

# A Literature Review of E-Learning and E-Teaching in the Era of Covid-19 Pandemic

Zethembe Mseleku  
University of Kwa-Zulu Natal

**Abstract:-** The emergence of Covid-19 pandemic undoubtedly resulted in devastating socio-economic challenges across the world. In attempt to manage the contagion, many countries have implemented restrictive measures to reduce social gatherings and to promote social distancing. This meant the closure of higher learning institutions and a major shift from traditional classroom-based teaching and learning to virtual approach. While higher education may have transformed and moved to online due to Covid-19, it is unknown whether this transformation produces positive teaching and learning outcomes. This literature review is conducted to elicit relevant evidence on E-learning and E-teaching outcomes, challenges and opportunities in the era of Covid-19 pandemic.

A comprehensive literature search was conducted on 16 databases for relevant studies published in the year 2020. In addition, reference lists of studies identified from the initial search were used to retrieve additional relevant studies. The search terms used were Covid-19, coronavirus, online learning, E-learning, E-teaching and higher education. An inclusion and exclusion criteria was developed to select the most relevant articles for final review. Studies were eligible for inclusion if they addressed higher education E-learning and E-teaching outcomes, challenges and opportunities in the era of Covid-19.

While numerous studies have been published on the pandemic, only few studies addresses the depth of E-learning and E-teaching outcomes, associated challenges and opportunities during the period of Covid-19. The literature presented a number of learning and teaching challenges faced by academics and students. These challenges include the inability to access or use the online learning and teaching tools; difficulties to adjust particularly for students living in rural areas and those from low-income families; and associated stress, depression and anxiety.

**Keywords:-** Covid-19, Coronavirus, Online Learning, E-Learning, E-Teaching And Higher Education.

## I. INTRODUCTION AND BACKGROUND

The unexpected Covid-19 pandemic outbreak affected various sectors of the economy and every single aspect of human life, not only in developing countries, but across the world (Bacher-Hicks et al., 2020; Flores & Gago, 2020; Johnson et al., 2020; Raaper & Brown, 2020; Wargadinata et al., 2020). While every country is impacted by this pandemic, it was anticipated that most developing countries will be severely impacted due to lack of coping mechanisms such as health facilities, infrastructure and technology (Blundell et al., 2020; Jægera & Blaabæk, 2020). This would further widens inequalities between world countries, regions and even communities (Blundell et al., 2020; Jægera & Blaabæk, 2020). However, it is evident that regions that were initially severely affected by major outbreaks include China, Europe, Iran, South Korea, and the United States among others (Sahu, 2020).

Studies (Huang et al., 2020; Roache et al., 2020; Sahu, 2020; Sandars et al., 2020; Tesar, 2020) show that the novel coronavirus disease 2019 (COVID-19) was first discovered in Wuhan, the capital of Central China's Hubei province. The virus then spread rapidly across the world, sending billions of people into lockdown and leading to over 100,000 deaths. The World Health Organization (WHO) has since declared the coronavirus epidemic a pandemic and it was accordingly declared by presidents as an emergency in their respective countries. According to UNICEF (2020) cited in Kwabena & Boateng (2020), the coronavirus disease is also known as Covid-19, with an acronym CO-the corona, VI- the virus, D- the disease and the 19 stands for the 2019, which is the year the novel virus was detected. According to the World Health Organisation, coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. The WHO further asserted that people infected with the COVID-19 virus experience mild to moderate respiratory illness and recover without requiring special treatment. However, older people and those with underlying health conditions such as diabetes, cardiovascular disease, chronic respiratory disease, and cancer are more likely to develop severe sickness and deaths (Aboagye et al., 2020; Jacob et al., 2020; Wahid et al., 2020).

To respond to Covid-19 and to manage its spread, the countries' authorities implemented the Covid-19 protocol or regulations. This includes the decision to implement restrictive measures to reduce social gatherings and to promote social distancing under national lockdown (Pham & Ho, 2020). In addition, most social and economic activities were closed including closure of gyms, museums, movie theatres, swimming pools, and places with large gatherings, inclusive of educational institutions, all this in attempt to fight this invisible enemy (Sahu, 2020). According to Liguori and Winkler (2020), the gradual outbreak of Covid-19 posed a major challenge to education landscape as education institutions, both primary, secondary and tertiary were forced to close down and to look for alternative teaching and learning approaches.

Correspondingly, higher education institutions worldwide have been pushed to experiment e-learning as the traditional class-based learning is impossible under Covid-19 regulations (Demuyakor, 2020; Ratten, 2020). It is therefore clear that Covid-19 has resulted in a major disruption in the education system, much of which is still being understood due to the severity of its effects (Bryson & Andres, 2020; Crawford et al., 2020). A number of affected stakeholders, including government authorities, academic staff, students, and parents are concerned if the shift from class-based learning to online learning will produce the desired results. While it was anticipated that the wider implementation of online learning will pose new challenges, possible innovation opportunities within higher education sector during these testing times should never be overlooked. There are so many questions that have been raised regarding the quality of online teaching and learning in the public domain. This current study draws from secondary data (existing literature) to consolidate evidence for online teaching and learning in the era of Covid-19. Its aim is to contribute to the understanding of online teaching and learning practices during lockdown, associated challenges and covid-19 induced opportunities. This article therefore covers the following themes: higher education institutions response to Covid-19 and lockdown; online versus offline learning; challenges for online teaching and learning; Covid-19 and academic outcomes; Covid-19 induced opportunities; and discussion, conclusion and recommendations.

## II. METHODOLOGY

A comprehensive literature search was conducted on 16 databases (see figure 1) to identify relevant studies. The search was restricted (search filter) to identify only studies published in the year 2020. In addition, reference lists of studies identified from the initial search were used to retrieve additional relevant studies. The search terms used were Covid-19, coronavirus, online learning, E-learning, E-teaching and higher education. An inclusion and exclusion criteria was developed to select the most relevant articles for final review. Studies were eligible for inclusion if they addressed higher education E-learning and E-teaching during Covid-19, challenges and opportunities in the era of Covid-19. The UKZN online library was used to locate

relevant databases for the search and the databases identified are presented in figure 1 below.

Database	Total number of results	Peer reviewed papers	Included for literature review
Google Scholar	370	360	22
EBSCOHost	27	27	7
ScienceDirect	22	22	9
Web of Science	25	22	3
Jstor	34	29	4
Science online	6	6	0
Sabinet	205	195	12
Scopus	32	29	4
Project MUSE	12	12	1
Proquest	21	19	3
Academic Search Complete	57	52	6
SAGE Journals	94	84	7
Social Science Research Network	20	18	2
Web of Science Core Collection	11	11	2
SpringerLink	8	8	1
Social Sciences Citation Index (Web of Science)	16	16	2
<b>Total</b>	<b>960</b>	<b>910</b>	<b>85</b>

Fig 1: Preliminary literature search database results

A total number of 960 articles were collated from the first search, with google scholar generating the most articles followed by sabinet. Out of 960 articles, 910 (excluding non-scientific writings such as magazine articles, trade publications etc.) were peer reviewed and only 85 articles were selected for the final review. Final selection for literature review was based on the abstract which should meet the following requirements: acceptable methodological standard, clear research objective relevant to the current study, published on accredited source (journal). Only articles available in full text were included for the final review.

## III. RESULTS

These results are based on the review outcome of the existing studies published in the area of online learning and teaching during the period of Covid-19. While most studies reviewed for this study addressed educational institutions' response to Covid-19 and challenges associated with online teaching and learning, few studies addressed opportunities emanating from the pandemic and academic outcomes. The results of this literature review are therefore grouped into the following themes: higher education institutions response to Covid-19 and lockdown; online versus offline learning; challenges for online teaching and learning; and Covid-19 induced opportunities.

➤ *Higher education institutions response to Covid-19 and lockdown*

Most studies conducted on the impact of Covid-19 and national lockdown address how higher education institutions responded. The most common response from higher learning institutions was to shut down campuses and cancel all physical class meetings (Huang et al., 2020; Prokopenko & Berezhna, 2020; Ratten, 2020). Accordingly, these institutions either postponed or cancelled all campus events such as graduation ceremonies, workshops, conferences, sports (both intra and inter universities), and other activities (Liguori and Winkler, 2020; Sahu, 2020). University and college academics and support staff members were since mandated and encouraged to work from home and observe the Covid-19 protocols (Abidah 2020; Aucejo et al., 2020; Ratten, 2020). Some universities went to an extent of cleaning or disinfecting the university premises following the Covid-19 positive tests by some of their students and staff members in attempt to avoid further spread of Covid-19 (Crawford et al., 2020; Owusu-Fordjour et al., 2020).

In order to continue with teaching and learning during the Covid-19 induced difficult times, most institutions of higher learning introduced or developed their online learning platforms as an alternative to class-based teaching and learning (Chang & Fang, 2020; Daniel, 2020; Ferdig et al., 2020; Hodges et al., 2020; Marinoni et al., 2020; Raaper & Brown, 2020; Radha et al., 2020; Shahzad et al., 2020; Wotto, 2020; Zhu & Liu, 2020). For instance, New York University Shanghai announced that all classes would be taught online from 17 February, while Duke Kunshan University and Zhejiang University transitioned to online by 24 February. Many other universities, including Peking University and Tsinghua University reported a similar timeline for their transition to online delivery, with Shanghai Jiao Tong University reporting their first online class on 1 March (Leung & Sharma, 2020 cited in Crawford et al., 2020). However, in implementing online teaching and learning, most academic institutions experienced numerous challenges including connectivity issues, lack of resources, students' and academics' difficulties to adjust etc. These challenges are discussed in detail in subtopic '*challenges for online teaching and learning*' below. Based on these studies, it is evidenced that most universities across the world followed the same approach in responding to Covid-19 global crises.

➤ *Online versus offline*

Due to devastating Covid-19 outbreak and the implementation of national lockdown in many countries, teaching and learning across worlds' universities has consequently shifted from the normal traditional class-based to online. While the traditional approach has been preferred by most academics and students, adjusting to online learning posed a new challenge to academics and students. The central question that is of interest to many is whether online learning is better and effective than class-based learning. Few studies (Flores & Gago, 2020; Mariia, & Strzelecki, 2020; Wargadinata et al., 2020; Wendelboe et al., 2020; Zhang et al., 2020) attempted to address this puzzle. They show that the traditional face to face learning is still

preferred given the challenges associated with online learning. According to Dawadi et al. (2020), in low-income countries such as Nepal, online learning is likely to increase the already existing inequalities because there are big gaps among its citizenry in terms of their socio-economic and education/literacy background. In the advent of COVID-19, the digital divide and the uneven access to e-learning and e-resources will increase the gaps even further by widening the inequalities between the advantaged and disadvantaged children (Dawadi et al., 2020). Wahid et al. (2020) further argued that online learning is particularly not suitable for students who study sciences especially in the fields of biology, chemistry, physics, and mathematics as conducting experimental learning is nearly impossible online. Likewise, Radha et al. (2020) discovered that despite the rising popularity of online learning, traditional classroom training is the majority of the students' choice. Unlike online learning, the classroom learning method is more real, and students have an opportunity to debate, deliberate, and discuss with their class teachers and friends (Radha et al., 2020). Therefore, while remote learning may sound as an alternative to face to face learning, it created a lot of challenges for students and academics.

➤ *Challenges for online teaching and learning*

A sudden implementation of online teaching and learning due Covid-19 and lockdown by many universities has proven to bring numerous challenges into higher education industry. Although there are remarkable successes especially for higher learning institutions who already had well established online teaching and learning systems, it has been recognised that the shift from class-based to online learning has not been smooth for most universities and colleges. The literature shows that, among others, academics' and students' difficulties to adjust; connectivity, network and internet issues; unconducive physical space and environment; mental health related issues; lack of basic needs; and lack of teaching and learning resources are the major challenges associated with the sudden change to online learning. These challenges are discussed below.

➤ *Academics' difficulties to adjust*

Academics play a critical role in their respective higher education institutions as facilitators of online learning. Due to a sudden COVID-19 outbreak and consequently, a sudden shift to online learning, ordinary academics did not have adequate time to adjust to the new teaching platforms (Burgess & Sievertsen, 2020; Chen et al., 2020; Wang et al., 2020). Further evidence shows that some academics lack sufficient knowledge of information technology, and their understanding of online teaching is relatively poor (Chen et al., 2020). As a result, these academics encounter challenges in facilitating the online learning. These challenges may include how to arrange online classes, how to carry out online teaching according to the plan, which online teaching platform to choose, and how to monitor the effect and quality of online teaching, which will lead to the decrease in user satisfaction (Chen et al., 2020; Goh & Sandars, 2020; Teras et al., 2020). The sudden transition to online teaching also raised serious concerns for academics regarding their capabilities to engage with

students in an online platform while maintaining the same level of interaction as face-to-face formats (Jegede, 2020; Ratten, 2020). It is for this reason that Bryson & Andres (2020) argued that replicating the classroom experience in an online platform is impossible and could undermine the learning outcomes. Since training was not provided to academics due to sudden shift to online learning, they are probably not familiar to online tools which constrains teaching (Chang & Fang, 2020; Donitsa-Schmidt & Ramot, 2020).

Furthermore, delivering a lesson online may be hindered by problems such as system jams (Chen et al., 2020). Conducting assessments online has also been reported as a challenging task for academics and faculty staff members, particularly on how to avoid plagiarism during examination (Sahu, 2020). Also, teaching students often have problems such as lack of self-discipline and learning attitude, this is even more challenging for academics who themselves are not experienced in online teaching (Bao, 2020). These are some of the challenges that resulted to the Commission on Higher Education (CHED)'s decision to suspend the online form of instruction after three days following the students' and teachers' complains against the online mode of learning, suggesting that Philippines are not prepared to implement this online learning system (Toquero, 2020). It is therefore argued that effective online teaching and learning system requires proper planning and adequate investment (Demuyakor, 2020). Unfortunately, in cases of emergency events, such as the one of Covid-19 outbreak, proper planning and investment for online learning in advance is nearly impossible.

#### ➤ *Students' difficulties to adjust*

Just like their teachers, students also had challenges in adjusting to online learning from traditional class-based learning. In the study of barriers to online learning in the time of Covid-19, Ronnie et al. (2020) discovered that students found it difficult to adjust to online learning styles, having to perform responsibilities at home, and due to poor communication between them and lectures. Students were generally not prepared for online learning. While it was found that social issues and lecturer issues affect students' intentions to study online, access to online learning platforms was a demonstrable major challenge to many students (Aboagye et al., 2020; Chung, 2020; Rapanta et al., 2020). In particular, technical issues may occur in the middle of online learning, yet most students do not have access to technical support and advanced technologies that facilitate online learning (O'Keefe, 2020). Access to digital learning devices such as laptops and tablets and access to data for internet connection were found as barriers for online learning for some students (Adnan & Anwar 2020; Dhawan, 2020; Moawad 2020). Lack of access to online learning system is common among students from poor families living in underdeveloped communities. The study that was conducted in West Bengal, India shows that 30.6% students were studying through reading textbooks by own effort and not participated in e-learning mainly due to lack of access to online learning platforms (Kapasias et al., 2020). As also

understood by Dawadi et al. (2020), access to online learning for some students in these difficult times is a major problem for higher education sector as it increases the already existing inequalities among its citizens in terms of their socio-economic and education/literacy. While some students are dissatisfied with the existing online teaching platforms (Chen et al., 2020), some students had more serious challenges to overcome, such as those concerning access to online learning platforms (Ronnie et al., 2020).

#### ➤ *Connectivity, network and internet issues*

Online teaching and learning requires fast and reliable internet connection. Therefore, the shift from traditional face to face learning to online learning meant that students and academics must stay connected to internet. However, under some circumstances, this maybe impossible, hence teaching and learning would be affected. Challenges with connectivity were highlighted as the leading factor undermining e-learning and e-teaching during lockdown as a result of Covid-19 pandemic outbreak (Aboagye et al., 2020; Bao, 2020; Berezna et al., 2020; Dawadi, 2020; Jena, 2020). In the study of barriers to online learning, Ronnie et al. (2020) found the availability of fast and reliable internet connection as a major concern than either device ownership or technical aptitude. The critical challenge for reliable internet connection for online learning was also reported in the literature (Mamun et al., 2020; Naciri, 2020) as the main cause for non-participation in online learning by majority students. This drawback for online learning, according to Demuyakor (2020), was attributed to lack of internet data by Ghanaian international students in China. The unavailability of suitable hardware and software to access online learning was also identified as a barrier by some students (Crawford et al., 2020).

In attempt to ensure that all students have equal access to online learning, Student Representative Councils (SRCs) in various universities demanded the provision of digital learning devices (smartphones, tablets and laptops) and internet data to all students (Kwabena & Boateng, 2020). However, some students could not access online tools despite having digital learning devices and internet data because of poor network at home (Aboagye et al., 2020; Rose, 2020; Wargadinata et al., 2020). The poor network problem is particularly common in developing countries where ICT and telecommunications systems are not properly developed (Aboagye et al., 2020). Correspondingly, Chang and Fang (2020) discovered that 60% - 70% of teachers agree that "network speed and stability are poor", leading to challenges with accessing online learning tools. This literature evidence suggests that reliable network infrastructure, availability of internet data and availability of digital learning devices such as smart phones, tablets and laptops to students is important to ensure smooth online teaching and learning.

#### ➤ *Unconducive physical space and environment*

Lack of physical learning space and environment also presented itself as a challenge for some students learning online during lockdown. In most poor households, students do not have private room where they can peacefully study

without disturbance (Ronnie et al., 2020). Learning from home therefore becomes difficult for this disadvantaged group of students. The research conducted by Demuyakor (2020) shows that some students have to rush to the toilets to answer calls from their professors or to turn off video feeds because of noisy background. Similarly, Kapasia et al. (2020) found that, of 232 students, 103 (44.4%) had no separate reading room for the study. Without conducive learning environment, students are unable to concentrate on their schoolwork, and study productivity is reduced as a result (Chang & Fang, 2020). As argued by Daniel (2020), it is therefore necessary that institutions and educational systems consider concerns of students whose parents are unsupportive and whose home environments are not conducive to study. The shift to online education during Covid-19 overlooked this reality of unconducive learning environment which negatively affects the learning outcomes.

#### ➤ *Mental health related issues*

The mental health issues associated Covid-19 and the sudden shift from class-based to online learning are also demonstrable in the literature. Such issues include stress, anxiety and depression which occurs due to a sudden change in one's lifestyle and uncertainty about the future (Rajkumar, 2020; Ronnie et al., 2020; Rossi et al., 2020; Tandon, 2020; Xiong et al., 2020). Learning loss and dropout rates, other harder to quantify factors due to Covid-19 cause social and emotional disruption for general public and worse for students (Dorn, 2020). In addition, students whose family income or livelihoods strategy was impacted by Covid-19 and its regulations were found likely to suffer from stress, anxiety and depression, which in turn affects motivation to engage in online learning (Cao et al., 2020; Husky et al., 2020; Son et al., 2020; Wu et al., 2020; Zolotov et al., 2020). While Covid-19 created fear and other mental health issues among Israeli university students, Zolotov et al. (2020) further discovered that students who are psychologically affected turned to substance use in order to cope. This coping mechanism during these difficult times has negative impact on learning. Among Chinese students, 24.9% have experienced anxiety because of this COVID-19 outbreak (Pragholapati, 2020). Anxiety was often associated with having a relative or acquaintance who is infected with COVID-19 (Pragholapati, 2020).

#### ➤ *Lack of basic needs*

Lack of access to basic needs such as food, shelter, clean water, electricity, health care and security has effect on student's ability to fully participate in online learning while at home (Ronnie et al., 2020). For example, food which is provided to residence students may not be available at home as funders may not have adequate time to prepare food vouchers for funded students (Sahu, 2020). Some students do not have proper shelter during the lockdown which affect their learning. This challenge is evidenced in Kapasia et al. (2020)'s study where it was discovered that students who were not living at their own home (staying in relative's home, rented house, and as a paying guest) were facing some difficulties related to financial (26.5%), food (51%), and health (22.5%). Although the impact of these

difficulties on students' learning is not measured in the existing literature, these factors undoubtedly affected the students' ability to learn online.

#### ➤ *Lack of teaching and learning resources*

The unavailability of resources that facilitate online teaching and learning was a major concern to academics and students. According to Kerres (2020), some universities did not have properly running online communication tools; for example, a university has limited student access licenses to online library materials. Such issues would definitely affect the delivery of online learning material. Additionally, the lack of access to high-speed broadband or digital devices was also reported as undermining the online learning (Azorín, 2020). While academics may experience difficulties working from home due to inadequate infrastructure or resources to facilitate online teaching with immediate effect, the burden to parents has increased as they need to secure computers and IT equipment for their children to study at home (Garbe et al., 2020; Sahu, 2020). In deep rural areas where there is no electricity, students may find difficulties to stay connected due to lack of power to charge the online learning devices such as laptops (Atabhotor et al., 2020; Sarwar et al., 2020; Verawardina et al., 2020). Overall, not all higher learning institutions have the resources, both human and physical, to transition to online delivery (Crawford et al., 2020).

#### ➤ *Covid-19 and academic outcomes*

There is limited research evidence on the impact of Covid-19 on students' academic performance. This is probably due to lack of data that measures academic outcomes during the Covid-19 period. However, it is expected that as academic results become available, more research will be conducted on this area. Gonzalez et al. (2020) studied the academic performance of students before and after the Covid-19 confinement. Their study results shows that students achieved significant improvements in their scores even in tests that were performed in the on-line format in previous years (Gonzalez et al., 2020). Moreover, this improvement is only significant when comparing data after the Covid-19 confinement (i.e. there are no significant differences in on-line tests that were performed before the confinement) (Gonzalez et al., 2020). Therefore, these findings reveal that the new assessment process cannot be the reason for the improvement in students' performance because the learners also achieved better scores when the format of the assessment did not change (Gonzalez et al., 2020). Although Gonzalez et al.' study did not find the effect of Covid-19 confinement on students' academic performance, it is expected the Covid-19 outbreak will not only cause poor performance among students, but it will also increase the dropout rate (Dorn et al., 2020).

#### ➤ *Covid-19 induced opportunities*

While Covid-19 has created a lot of problems for higher education sector, it has been recognised that this pandemic has, on a positive side created opportunities. Such opportunities involves new approaches and tools for learning online and capacity development. For instance, lockdown implemented as a result of Covid-19 pushed

universities which previously used traditional teaching methods to digital world (Ratten, 2020). This means, universities must develop innovative ways to deliver teaching without compromising quality (Ratten, 2020). Also, new challenges associated with online teaching and learning will create a space for innovative thinking and innovative solutions within the sector (Bryson & Andres, 2020). It is also argued that due to online teaching and learning, both students and teaching staff will further develop their online communication and interpersonal skills through regular exposure to online platforms (Beech & Anseel, 2020). The Covid-19 outbreak also presented opportunities for new research in a new area, the more use of digital data collection methods and wider exposure to virtual dissemination of research results. This provided researchers and academics with new experiences in digital world necessary for their capacity development (Gardner, 2020; Shahzad et al., 2020; Zhu & Liu 2020). Therefore, not all is bad about Covid-19, however, challenges and problems far exceed opportunities.

#### IV. DISCUSSION

Drawing from the existing literature, this study consolidated evidence which contributes to the understanding of online learning and teaching, learning practices during lockdown, and associated challenges and opportunities. The previous studies, such as (Demuyakor, 2020; Ratten, 2020; Sahu, 2020; Sandars et al., 2020; Tesar, 2020) largely examined the impact of Covid-19 on the overall higher education sector. These studies further address the shift from class-based to online teaching and learning as a consequence of Covid-19 lockdown. Previous studies show that the emergency response to Covid-19 by many universities was mainly through closing all campuses (Huang et al., 2020) and postpone or cancel academic related activities (Liguori and Winkler, 2020); a decision which was followed by the implementation of remote learning (Chang & Fang 2020).

Only few studies compared offline and online learning (Dawadi et al., 2020; Flores & Gago, 2020; Mariia, & Strzelecki, 2020; Radha et al., 2020; Wargadinata et al., 2020; Wendelboe et al., 2020; Zhang et al., 2020). It is demonstrated in these studies that face to face teaching is preferable by academics and students. In this current study, academics' and students' preference of offline learning instead of online learning is attributed to various challenges associated with online learning. Kapasia et al. (2020) and other researchers identified unavailability of conducive learning environment as a challenge for students to effectively learn online during lockdown. The physical learning space at home or other settings may not provide the same level of comfort which most students get when they are in university residences. Mental health issues such as stress, anxiety and depression which occurs due to a sudden change in one's lifestyle and uncertainly about the future also affected students' ability to learn online (Rajkumar, 2020; Ronnie et al., 2020; Rossi et al., 2020; Tandon, 2020; Xiong et al., 2020). Lack of basic needs such as food, shelter, electricity at home constrained students' online

learning. Inadequate resources to facilitate online learning was also reported as a challenge for many higher learning institutions.

In the previous studies, connectivity, network and internet issues were identified as major problem associated with online learning. For instance, in the study of barriers to online learning, Ronnie et al. (2020) found the unavailability of fast and reliable internet connection as a major concern than either device ownership or technical aptitude. Whereas, difficulties to adjust to online learning platforms are also reported in the existing literature. Such difficulties were normally linked to lack of adequate knowledge to navigate the online learning platforms and the general lack of technological knowledge (O'Keefe, 2020; Ronnie et al., 2020). By critically analysing the existing literature, this current study deduced that first year students were likely to fail to adjust compared to returning students. It is knowledge and familiarity with online learning tools that differentiate these groups.

While previous research isolated challenges associated with online learning, this current study establish that students and academics were more likely to experience more than one challenge. For example, students who experienced connectivity issues were likely to lack basic needs, live in unconducive learning environment and consequently suffer mental health issues. This current study further suggest that these interrelated challenges were commonly experienced by students attending learning institutions in developing countries. There is limited research evidence on the impact of Covid-19 on students' academic performance which this current study attribute to lack of data that measures academic outcomes during the Covid-19 period. However, it is expected that as academic results become available, more research will be conducted on this area. Unlike most previous studies which only evidence challenges associated with Covid-19 lockdown, this current study consolidated evidence which suggest the Covid-19 induced opportunities. These opportunities include innovation and capacity development. Overall, this study revealed that both students and academics were not prepared for an online learning experience in this pandemic era.

#### V. CONCLUSION AND RECOMMENDATIONS FOR FURTHER RESEARCH

In conclusion, the Covid-19 outbreak has introduced a lot of challenges for higher education institutions across the world. Lockdown and other Covid-19 regulations has forced a sudden shift from face to face learning to online learning in many academic institutions. While this shift was considered a possible solution to higher education crises in the era of Covid-19, it is shown in this study that this shift came with numerous challenges for students and academics. As discussed in this study, these challenges include; difficulties to adjust by lectures and students, connectivity issues, unconducive physical environment, mental health related issues, lack of basic needs, lack of teaching and learning resources. Despite these challenges, this study shows that there are Covid-19 induced opportunities such as

innovation and capacity development. There is lack of scientific research evidence on the impact of Covid-19 on academic outcomes. It is therefore recommended that further research should be conducted to measure the impact (short-term and long-term) of Covid-19 on academic outcomes.

## REFERENCES

- [1]. Abidah, Azmil, Hasan Nuurul Hidaayatullaah, Roy Martin Simamora, Daliana Fehabutar, and Lely Mutakinati. "The Impact of Covid-19 to Indonesian Education and Its Relation to the Philosophy of "Merdeka Belajar".*" Studies in Philosophy of Science and Education 1*, no. 1 (2020): 38-49.
- [2]. Aboagye, Emmanuel, Joseph Anthony Yawson, and Kofi Nyantakyi Appiah. "COVID-19 and E-learning: The challenges of students in tertiary institutions." *Social Education Research* (2020): 1-8.
- [3]. Adnan, Muhammad, and Kainat Anwar. "Online Learning amid the COVID-19 Pandemic: Students' Perspectives." *Online Submission 2*, no. 1 (2020): 45-51.
- [4]. Assunção Flores, Maria, and Marília Gago. "Teacher education in times of COVID-19 pandemic in Portugal: national, institutional and pedagogical responses." *Journal of Education for Teaching* (2020): 1-10.
- [5]. Assunção Flores, Maria, and Marília Gago. "Teacher education in times of COVID-19 pandemic in Portugal: national, institutional and pedagogical responses." *Journal of Education for Teaching* (2020): 1-10.
- [6]. Atabhotor, Ipotokin Sunday, Ojutalayo Mobolanle Kofoworola, and SOWunmi Elizabeth Bolatito. "Challenges Of E-Learning Amid COVID-19 Lockdown in Federal Polytechnics, Nigeria."
- [7]. Aucejo, Esteban M., Jacob French, Maria Paola Ugalde Araya, and Basit Zafar. "The impact of COVID-19 on student experiences and expectations: Evidence from a survey." *Journal of Public Economics* 191 (2020): 104271.
- [8]. Azorín, Cecilia. "Beyond COVID-19 supernova. Is another education coming?." *Journal of Professional Capital and Community* (2020).
- [9]. Bacher-Hicks, Andrew, Joshua Goodman, and Christine Mulhern. *Inequality in household adaptation to schooling shocks: Covid-induced online learning engagement in real time*. No. w27555. National Bureau of Economic Research, 2020.
- [10]. Bao, Wei. "COVID-19 and online teaching in higher education: A case study of Peking University." *Human Behavior and Emerging Technologies* 2, no. 2 (2020): 113-115.
- [11]. Baticulon, Ronnie E., Nicole Rose I. Alberto, Maria Beatriz C. Baron, Robert Earl C. Mabulay, Lloyd Gabriel T. Rizada, Jinno Jenkin Sy, Christl Jan S. Tiu, Charlie A. Clarion, and John Carlo B. Reyes. "Barriers to online learning in the time of COVID-19: A national survey of medical students in the Philippines." *medRxiv* (2020).
- [12]. Beech, Nic, and Frederik Anseel. "COVID-19 and Its Impact on Management Research and Education: Threats, Opportunities and a Manifesto." *British Journal of Management* 31, no. 3 (2020): 447-449.
- [13]. Berezna, Svetlana, and Ivan Prokopenko. "Higher Education Institutions in Ukraine during the Coronavirus, or COVID-19, Outbreak: New Challenges vs New Opportunities." *Revista Romaneasca pentru Educatie Multidimensionala* 12, no. 1Sup2 (2020): 130-135.
- [14]. Blundell, Richard, Monica Costa Dias, Robert Joyce, and Xiaowei Xu. "COVID-19 and Inequalities." *Fiscal Studies* 41, no. 2 (2020): 291-319.
- [15]. Bryson, John R., and Lauren Andres. "Covid-19 and rapid adoption and improvisation of online teaching: curating resources for extensive versus intensive online learning experiences." *Journal of Geography in Higher Education* (2020): 1-16.
- [16]. Burgess, Simon, and Hans Henrik Sievertsen. "Schools, skills, and learning: The impact of COVID-19 on education." *VoxEu.org* 1 (2020).
- [17]. Cao, Wenjun, Ziwei Fang, Guoqiang Hou, Mei Han, Xinrong Xu, Jiaxin Dong, and Jianzhong Zheng. "The psychological impact of the COVID-19 epidemic on college students in China." *Psychiatry research* (2020): 112934.
- [18]. Chang, Chiu-Lan, and Ming Fang. "E-Learning and Online Instructions of Higher Education during the 2019 Novel Coronavirus Diseases (COVID-19) Epidemic." In *Journal of Physics: Conference Series*, vol. 1574, no. 1, p. 012166. IOP Publishing, 2020.
- [19]. Chen, Tinggui, Lijuan Peng, Xiaohua Yin, Jingtao Rong, Jianjun Yang, and Guodong Cong. "Analysis of user satisfaction with online education platforms in China during the COVID-19 pandemic." In *Healthcare*, vol. 8, no. 3, p. 200. Multidisciplinary Digital Publishing Institute, 2020.
- [20]. Chung, Ellen, Geetha Subramaniam, and Laura Christ Dass. "Online Learning Readiness Among University Students in Malaysia Amidst Covid-19." *Asian Journal of University Education* 16, no. 2 (2020): 45-58.
- [21]. Crawford, Joseph, Kerrynt Butler-Henderson, Jürgen Rudolph, Bashar Malkawi, Matt Glowatz, Rob Burton, Paulo Magni, and Sophia Lam. "COVID-19: 20 countries' higher education intra-period digital pedagogy responses." *Journal of Applied Learning & Teaching* 3, no. 1 (2020): 1-20.
- [22]. Daniel, Sir John. "Education and the COVID-19 pandemic." *Prospects* (2020): 1-6.
- [23]. Dawadi, Saraswati, Ram Giri, and Padam Simkhada. "Impact of COVID-19 on the Education Sector in Nepal: Challenges and Coping Strategies." (2020).
- [24]. Demuyakor, John. "Coronavirus (COVID-19) and online learning in higher institutions of education: A survey of the perceptions of Ghanaian international students in China." *Online Journal of Communication and Media Technologies* 10, no. 3 (2020): e202018.
- [25]. Dhawan, Shivangi. "Online learning: A panacea in the time of COVID-19 crisis." *Journal of Educational Technology Systems* 49, no. 1 (2020): 5-22.

- [26]. Donitsa-Schmidt, Smadar, and Rony Ramot. "Opportunities and challenges: teacher education in Israel in the Covid-19 pandemic." *Journal of Education for Teaching* (2020): 1-10.
- [27]. Dorn, Emma, Bryan Hancock, Jimmy Sarakatsannis, and Ellen Viruleg. "COVID-19 and student learning in the United States: The hurt could last a lifetime." *McKinsey & Company* (2020).
- [28]. Ferdig, Richard E., Emily Baumgartner, Richard Hartshorne, Regina Kaplan-Rakowski, and Chrystalla Mouza. "Teaching, technology, and teacher education during the covid-19 pandemic: Stories from the field." *Waynesville, NC, USA: Association for the Advancement of Computing in Education (AACE)* (2020).
- [29]. Garbe, Amber, Uzeyir Ogurlu, Nikki Logan, and Perry Cook. "Parents' Experiences with Remote Education during COVID-19 School Closures." *American Journal of Qualitative Research* 4, no. 3 (2020): 45-65.
- [30]. Gardner, Lee. "Covid-19 has forced higher ed to pivot to online learning. Here are 7 takeaways so far." *The Chronicle of Higher Education* 20 (2020).
- [31]. Goh, Poh-Sun, and John Sandars. "Rethinking scholarship in medical education during the era of the COVID-19 pandemic." *MedEdPublish* 9 (2020).
- [32]. Gonzalez, Teresa, M. A. de la Rubia, Kajetan Piotr Hincz, M. Comas-Lopez, Laia Subirats, Santi Fort, and G. M. Sacha. "Influence of COVID-19 confinement on students' performance in higher education." *PloS one* 15, no. 10 (2020): e0239490.
- [33]. Hodges, Charles, Stephanie Moore, Barb Lockee, Torrey Trust, and Aaron Bond. "The difference between emergency remote teaching and online learning." *Educuse Review* 27 (2020).
- [34]. Huang, R. H., D. J. Liu, A. Tlili, J. F. Yang, and H. H. Wang. "Handbook on facilitating flexible learning during educational disruption: The Chinese experience in maintaining undisrupted learning in COVID-19 Outbreak." *Beijing: Smart Learning Institute of Beijing Normal University* (2020).
- [35]. Huang, Ronghuai, Ahmed Tlili, Ting-Wen Chang, Xiangling Zhang, Fabio Nascimbeni, and Daniel Burgos. "Disrupted classes, undisrupted learning during COVID-19 outbreak in China: application of open educational practices and resources." *Smart Learning Environments* 7, no. 1 (2020): 1-15.
- [36]. Husky, Mathilde M., Viviane Kovess-Masfety, and Joel D. Swendsen. "Stress and anxiety among university students in France during Covid-19 mandatory confinement." *Comprehensive Psychiatry* 102 (2020): 152191.
- [37]. Jacob, Ogunode Niyi, I. Abigeal, and A. E. Lydia. "Impact of COVID-19 on the higher institutions development in Nigeria." *Electronic Research Journal of Social Sciences and Humanities* 2, no. 2 (2020): 126-135.
- [38]. Jæger, Mads Meier, and Ea Hoppe Blaabæk. "Inequality in learning opportunities during Covid-19: Evidence from library takeout." *Research in Social Stratification and Mobility* 68 (2020): 100524.
- [39]. Jegede, Deborah. "Perception of Undergraduate Students on the Impact of COVID-19 Pandemic on Higher Institutions Development in Federal Capital Territory Abuja, Nigeria."
- [40]. Jena, Pravat Kumar. "Impact of pandemic COVID-19 on education in India." (2020).
- [41]. Johnson, Nicole, George Veletsianos, and Jeff Seaman. "US Faculty and Administrators' Experiences and Approaches in the Early Weeks of the COVID-19 Pandemic." *Online Learning* 24, no. 2 (2020): 6-21.
- [42]. Kapasia, Nanigopal, Pintu Paul, Avijit Roy, Jay Saha, Ankita Zaveri, Rahul Mallick, Bikash Barman, Prabir Das, and Pradip Chouhan. "Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India." *Children and Youth Services Review* 116 (2020): 105194.
- [43]. Kerres, Michael. "Against all odds: Education in Germany coping with Covid-19." *Postdigital Science and Education* (2020): 1-5.
- [44]. Liguori, Eric, and Christoph Winkler. "From Offline to Online: Challenges and Opportunities for Entrepreneurship Education Following the COVID-19 Pandemic." (2020): 2515127420916738.
- [45]. Mamun, Mohammed A., Rubaiya Matin Chandrima, and Mark D. Griffiths. "Mother and son suicide pact due to COVID-19-related online learning issues in Bangladesh: An unusual case report." *International Journal of Mental Health and Addiction* (2020): 1-4.
- [46]. Marinoni, Giorgio, Hilligje van't Land, and Trine Jensen. "The impact of Covid-19 on higher education around the world." *IAU Global Survey Report* (2020).
- [47]. Moawad, Ruba Abdelmatloub. "Online Learning during the COVID-19 Pandemic and Academic Stress in University Students." *Revista Românească pentru Educație Multidimensională* 12, no. 1 Sup2 (2020): 100-107.
- [48]. Naciri, Aziz, Mohamed Amine Baba, Abderrahmane Achbani, and Ahmed Kharbach. "Mobile learning in Higher education: Unavoidable alternative during COVID-19." *Aquademia* 4, no. 1 (2020): ep20016.
- [49]. Nantwi, William Kwabena, and Barfo Boateng. "COVID-19 AND EDUCATION IN GHANA: A TALE OF CHAOS AND CALM." *African Journal of Emerging Issues* 2, no. 5 (2020): 41-52.
- [50]. O'Keefe, L., J. Rafferty, A. Gunder, and K. Vignare. "Delivering High-Quality Instruction Online in Response to COVID-19: Faculty Playbook." *Online Learning Consortium* (2020).
- [51]. Owusu-Fordjour, C., C. K. Koomson, and D. Hanson. "The impact of Covid-19 on learning-the perspective of the Ghanaian student." *European Journal of Education Studies* (2020).
- [52]. Pham, Hiep-Hung, and Tien-Thi-Hanh Ho. "Toward a 'new normal' with e-learning in Vietnamese higher education during the post COVID-19 pandemic." *Higher Education Research & Development* (2020): 1-5.
- [53]. Praghlapati, Andria. "COVID-19 IMPACT ON STUDENTS." (2020).

- [54]. Prokopenko, Ivan, and Svitlana Berezhna. "Higher Education Institutions in Ukraine during the Coronavirus, or COVID-19, Outbreak: New Challenges vs New Opportunities." (2020).
- [55]. Raaper, Rille, and Chris Brown. "The Covid-19 pandemic and the dissolution of the university campus: Implications for student support practice." *Journal of Professional Capital and Community* (2020).
- [56]. Radha, R., K. Mahalakshmi, V. Sathis Kumar, and A. R. Saravanakumar. "E-learning during lockdown of Covid-19 pandemic: a global perspective." *International journal of control and automation* 13, no. 4 (2020): 1088-1099.
- [57]. Rajkumar, Ravi Philip. "COVID-19 and mental health: A review of the existing literature." *Asian journal of psychiatry* (2020): 102066.
- [58]. Rapanta, Chrysi, Luca Botturi, Peter Goodyear, Lourdes Guàrdia, and Marguerite Koole. "Online university teaching during and after the Covid-19 crisis: Refocusing teacher presence and learning activity." *Postdigital Science and Education* (2020): 1-23.
- [59]. Ratten, Vanessa. "Coronavirus (Covid-19) and the entrepreneurship education community." *Journal of Enterprising Communities: People and Places in the Global Economy* (2020).
- [60]. Rizun, Mariia, and Artur Strzelecki. "Students' Acceptance of the COVID-19 Impact on Shifting Higher Education to Distance Learning in Poland." *International Journal of Environmental Research and Public Health* 17, no. 18 (2020): 6468.
- [61]. Roache, Darcia, Dina Rowe-Holder, and Richard Muschette. "Transitioning to Online Distance Learning in the COVID-19 Era: A Call for Skilled Leadership in Higher Education Institutions (HEIs)." *CCEAM* (2020): 103
- [62]. Rose, Suzanne. "Medical student education in the time of COVID-19." *Jama* (2020).
- [63]. Rossi, Rodolfo, Valentina Socci, Dalila Talevi, Sonia Mensi, Cinzia Niolu, Francesca Pacitti, Antiniscia Di Marco, Alessandro Rossi, Alberto Siracusano, and Giorgio Di Lorenzo. "COVID-19 pandemic and lockdown measures impact on mental health among the general population in Italy." *Frontiers in Psychiatry* 11 (2020): 790.
- [64]. Sahu, Pradeep. "Closure of universities due to Coronavirus Disease 2019 (COVID-19): impact on education and mental health of students and academic staff." *Cureus* 12, no. 4 (2020).
- [65]. Sandars, John, Raquel Correia, Mary Dankbaar, Peter de Jong, Poh-Sun Goh, Inga Hege, Ken Masters et al. "Twelve tips for rapidly migrating to online learning during the COVID-19 pandemic." *MedEdPublish* (2020): 3068.
- [66]. Sarwar, Huma, Hira Akhtar, Meshal Muhammad Naeem, Javeria Ali Khan, Khadija Waraich, Sumaiya Shabbir, Arshad Hasan, and Zohaib Khurshid. "Self-Reported Effectiveness of e-Learning Classes during COVID-19 Pandemic: A Learning-Wide Survey of Pakistani Undergraduate Dentistry Students." *European Journal of Dentistry* (2020).
- [67]. Shahzad, Arfan, Rohail Hassan, Adejare Yusuff Aremu, Arsalan Hussain, and Rab Nawaz Lodhi. "Effects of COVID-19 in E-learning on higher education institution students: the group comparison between male and female." *Quality & Quantity* (2020): 1-22.
- [68]. Son, Changwon, Sudeep Hegde, Alec Smith, Xiaomei Wang, and Farzan Sasangohar. "Effects of COVID-19 on College Students' Mental Health in the United States: Interview Survey Study." *Journal of medical internet research* 22, no. 9 (2020): e21279.
- [69]. Tandon, Rajiv. "COVID-19 and mental health: preserving humanity, maintaining sanity, and promoting health." *Asian journal of psychiatry* (2020).
- [70]. Teräs, Marko, Juha Suoranta, Hanna Teräs, and Mark Curcher. "Post-Covid-19 education and education technology 'solutionism': A seller's market." *Postdigital Science and Education* (2020): 1-16.
- [71]. Tesar, Marek. "Towards a post-Covid-19 'new normality?': Physical and social distancing, the move to online and higher education." (2020): 556-559.
- [72]. Toquero, Cathy Mae. "Challenges and Opportunities for Higher Education Amid the COVID-19 Pandemic: The Philippine Context." *Pedagogical Research* 5, no. 4 (2020).
- [73]. Verawardina, Unung, Lise Asnur, Arina Luthfini Lubis, Yeka Hendriyani, Dochi Ramadhani, Ika Parma Dewi, Resmi Darni, Tigus Juni Betri, Wilda Susanti, and Titi Sriwahyuni. "Reviewing Online Learning Facing the Covid-19 Outbreak." *Talent Development & Excellence* 12 (2020).
- [74]. Wahid, Ridzal, Florence Pribadi, and Berlian Ester Wakas. "Digital Activism: Covid-19 Effects in Campus Learning." *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal* 3, no. 3 (2020): 1336-1342.
- [75]. Wang, Chuanyi, Zhe Cheng, Xiao-Guang Yue, and Michael McAleer. "Risk management of COVID-19 by universities in China." (2020): 36.
- [76]. Wargadinata, W., Maimunah, I., Eva, D., & Rofiq, Z. (2020). Student's responses on learning in the early COVID-19 pandemic. *Tadris: Journal of Education and Teacher Training*, 5(1), 141-153.
- [77]. Wargadinata, Wildana, Iffat Maimunah, Eva Dewi, and Zainur Rofiq. "Student's Responses on Learning in the Early COVID-19 Pandemic." *Tadris: Jurnal Keguruan dan Ilmu Tarbiyah* 5, no. 1 (2020): 141-153.
- [78]. Wargadinata, Wildana, Iffat Maimunah, Suci Ramadhanti Febriani, and Luluk Humaira. "Mediated Arabic Language Learning for Higher Education in COVID-19 Situation." *Izdihar: Journal of Arabic Language Teaching, Linguistics, and Literature* 3, no. 1 (2020): 59-78.
- [79]. Wendelboe, Aaron M., J. D. Amanda Miller, Douglas Drevets, Linda Salinas, E. J. Miller, Dalton Jackson, Ann Chou, J. D. Jill Raines, and Public Health Working Group. "Tabletop exercise to prepare institutions of higher education for an outbreak of COVID-19." *Journal of Emergency Management* 18, no. 2 (2020): 1-20.

- [80]. Wotto, Marguerite. "The Future High Education Distance Learning in Canada, the United States, and France: Insights From Before COVID-19 Secondary Data Analysis." *Journal of Educational Technology Systems* 49, no. 2 (2020): 262-281.
- [81]. Wu, Mengting, Wenyan Xu, Yuhong Yao, Lei Zhang, Lei Guo, Juan Fan, and Jue Chen. "Mental health status of students' parents during COVID-19 pandemic and its influence factors." *General Psychiatry* 33, no. 4 (2020).
- [82]. Xiong, Jiaqi, Orly Lipsitz, Flora Nasri, Leanna MW Lui, Hartej Gill, Lee Phan, David Chen-Li et al. "Impact of COVID-19 pandemic on mental health in the general population: A systematic review." *Journal of affective disorders* (2020).
- [83]. Zhang, Wunong, Yuxin Wang, Lili Yang, and Chuanyi Wang. "Suspending classes without stopping learning: China's education emergency management policy in the COVID-19 Outbreak." (2020): 55.
- [84]. Zhu, Xudong, and Jing Liu. "Education in and After Covid-19: Immediate Responses and Long-Term Visions." *Postdigital Science and Education* (2020): 1-5.
- [85]. Zolotov, Yuval, Alexander Reznik, Shmaya Bender, and Richard Isralowitz. "COVID-19 fear, mental health, and substance use among Israeli university students." *International Journal of Mental Health and Addiction* (2020): 1-7.