducting the systematic review:

- Planning phase
- Documents selection phase
- Execution phase

Planning phase

Eight scientific search engines were used by the researchers to obtain the data for the study which include: Google Scholar, EBSCOhost, ResearchGate, ScienceDirect, Sabinet, ProQuest, Cambridge Core, and Scopus. In this regard, terms such as: "South African higher education institutions", online teaching and learning", and "Covid-19 and education" were used by the researchers to retrieve documents used in the study.

Scholarly documents selection phase

In this study, the researchers selected scholarly documents mostly peer-reviewed journal articles to answer the above-mentioned research questions. Figure 1 below depicts the various steps such as identification, screening and inclusion followed by the researchers of this study during the process of searching the used scholarly documents. In this regard, identification deals with the number of articles recorded through online and another database search; screening covers the actual articles screened and duplicates removed while inclusion deals with the actual number of articles adopted or used in this study (meta-analysis).

Therefore, the initial search yielded 40 records. Due to information duplication or failure to meet the inclusion criteria, 10 records were excluded from this total. The remaining records numbered 30, of which 25 were screened further. As a result of the screening, 5 records were eliminated because they contained irrelevant information, leaving 20 records. The eligibility of the remaining 20 records was then determined. In addition, 8 scholarly documents were removed because they contained unwanted information about other countries. Finally, only 12 scholarly documents were used in this study.

Figure 1. PRISMA flow diagram
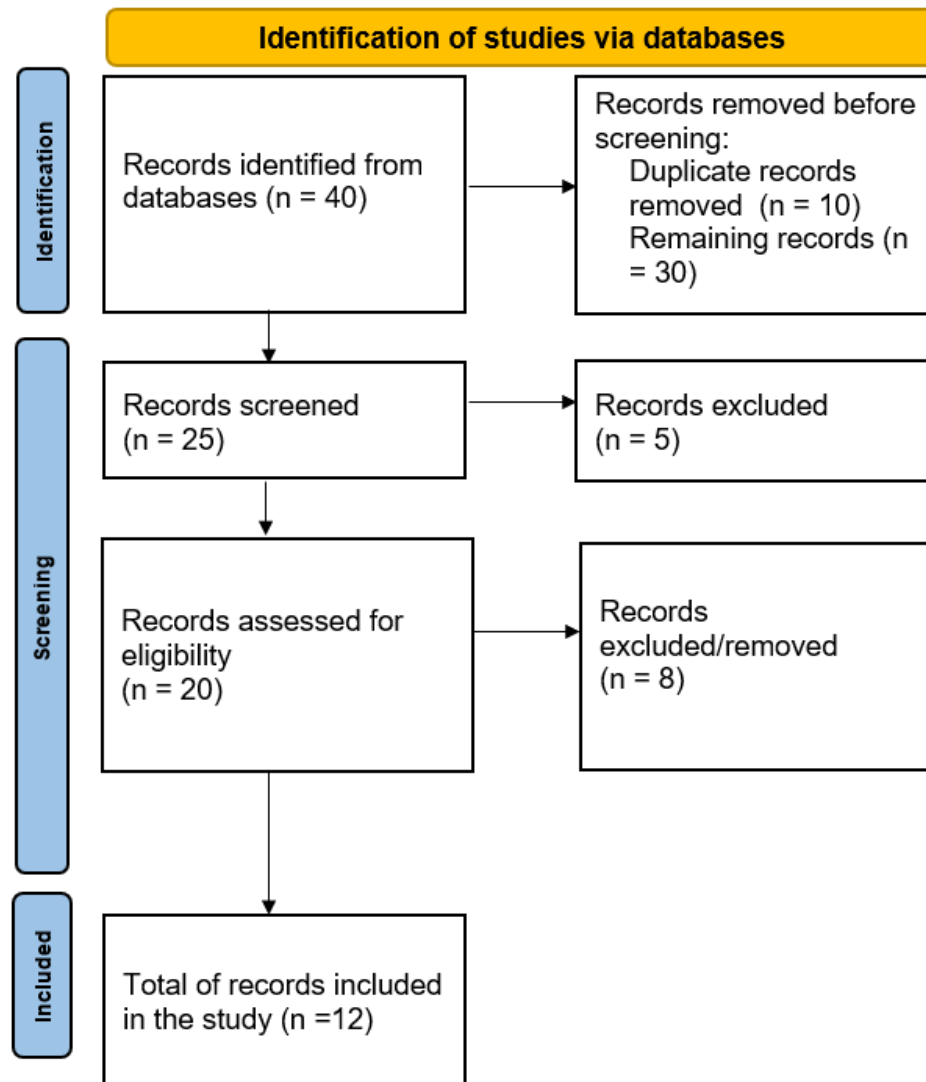
From: Page, Moher, Bossuyt, Boutron, Hoffmann, Mulrow, Shamseer, Tetzlaff, Akl, Brennan, Chou, Glanville, Grimshaw, Hróbjartsson, Lalu, Li, Loder, Mayo-Wilson, McDonald, McGuinness, Stewart, Thomas, Tricco, Welch, Whiting & McKenzie (2020)

Execution phase

The researchers for this validated the retrieved documents to ensure the quality of the study. As indicated below, the study has focused on twelve scholarly documents mostly peer-reviewed journal articles. Therefore, the researchers reviewed every scholarly document to determine if the inclusion and exclusion criteria were met. The inclusion and exclusion criteria were explained below:

Inclusion criteria

- Scholarly documents in the English language.
- Scholarly documents covering the variables of the study.
- Scholarly documents on student-lecturer readiness for online teaching and learning amid and beyond Covid-19
- Global studies that covered variables of the study.
- Scholarly documents published from 2002 to 2023.

Exclusion criteria

- Scholarly documents not published in the English language.
- Scholarly documents that did not cover the variables of the study.

- Scholarly documents that did not focus on student-lecturer readiness for online teaching and learning amid and beyond Covid-19.
- Global studies that did not cover the variable of the study.
- Scholarly documents published before 2002.

Table 1. Summary of the scholarly documents used in the study
The current study included twelve scholarly documents published in various databases mentioned above. In this regard, Table 1 depicts a representation of the entire process of the researcher's search.

Author(s), Year and Country of Publication	Consulted Documents	Methods	Theoretical/Conceptual Framework(s)
Gumede & Badriparsad (2021), *United Kingdom*	Journal article	Qualitative, Purposive sampling, One-on-one online interviews, Content analysis	N/A
Dube (2020), Spain	Journal article	Qualitative, Snowball method	Critical emancipatory research
Mishra, Gupta & Shree (2020), United Kingdom	Journal article	Qualitative & Quantitative,Questionnair-es, Content analysis	N/A
Brenya (2021), Ghana	Conference paper	Qualitative, Open-ended question, Thematic analysis	N/A
Nasria, Husninb, Mahmudc, & Halimcthe 2020), Malaysia	Journal article	Qualitative	Technological pedagogical content knowledge model
Shanmugam, Zainal, & Gnanasekare (2019), England	Journal article	Qualitative	N/A
Protsiv & Atkins (2016), United Kingdom	Journal article	Qualitative, Content analysis	N/A
Coppola, Hiltz & Rotter (2002), United States	Journal article	Qualitative	N/A
Diki (2013), United States	Journal article	Qualitative	N/A

Salleh & Nik Azman (2020), Spain	Journal article	Quantitative	N/A
Rahayu, Putra, Meiliasari, Sulaeman, & Koul (2020), Netherlands	Journal article	Quantitative	N/A
Sundani & Mangaka (2023), South Africa	Journal article	Qualitative, Non-empirical research design, Systematic review	The conversation theory

SYSTEMATIC REVIEW

Problematisation of student-lecturer readiness for online teaching and learning amid and beyond Covid-19

Gumede and Badriparsad (2021) discovered in their study that social distancing has resulted in the elimination of contact activities that comprise the curriculum in the majority of South African universities, including those based in rural areas. According to the authors, during Covid-19, only a few students had access to the online learning platform, which hampered their transition from contact learning to remote learning.

According to Dube (2020), online teaching and learning discriminate against underprivileged students while benefiting students from urban areas. Furthermore, Dube (2020) emphasised that this is widening the gap between the rich and the poor, rather than uniting the nation in the fight against Covid-19. Mishra, Gupta, and Shree (2020) found that some students struggled to concentrate during online lectures because they were unfamiliar with learning through their devices. This is evidence that there is a major problem that has arisen as a result of the Covid-19 outbreak, and that this has affected teaching and learning in HEIs.

Readiness of students and lecturers towards online teaching and learning amid and beyond Covid-19

According to Brenya (2021), the impact of Covid-19 has radically transformed practices in higher education settings, and additional changes are almost certain. Adoption and application of the internet, computers, smartphones and gadgets and digital learning platforms, for example, are continually evolving the delivery of instruction, learning, and research practices in HEIs in South Africa and across the globe. As a result, many institutions of higher learning have developed online learning teaching and learning protocols as a primary alternative to the traditional face-to-face pedagogical approach (Nasria, Husninb, Mahmudc, & Halimcthe, 2020). This initiative includes revising the course content, delivery and assessment approaches while keeping the course objectives in mind. According to Gumede and Badriparsad (2021), the pandemic has accelerated the urgent need for lecturers and students in South Africa to be skilled in online teaching and learning, in addition to long-standing challenges such as tuition affordability, perceived exclusivity, and issues of access and transformation. In this regard, Nasria et al. (2020) assert that the HEIs' faculties immediately responded to the Covid-19 shutdown by virtualising teaching and learning in order to ensure continuity of learning for student teachers. E-learning is a learning experience that is enhanced by the use of new technologies such as the internet both outside and inside the educational organisation's facilities. Its primary function is to aid in the enhancement of the learning and teaching process without regard for time or geographical barrier (Shanmugam, Zainal, & Gnanasekaren, 2019).

HEIs, such as universities, can continue to provide services during the movement control order period by using virtual learning. However, while new technologies are crucial to the current generation, particularly in the teaching and learning sphere, there are numerous opportunities and challenges that students and lecturers face when using e-learning platforms. According to Protsiv and Atkins (2016), one of the benefits of e-learning is the ability to create equal opportunities for students and improve access to learning motivated by participants. Furthermore, e-learning allows both young and adult learners (students) to learn whenever and wherever they want, including those with hectic schedules and multiple responsibilities that prevent them from fully participating in traditional face-to-face classes.

Coppola, Hiltz, and Rotter (2002) argue that online learning leads to different paradigms for teaching and learning than traditional classroom teaching, with both unique problems of coordination and unique opportunities to support active, collaborative (group or team-based) learning.

Challenges affecting student-lecturer readiness for online teaching and learning amid and beyond Covid-19

Looking at the readiness of the students and lecturers in the rural universities and how they functioned during the pandemic, the study conducted by Brenya (2021) found that some of the challenges that hindered the effective use of technology were the lack of solid digital infrastructure and the unstable internet connections that affected the sound and video quality of the discussions. According to Dube (2020), to this end, rural students and lecturers are seemingly helpless on how to approach online learning during the Covid-19 lockdown, and, therefore, the chasm between the haves and the have-nots gets ever deeper. Looking at the above-mentioned statement, one can concur that those who can afford modern technologies are the ones who can receive better education during the pandemic.

As a flashback, it is of utmost importance to note that the implementation of online learning in HEIs had so many obstacles long before the pandemic, such as funding and availability of experts, as well as the difficulty of equitable internet access (Diki, 2013).

Moreover, Salleh and Nik Azman (2020) argue that one should take into consideration that most lecturers and students were familiar with face-to-face teaching and learning and only used technology as a way to support teaching and learning experiences.

The study conducted by Gumede and Badriparsad (2021) revealed that the pandemic has highlighted the devastating digital literacy divide in South Africa. Within higher education, digital literacy is an essential skill that students are required to display and utilise to view digital information across various digital technologies. Similar to the above, Rahayu, Putra, Meiliasari, Sulaeman, and Koul (2020) state that online classes are affected by various issues, such as lecturers' inadequate technology skills and the risk of being unable to resolve technology-related problems during online classes, which can impact student access to learning materials. Moreover, the above authors highlight that online teaching requires good interaction and communication between lecturers and students. This includes interaction through e-mail, chat, live class questions or feedback. One can concur that challenges such as lack of data provision and digital skills literacy have affected teaching and learning in rural South African HEIs.

According to Dube (2020), rural students face unprecedented challenges in adjusting to a new mode of life and learning, the latter being characterised by the predominant use of online learning management systems and low-tech applications. Similar to Dube (2020), Brenya (2021) found another major concern that shows that universities were never prepared for the adoption of e-learning as a method for teaching and learning. Training is given to staff members to effectively use new technologies while students are left stranded.

Again, in their studies, Gumede and Badriparsad (2021) revealed that some students were able to access online learning platforms from the start of the national lockdown, and many were dependent on the government for smartphones, tablets, or laptops and free data.

Dube (2020) revealed that the greatest challenge faced with online education is that internet connectivity is very expensive and, in some cases, very limited.

Strategies that could help to improve student-lecturer readiness for online teaching and learning

To improve student-lecturer readiness for online teaching and learning amid Covid-19 in rural HEIs, Gumede and Badriparsad (2021) suggested that newer technologies that promote tangible growth and results within online teaching and learning be implemented due to the notably vast digital divide faced within South Africa.

From the study conducted by Sundani and Mangaka (2023), it was suggested that rural-based institutions of higher learning need to continuously seek ways to enhance this new kind of learning, i.e., workshops and training for students and lecturers to flex their digital skills. For example, lecturers need to have basic computing skills, electronic presentation skills, internet navigation skills, networking and collaboration skills, among others. Further, Sundani and Mangaka (2023) recommended that education researchers and policymakers conduct research on online learning and implement policies that could advance the pedagogical skills of students and lecturers in rural-based institutions of higher learning.

Brenya (2021) suggested that to reach the threshold and be fully prepared for e-learning, facets of face-to-face education must be replaced with relevant learning methodologies such as labs, simulation models, tutorial videos and assessment procedures. In addition to this, Protsiv and Atkins (2016) revealed that virtual (online) learning requires additional skills and efforts from the lecturers in terms of the preparation of materials for the students.

In the study conducted by Gumede and Badriparsad (2021), it was revealed that the participants believed that all students should be provided with equal opportunities to transition to online teaching and learning. In this regard, Salleh and Nik Azman (2020) proposed that lecturers need to provide appropriate and effective communication media during their virtual learning subject courses and ensure that they build a strong relationship with students, so that students receive better communication that will enable them to focus more on their studies

as they did not have to feel alone during the learning process. Moreover, the above authors found that the major factor contributing to the readiness of the students and the lecturers is the implementation of the course design development. Thus, the findings of the study suggest that lecturers need to develop suitable course designs for virtual learning that will meet the needs of their students.

According to Dube (2020), there is a need for an inclusive approach that caters to the lived realities of rural students. According to the aforementioned author, this will give rural students access to online learning, which has been seen as a way to deal with crises, not only for survival but also for teaching and learning by people in deprived communities, like those in rural institutions.

Based on the study conducted by Dube (2020), it is suggested that rural students and lecturers should have access to data that allows them to engage in an online learning process. In addition, the author suggested that the government should provide students and lecturers with devices such as smartphones, tablets or general phones that support the installation of learning packages such as Blackboard, among others.

Limitations of the study

Since rural South African HEIs were the most affected by the emergence of Covid-19, the study focused primarily on teaching and learning in the context of Covid-19. More urban institutions, for example, could be included in the future to see if they also encountered challenges affecting student-lecturer readiness for online teaching and learning during Covid-19.

CONCLUSION AND FUTURE DIRECTIONS OF THE STUDY

This study explored student-lecturer readiness for online teaching and learning in rural HEIs during Covid-19. The majority of the scholars cited in this study emphasised the importance of new technologies in providing exceptional online teaching and learning. Thus, in terms of students' and lecturers' readiness for online teaching and learning during Covid-19, the study revealed that the adoption and application of the internet, computers, smartphones and gadgets, and digital learning platforms are constantly changing the delivery of teaching and learning in South African rural HEIs. The study also revealed that the pandemic has accelerated the urgent need for lecturers and students to be skilled in online teaching and learning. Concerning the teaching and learning sphere in rural-based HEIs during Covid-19, the study discovered that there are numerous opportunities that students and lecturers experience through the use of e-learning platforms. It was also found that e-learning allows students to learn at any time from any location, including those with busy schedules and multiple responsibilities who may be unable to fully participate in traditional face-to-face classes. The research findings also revealed that most HEIs have adopted the online learning method to improve the way knowledge is delivered to students. On the other hand, the primary challenges that hampered the effective provision of online teaching and learning in most rural HEIs were found to be a lack of internet connections, insufficient technology skills, a lack of online teaching and learning preparedness and a lack of online teaching and learning preparedness. Thus, the study recommends the following to improve online teaching and learning in rural South African HEIs during and after Covid-19, as most institutions may continue to adopt the new way of learning:

- To avoid negative effects on students and lecturers, HEIs should incorporate modern teaching and learning management into their programmes;
- HEIs should proceed with caution when imposing online learning on students after addressing their needs and concerns using a student-centered approach. This could improve HEI students' preparedness, adoption and use of virtual (online) learning;
- During the transition from contact to online teaching and learning, both lecturers and students should require ongoing support and skill development. This could increase positive student engagement and achievement;
- To avoid wasting time and encountering difficulties during online teaching and learning, students and lecturers should be given hands-on training on how to use e-learning systems;
- The government should continue to provide technologies that will assist students and lecturers in adjusting to a new mode of teaching and learning; and
- Educational technologists, strategists and policymakers should conduct research to identify solutions to issues affecting teaching and learning in rural institutions amid Covid-19.

REFERENCES

Ahn, E., & Kang, H. (2018). Introduction to systematic review and meta-analysis. *Korean Journal of Anesthesiology,* 71(2), 103–112.

Al-Dmour, H., Masa'deh, R., Salman, A., Abuhashesh, M., & Al-Dmou, R. (2020). Influence of social media platforms on public health protection against the Covid-19 pandemic via the mediating effects of public health awareness and behavioral changes: Integrated model. *Journal of Medical Internet Research,* 22(8), 1–15.

Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. *Human Behavior and Emerging Technologies,* 2(2), 113–115.

Brenya, B. (2021, 15–17 December). *Students' Blended Learning Practices in Higher Education Institution amidst Covid-19 Pandemic.* International Conference on Cyber Security and Internet of Things (ICSIoT 2021), Virtual.

Brian, H. (2012). *Critical theory.* https://www.researchgate.net/publication/261697559_Critical_Theory

Clarke, J. (2011). What is a systematic review? *Evidence-Based Nursing,* 14(3).

Coppola, N. W., Hiltz, S. R., & Rotter, N. G. (2002). Becoming a virtual professor: Pedagogical roles and asynchronous learning networks. *Journal of Management Information Systems,*18(4), 169–189.

Diki, D. (2013). International collaboration of distance learning universities for online learning in indonesia. LUX: *A Journal of Transdisciplinary Writing and Research from Claremont Graduate University*, 2(1), 1–8.

Dooly, M., & Moore, E. (2017). Introduction: Qualitative approaches to research on plurilingual education. In E. Moore & M. Dooly (Eds), *Qualitative approaches to research on plurilingual education* (pp. 1-10). Research-publishing.net. https://doi.org/10.14705/rpnet.2017.emmd2016.618

Dube, B. (2020). Rural online learning in the context of COVID-19 in South Africa: Evoking an inclusive education approach. *Multidisciplinary Journal of Educational Research*, 10(2), 135–157.

Gumede, L., & Badriparsad, N. (2021). Online teaching and learning through the students' eyes- uncertainty through the COVID-19 lockdown: A qualitative case study in Gauteng Province, South Africa. *Radiography,* 28, 193–198.

Mazzoleni, G. (2015). *The international encyclopedia of political communication*. Singapore: John Wiley & Sons, Inc.

Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *International Journal of Educational Research Open 1.*

Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., & Stewart, L. A. (2015). "Preferred reporting items for systematic review and meta-analysis protocols (PRISMAP) 2015 statement". Systematic Reviews, 4(1), 1–9.

Muhuro, P., & Kang'ethe, S. M. (2021). Prospects and pitfalls associated with implementing blended learning in rural-based higher education institutions in Southern Africa. *Perspectives in Education,* 39(1), 427–441.

Nasria, N., Husninb, H., Mahmudc., S. N. D., & Halimc, L. (2020). Mitigating the COVID-19 pandemic: A snapshot from Malaysia into the coping strategies for pre-service teachers' education. *Journal of Teaching for Education*, 46(4), 546–553.

Otoo, S., Korang, T., Alzaid, A., Otayn, K., & Cifuentes, L. (2020). *The role of critical theory in learning technologies implementation   in   a   global   society.* https://www.researchgate.net/publication/340984762_The_Role_of_Critical_Theory_in_Learning_Technologies_Implementation_in_a_Global_Society

 Page, M. J, Moher, D., Bossuyt, P. M, Boutron, I, Hoffmann, T. C, Mulrow, C. D, Shamseer, L., Tetzlaff, J. M, Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., McGuinness, L. A., Stewart, L .A., Thomas, J., Tricco, A. C., Welch, V. A, Whiting, P., & McKenzie, J. E. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews, BMJ, 372(71).

Protsiv, M., & Atkins, S. (2016). The experiences of lecturers in African, Asian and European universities in preparing and delivering blended health research methods courses: A qualitative study. *Global Health Action,* 9(1), 28149.

Rahayu, W., Putra, M. D. K., Meiliasari, F., Sulaeman. E., & Koul, R. B. (2022) Development and validation of online classroom learning environment inventory (OCLEI): The case of Indonesia during the COVID-19 pandemic. *Learning Environments Research*, 25(1), 97–113.

Salleh, S. M., & Nik Azman, A. M. (2020). Lecturer POV: Moving toward virtual learning. *Global Business and Management Research: An International Journal,* 12(4), 24–33.

Shanmugam, K., Zainal, N. K., & Gnanasekaren, C. (2019). Technology foresight in the virtual learning environment in Malaysia. *Journal of Physics: Conference Series,* 1228.

Siddaway, A. P., Wood, A. M., & Hedges, L. V. (2019). How to do a systematic review: A best practice guide to conducting and reporting narrative reviews, meta-analyses, and meta-syntheses. *Annual Review of Psychology,* 70.

Sundani, N. D., & Mangaka A. C. (2023). The adoption of blended learning by rural-based institutions of higher learning in South Africa amid Covid-19: Experiences and challenges. *African Perspectives of Research in Teaching & Learning (APORTAL),* 7(1), 140–154.

The Star Online. (2020). *Is Malaysia ready for full implementation of virtual learning?* https://www.thestar.com.my/tech/tech-news/2020/09/21/ismalaysia-ready-for-full-implementation-of-virtual-learning

Volchenkova, K. N., & Bryan, A. (2016). Blended learning: definition, models, implications for higher education. *Bulletin of the South Ural State University. Ser. Education. Educational Sciences,* 8(2): 24–30.

Wadood, A, Mamun, M., Rafi, A., Islam, K., Mohd, S., Lee, L. L., & Hossain, G. (2020). Survey on knowledge, attitude, perception and practice among university students during COVID-19 pandemic. *J Sci Med*, 3, 67–79.

World Health Organisation. (2021). *Coronavirus.* https://www.who.int/health-topics/coronavirus#tab=tab_1