







COVID-19 EMERGENCY REMOTE TEACHING: THE PERCEPTIONS, CHALLENGES AND COPING STRATEGIES OF HIGHER EDUCATION STUDENTS IN GHANA.

Justice Kofi Armah , Emmanuel Arthur Nyarko  and Alexander Asante 

Emergency Remote Teaching (ERT) is a mode of teaching usually triggered by disasters and pandemics such as the deadly Coronavirus. This study used a self-reported questionnaire to investigate student perceptions, challenges, and coping strategies during ERT at a public university in Ghana. Using a randomly selected sample of 80 students, the study established the relationships between student perceptions and coping strategies, perceptions, and challenges. Out of the 80 respondents, 76 questionnaires were duly completed and were analysed using partial least square structural equation modelling (PLS-SEM). The bootstrapping results indicate that student perceptions of ERT have a significantly positive relationship with their coping strategies, the challenges have a significant negative relationship with coping strategies. However, student perceptions did not significantly correlate with students' challenges. Results recommend that the university put appropriate measures in place to reduce the challenges associated with ERT, which will improve students' perceptions since the pandemic is still raging with a series of waves. Challenges such as lack of access to digital devices and high-speed internet should also be addressed urgently.

KEYWORDS: Emergency Remote Teaching, Student Perceptions, Coping Strategies, Challenges

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INTRODUCTION

Emergency remote teaching is a mode of teaching triggered by disasters and pandemics such as the deadly coronavirus. The COVID-19 pandemic has had a staggering impact globally. The first-ever pandemic to have hit the entire world in the 21st century has had a devastating effect on every sector of the world. The pandemic has drastically changed how things are done. One sector that hugely bore the brunt of this deadly virus outbreak was education – from basic to higher education (d’Orville, 2020). According to the statistics, UNESCO believes that about 1.5 billion students and children have been affected since the early part of 2020 UNESCO (2000) and 85% of the world’s student population in about 180 countries were affected through school closure. This compelled managers of education at all levels, especially tertiary and higher education, to take certain drastic measures to change how teaching and learning are conducted in the face of this pandemic to ensure learners’ continuous access to learning and resources. During this period, one measure that came to the rescue and was widely applied to save the situation was the use of digital and online technologies. There was a significant increase in the use of online portals, learning management systems and other digital tools (Mahyoob, 2020). The use of video conferencing tools such as Zoom, Google Meet, and Microsoft Teams, and online platforms such as Google Classroom, Moodle, and others, grew exponentially. All these were done with the idea of introducing digital technologies, also referred to as eLearning, into education and to curb the global crisis.

In Ghana the ravaging effect of COVID-19 on the globe is not different. The observance of “social distancing” or “physical distancing” protocol made face-to-face teaching impossible at all levels of education. Universities had to make the quick transition from face-to-face teaching to online using diverse online technologies that their skills and time would permit including a learning management system (LMS). This brought a total change to the higher education landscape in the country since most of the institutions were unprepared for online teaching. The response adopted by most of the institutions appears to be Emergency Remote Teaching (ERT) rather than eLearning.

ERT has had a long history since the 19th century, using the latest available media. It is considered a branch of distance learning (Hodges et al., 2020). In 1897, ERT was based on correspondence by letter through the post. For instance, The French Centre national d’enseignement à distance (CNED) sent schoolwork to students by post in World War II. Today CNED continue to offer education to school children, for various reasons - such as illness, travel or intensive sporting activities. During the 1970s, Centralized TV broadcasting, accompanied by programmed instruction, came up as a media technology hype 1970s to transfer knowledge to students during the crisis with no face-

to-face instruction at all. In countries, such as Afghanistan, Bosnia, Liberia, Herzegovina, and Cambodia, ERT has been used to maintain and expand education. Models such as mobile learning, radio education, DVDs or other solutions that are contextually more feasible were used to maintain educational access and expansion where teaching and learning were disrupted by conflict and violence (Davies & Bentrovato, 2011). During the COVID-19 period, many schools worldwide moved to online education environments where students and teachers interacted via modern technologies such as Zoom, Google Classroom or Jitsi. While e-learning is a planned instruction delivered either through the web or on a digital device intended to support learning, ERT is simply a temporal shift from the normal modes of teaching during an emergency. The primary objective of ERT is not to reconstruct another complex technology-enabled learning environment but to provide quick, temporary, reliable, and durable access to instructional materials and to sustain instructional delivery during pressing circumstances (Hodges et al., 2020). In trying to distinguish between ERT and eLearning, ERT is said to be “activated in response to a crisis or something beyond human control; meant to be temporary; may lack resources; may not have full faculty support; and students may not have a choice” (University of the People, 2020, p.1). These characteristics vividly describe the kind of teaching that was adopted in most universities and other institutions of higher learning in Ghana during the pandemic.

There is a perceived tag of lower quality attached to eLearning or online learning, despite the contrary findings shown in the literature. There is therefore the possibility that these sudden moves of face-to-face teaching online at once during the global crisis could confirm the already bad perception of online learning held by some people as a weak option when in reality it might be the result of a hasty transition to online learning under such a catastrophic circumstance. The process of changing from the usual face-to-face to ERT appears to have affected students’ perceptions, aggravate the already established challenges and changed their intention to use online learning tools. However, not much research has been directed at this area. This study, therefore, sought investigate the relationship among students’ perceptions, challenges and coping strategies adopted during the ERT amid the devastating COVID-19 pandemic.

CONCEPTUAL FRAMEWORK

Figure 1. shows the framework for measuring students’ perceptions, challenges, and coping strategies in the adoption of ERT during the crisis. Changes to the “status quo” does not come so easy. During the pandemic, students encountered the new reality of fear of contracting the COVID-19 virus, and the challenges of emergency remote teaching. Earlier studies suggest that

challenges associated with learning with digital technology in times of crisis affect students coping strategies negatively (Daniels et al., 2013). Also, prior research showed that resilience – the individuals’ ability to cope with or overcome a variety of adversities and perceived stress-mediated traumatic and post-traumatic experiences, correlates with their perceptions (Daniels et al., 2013; Karatzias et al., 2017). Consequently, it is possible that challenges encountered by students in the use of ERT during crises may affect students’ perceptions of ERT. It is also possible that coping strategies utilized by students when they have difficulty with ERT must be profound and could be a result of their perceptions. This study measures the link between the challenges students faced with ERT during the COVID-19 pandemic and the students’ coping strategies and perceptions. We also hypothesize that the challenges students faced with learning with digital technology during the crisis had a link with their coping strategies. We assume that the perception of students towards ERT is associated with their coping strategy. Also, the student’s perception towards digital learning in times of crisis correlates with the challenges encountered with the technology are also explored. The topic of research is of high relevance, the responsibility of higher education institutions towards the adoption of ERT is highlighted and the coping strategies used by students may allow for future interventions. It is therefore expedient to ascertain how students’ perceptions correlate with perceived challenges and coping strategies, and how perceived challenges relate with coping strategies.

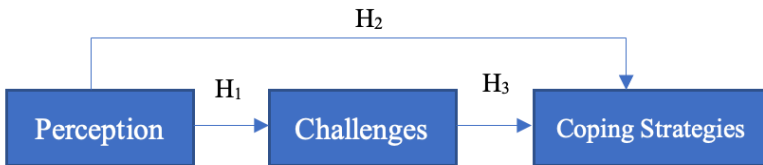


Figure 1. Conceptual framework for the study

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LITERATURE REVIEW

Even though many institutions across the world have been preparing to move online, online space was not a usual platform where students and lecturers in low economic countries socialized or communicated formally. The covid-19 pandemic forced schools and universities around the world to halt in-person

interactions to minimise the spread of the virus (Chandra, 2021). This resulted in many higher education institutions contemplating the need to move online to expedite processes to migrate their teaching and learning activities online to make up for the learning lost during the closure of schools. Some institutions resorted to the use of video conferencing tools such as zoom, Microsoft Teams, and learning management systems to support learning (Larry, 2020). In some institutions, the move to online teaching happened rapidly and lacked deliberate planning from the beginning. Such intervention to shift teaching and learning online during a crisis according to Hodges et al. (2020) is termed emergency remote teaching.

The ERT model facilitated the teaching and learning process during the lockdown and helped to develop new strategies to overcome intractable problems (Tabatadze & Chachkhiani, 2021). In some institutions, ERT has teachers and students develop best practices and procedures for technology integration as teachers and students act differently to technology integration. In situations where there were no meaningful solutions to the crisis, the adoption of ERT helped to disentangle wicked problems such as students' access to digital technology, equal access to instruction, instructional support (Keswani et al., 2020) and the underlining principles of Online learning compared to in-person learning. The crisis has also opened discourse on digital integration as well as recognising education models appropriate for the new normal (Ancho, 2020; Keswani et al., 2020). It has also helped to expand the need for transformative digital integration first by critically analysing the effect of the pandemic on the teaching calendar. For students, the ERT model provided an opportunity for them to take charge of their own learning, and thinking, develop their digital skills and exploit social networking tools. (Mohammed et al., 2020)

CHALLENGES OF ERT ADOPTION

Despite the benefits associated with the adoption of ERT, the ERT model present some challenges to teachers and students alike. Students are requested to do the unusual regarding learning that has not been seen on a large scale (Hodges et al., 2020). It is, therefore, necessary to address such challenges and adapt the best processes for learning in emergency situations (Hodges et al., 2020). Access to digital technologies has long been a barrier to digital integration in the learning environment UNESCO (2000). During the COVID-19 pandemic, digital access remained a hindrance to the implementation of ERT in schools. A UNICEF report indicates that about 463 million students globally lacked access to emergency teaching through technology (UNICEF, 2020). In Trinidad and Tobago for instance, ERT challenged socially vulnerable groups as schools struggled to teach remotely. This was caused by varying degrees of access to technology and support and supervision at home during

emergency remote teaching (Leacock & Warrican, 2020). The main barriers to e-learning in Africa according to Adarkwah (2021), and Stork et al. (2013) are two-fold - access and affordability and the difficulty in attracting users. Despite these hindrances, students in developed countries continue to adjust their technological capacity to the demands of the new normal (Purnomo & Kusnandar, 2019; Stork et al., 2013). In effect, the pandemic increased the digital gap between vulnerable students and those who have.

Some empirical studies have provided evidence that Internet access is a critical challenge to students' participation in the digital learning environment. For example, Ancho (2020) studied the experiences of students during the COVID-19 pandemic in the Philippines and identified that internet access was a big challenge to successful ERT implementation. According to the researcher, some students complained of poor internet connection in their homes. The researcher continued that those students had to subscribe to a stronger and more stable internet connection to complete and submit their assessment tasks. A similar finding was echoed by Demuyakor (2020) who investigated eLearning satisfaction among Ghanaian International Students living in China and how they are coping with ERT initiatives during COVID-19. It is therefore cogent to state that in Africa, online learning has not been deeply explored due to poor internet connection. This has a dire effect on the adoption of the ERT model adopted by schools and higher education and poses a lot of challenges and difficulties for all parties involved in ERT - students, teachers, and school administrators in institutions where in-person was the norm prior to the pandemic (Chandra, 2021).

Another challenge that students faced during ERT implementation is the capability to use their digital tools to support their learning. Though students in higher education institutions have grown with digital technology and responded to its use in learning, they lack the capability to effectively use their own technology to support learning (Adarkwah, 2021). Effective communication, for instance, plays a crucial role in successful online learning. Constant communication between students and student - lecturers helps students to accomplish learning tasks. However, Mohammed et al. (2020) underscored an emerging challenge students faced with the rapid implementation of eLearning. According to the researchers, students are unable to use their digital technologies to transmit clear and precise information to help them accomplish their tasks. They opined that some students found it difficult to communicate effectively and efficiently in virtual spaces with their colleagues and teachers using technology, learn independently, oppugn (question the truth) themselves and seek online support when in need.

COPING STRATEGIES

Challenges require meaningful and careful thought-out mitigation plans and combat. Eraca (2020) explains coping as a general term that encompasses our thoughts, feelings, and actions towards dealing with stressful situations. Lazarus and Folkman (1984) defined coping as ‘constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person (p.178). From these, coping strategies can be explained as the thoughts, feelings and actions put up in response to stress and crises. Coping strategies can be classified into problem-focused strategies and Emotion-focused coping strategies. With the former strategy individuals practically develop techniques or engage in activities aimed at eliminating/ minimising the emotional distress caused by the stressors (Gil, 2005; Lazarus & Folkman, 1984). On the other hand, emotion-focused strategies aim “to reduce the stressful emotional reaction by the environment.” (Shin, Park, Ying, Kim, Noh and Lee, 2014, p. 45). The latter is mostly used where individuals have little control over the stressors.

In the learning environment, students need proper means of coping to self-regulate their learning and to gain autonomy over academic activities (Lawrence et al., 2006). According to Sullivan, college students utilize diverse coping strategies concerning their problems. In their study, Zepp et al. (2018) focused on the influence of problem-focused coping and emotion-focused coping strategies on students’ academic performance. The study controlled financial stress which has been identified as a pervasive problem among higher education students. The result showed that solution-focused coping strategies had a positive influence on students’ academic performance.

During the COVID-19 period, Lyons et al. (2020) investigated the impact of COVID-19 on medical students regarding their mental well-being, assess concerns and determined the activities used by students to help them cope with the situation. Two hundred and ninety-seven students were samples for the study with only 37.5% responding to the questionnaire. The researchers identified among others that the COVID-19 pandemic impacted negatively on students’ social connectedness, studies, and stress levels. They also identified that the students engaged in activities such as video chats, social media, exercise, and hobbies to cope with the situation. Similarly, Salman et al. (2020) study among mental health students in four Pakistani renowned institutions revealed that students in Pakistan adopted religious or spiritual coping strategies, acceptance, self-distraction, and active coping strategies. The above paragraphs indicate that students adopt both behaviour and emotion-focused strategies to deal with the stress posed by a health crisis and their learning. The next section looks at the perception of students towards the use of the ERT teaching model

during the crisis. However, this study hypothesizes that there is no significant relationship between challenges and coping strategies in ERT.

PERCEPTION OF EMERGENCY REMOTE TEACHING

In implementing any learning system, learner perception should be considered (Al-Hunaiyyan et al., 2018). According to Sabah (2016), the most significant factor driving e-learning implementation is the perception of the users about the technology use. Baloran (2020) studied the students' knowledge, attitudes, anxiety, and coping strategies of students in the Philippines during the global health crisis. The cross-sectional study also examined students' perceptions of ERT intervention. The result showed that even though the students were satisfied with the actions by the government and institutions to mitigate the learning loss they showed unwillingness to the online-blended learning approach. On the other hand, the Ghanaian international students living in China were of the view the ERT approach to learning adopted by Chinese higher education institutions during the crisis was good. The current study modelled students' perceptions, challenges and coping strategies adopted during the global crisis. Based on these, the current study hypothesized that there is no significant relationship between students' perceptions and coping strategies.

OBJECTIVES OF THE STUDY

Specifically, the study sought to:

1. explore the perceptions, challenges, and coping strategies of student during the ERT amid the covid-19 pandemic
2. investigate the effect of students' perception on challenges faced during the ERT
3. establish the relationship between challenges and coping strategies
4. examine the relationship between students' perception of ERT and coping strategies during the pandemic.

HYPOTHESES OF THE STUDY

Following are the hypotheses of the study:

1. Ho1: There is no significant relationship between students' perceptions and challenges during ERT
2. Ho2: There is no significant relationship between students' perceptions and coping strategies during ERT

3. Ho3: There is no significant relationship between challenges and coping strategies during ERT.

RESEARCH METHODOLOGY

Design

The study adopted a quantitative cross-sectional survey design. The cross-sectional design allows researchers to collect data at one point in time from a representative sample selected from a large population (Owens, 2002). Besides, survey research was preferred because surveys have a broad acceptance, and they are considered a reflection of respondents' attitudes, preferences and opinions (Rea & Parker, 2014). A blend of these two designs helped to effectively achieve the objectives of the study.

Sample

The study was carried out at one of the recognised universities in Ghana. As a dual-mode institution, the university runs regular programmes as well as distance-mode programmes. The simple random sampling technique was used to select 80 non-regular postgraduate students who were pursuing their master's programme, of which 76 students were accepted to participate in the study. The University of Cape Coast has two intakes yearly, namely, the regular students' intake and sandwich (non-regular) students' intake. The non-regular students normally take their studies when the regular students are on vacation and spend only two months in school per each sandwich session. Such students usually have quite tight study schedules due to the compact nature of their programme. The students involved included M.A. in English Language (10), M.A. in English Literature (4), MBA in Accounting (21), MBA in Finance (8), M.Ed. Accounting (15), M.Sc. Project Management (8) and M.Sc. Procurement and Supply Chain Management (10) students. The ethical considerations of the study were therefore not compromised since four students (4) who opted out of the study were permitted to do so.

Instrument and Data Collection

The study utilized a self-reported survey questionnaire as an instrument for data collection due to its convenience and anonymity to the respondents (Rea & Parker, 2014). The adapted questionnaire had four sections that collected data on students' perceptions, challenges and coping strategies adopted during the emergency remote teaching. Items on eLearning Perceptions were self-developed based on an in-depth review of the literature. The eLearning per-

ception scale consisted of 11 items. The items involving ERT challenges were adapted from online challenges and coping strategies developed by Hodges et al. (2020) with slight modifications. This scale was made up of nine items. Similarly, the 11 coping strategy items were adapted from the Coping Strategies inventories developed by Zepp et al. (2018) and S Schwarzer and Jerusalem (1995). All items for the three constructs were measured on a 5-point Likert-type of questions, ranging from strongly agree (5) to strongly disagree (1).

The instrument was validated through expert review to clarify ambiguities and unclear items. This was followed by an initial exploratory factor analysis of pilot study data to determine the reliability of the instrument. Some items were eliminated because their Cronbach’s alpha fell below the recommended threshold of 0.5 as indicated by Hair et al. (2017) and Kline (2015) after which a confirmatory factor analysis was conducted. As a result of that, all three constructs demonstrated adequate convergent validity in terms of Cronbach’s Alpha having coefficients between 0.8348-0.8910, Composite Reliability (0.8671 – 0.9109), and Average Variance Extracted (AVE) hovering between 0.5061 and 0.6072. The coefficients of the constructs for all the reliability and validity measures were above the 0.5 minimum threshold. The results are displayed in Table 1.

Table 1
Construct Reliability and Validity.

Constructs	Cronbach’s Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Challenges	0.8416	0.9177	0.8845	0.6072
Coping Strategies	0.8910	0.8949	0.9109	0.5073
Perceptions	0.8348	0.8502	0.8671	0.5061

DATA COLLECTION PROCEDURE

Data were collected when students reported to campus to write their end-of-semester examinations in person in August 2020, right after the emergency remote teaching. During this period, some lectures were conducted face-to-face to finish up all the lectures held online. Questionnaires were distributed to students at their lecture halls, and they were given the option to be part of or stay out of the study. Respondents were given 15 minutes to complete

the questionnaires. Considering the choice of study design, the data collection lasted for a week.

DATA ANALYSIS

Data analysis followed right after the data collection. The collected data were critically scrutinized and cleaned. It was entered in SPSS software version 25, and then converted to comma-separated value and pushed through to smart partial least square - structural equation modelling (Smart PLS-SEM) for the analysis. The initial analysis was conducted using the PLS Algorithm as recommended by Hair et al. (2018) while bootstrapping with 5000 subsamples was used to test the hypotheses as recommended by Garson (2016). Descriptive analysis was carried out using means and standard deviations. An exploratory analysis was also conducted to determine measurement or indicator loadings and fitness of further analysis.

RESULTS OF THE STUDY

The focus of this study was to determine students’ perceptions, challenges and coping strategies during an emergency remote teaching and to establish relationships between perception and coping strategies, between perceptions and challenges, and between challenges and coping strategies.

Descriptive Statistics of the Students’ Perceptions, Challenges and Coping Strategies

This analysis assessed students’ perceptions, challenges and coping strategies of an emergency remote teaching during the Covid-19 pandemic. The descriptive statistics results are shown in Table 2.

Table 2

Descriptive Statistics of Students Perceptions, Challenges and Coping Strategies.

Construct	N	Minimum	Maximum	Mean	SD
Perceptions	76	1.00	5.00	2.5096	0.68869
Challenges	76	1.00	5.00	2.8889	1.17295
Coping Strategies	76	1.00	5.00	2.7907	0.72104

The results from Table 2 demonstrate that the students had moderate (M=2.510, SD=0.68869) perceptions about emergency remote teaching. Chal-

lenges had a slightly higher mean of 2.889 (SD=1.1710) while coping strategies obtained a mean of 2.7907 (SD=0.7210). The mean scores obtained by these three constructs suggest that majority of the students affirmed the challenges and coping strategies subscales but were neutral on the perception subscale.

Structural Model Analyses and Measurement

To carry out the structural model analysis and measurement, the Smart PLS-SEM was utilized for the initial confirmatory factor analyses. The PLS algorithm was run to compute and display the factor loadings (outer and inner models) for each construct. The results are shown in the model in Figure 2.

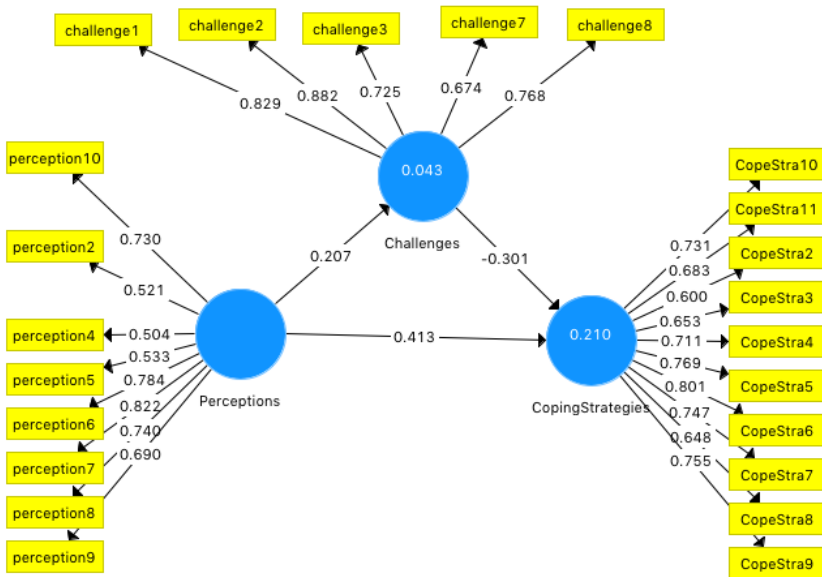


Figure 2. Factor Loadings for the Items.

The partial least square (PLS) algorithm was run to explore measurement loadings to determine item (indicator) reliability (Garson, 2016). Figure 2 shows the item loadings for the various constructs in the study. After the exploratory analysis, items with indicator outer loadings of less than 0.5 were dropped from the model (Hair et al., 2014). For this reason, indicators: perception 2, perception 3 and perception11 were dropped from the perceptions construct, indicators; challenge 4, challenge 5, challenge 6 and challenge 9 were dropped from the challenge construct, whilst copestra1 was dropped from the

coping strategies construct. All items that loaded above the recommended threshold of 0.5 as recommended by Hair et al. (2017) were maintained. For example, the items on the perception subscale loaded between 0.504 – 0.822. items on the challenges and coping strategies subscale also loaded between 0.674-0.882 and 0.600-0.801 respectively.

Inner Model Path Coefficient Sizes and Significance

The inner model paths as shown in Figure 2 suggest that perception had a stronger relationship with coping strategies (0.413) compared to the relationship between perception and challenges which had a path coefficient of -0.301. Therefore, the relationship between perception and coping strategies is statistically significant (0.413 > 0.1). In addition, the hypothesized relationship between perceptions and challenges is statistically significant (0.207 > 0.1). Furthermore, hypothesized relationship between challenges and coping strategies is also statistically significant (-0.301 > 0.1).

RESULTS SUMMARY FOR THE REFLECTIVE OUTER MODEL.

Table 3

Results Summary for the Reflective Outer Model.

Latent Variable	Indicators	Loadings	Indicator Reliability	Composite Reliability (CR)	Average Variance Extracted (AVE)
Coping Strategies	CopeStra10	0.7364	0.5	0.8845	0.6072
	CopeStra11	0.6886	0.5		
	CopeStra2	0.5979	0.4		
	CopeStra3	0.6511	0.4		
	CopeStra4	0.7069	0.5		
	CopeStra5	0.7660	0.6		
	CopeStra6	0.8012	0.6		
	CopeStra7	0.7464	0.6		
	CopeStra8	0.6471	0.4		
	CopeStra9	0.7557	0.6		
Challenges	challenge1	0.8296	0.7	0.9109	0.5073
	challenge2	0.8818	0.8		
	challenge3	0.7241	0.5		
	challenge7	0.6743	0.5		

Continued on next page

Table 3 continued

	challenge8	0.7689	0.6		
	perception10	0.7298	0.5		
	perception2	0.5200	0.3		
	perception4	0.5046	0.3		
Perception	perception5	0.5329	0.3	0.8671	0.5061
	perception6	0.7842	0.6		
	perception7	0.8221	0.7		
	perception8	0.7407	0.5		
	perception9	0.6900	0.5		

Table 3 shows the outer model of the reflective model for this study, made up of indicators, loadings, indicator reliability, composite reliability and the average variance extracted (AVE). According to [Hamid et al. \(2017\)](#), the evaluation of the outer model is the very first step in Partial least square – structural equation modelling analysis (PLS-SEM). The outer loadings of the model show the correlation between the latent variables and the indicators ([Wong, 2013](#)). Its purpose is to determine how well the questions load on the hypothetical-defined construct.

The indicator reliability for each indicator is the square of the outer loadings and ranges between 0 and 1. As recommended by [Wong \(2013\)](#) a value of 0.7 or higher is preferred, however, 0.4 is acceptable. The results from Table 3 indicate that almost all the indicators for all the latent variables had indicator reliability within the recommended threshold. It, therefore, suffices to conclude that indicator reliability is achieved in the current study.

The most basic means for establishing internal consistency are Cronbach Alpha and Composite reliability and these measures the reliability based on the intercorrelation of the observed items ([Wong, 2013](#)). In the current study, the composite reliability (CR) recorded higher values for the constructs (perceptions=0.8671, challenges = 0.9109, and coping strategies=0.8845) in the model. It can therefore be concluded that the internal consistency of this study is achieved because the values conform to the threshold as recommended by [Hair et al. \(2014\)](#).

Convergent validity is the measure of the level of relationship of multiple indicators of the same construct that agree. This can be measured using the composite reliability (CR) and average variance extracted (AVE). Referring to Table 4, the results indicate that CR for all the constructs is above the 0.70 threshold as recommended by [Hair et al. \(2014\)](#). The AVE values are also higher than the 0.50 threshold and are therefore considered adequate for convergent validity ([Hair et al., 2014](#); [Henseler et al., 2009](#)).

Discriminant Validity

Discriminant validity (DV) assessment is a popular requirement for determining whether there is strongest relationship between a construct and its indicators as compared to any other construct (Hair et al., 2017). It evaluates how the constructs in the study differ from one another empirically (Ab Hamid, Sami and Mohmad Sidek, 2017). The study used both Fornell-Larcker Criterion and the heterotrait-monotrait ratio of correlations (HTMT) criterion. The results in Table 4 depicting Fornell-Larcker Criterion, indicate that discriminant validity of constructs is duly established (Hair et al., 2011).

Table 4
Fornell-Larcker Criterion.

Construct	Challenges	Coping Strategies	Perceptions
Challenges	0.7792		
Coping Strategies	-0.2175	0.7123	
Perception	0.2071	0.3497	0.6761

Note. As recommended by Yeap et al., (2015) and Hair et, (2014), the bolded figures represent the square root of the correlations among constructs and should be greater than the correlation coefficients paraded below them.

To further confirm the discriminant validity adequacy of the model, the multitrait-multimethod matrix based alternative approach for assessing DV was computed. The results of heterotrait-monotrait ratio of correlations (HTMT) criterion, the most conservative criterion, as recommended by Henseler et al. (2009), is shown in Table 5.

Table 5
Results of Discriminant Validity Assessment using Heterotrait-Monotrait Ratio (HTMT).

Construct	Challenges	Coping Strategies	Perceptions
Challenges	-		
Coping Strategies	0.2418	-	
Perceptions	0.2406	0.3761	-

From Table 5, the data indicates that the computation yielded values between 0.2406 and 0.3761 which is far below the threshold values and therefore does not violate the 0.85 HTMT value. For example, HTMT (Challenges, Coping Strategies) is 0.2418, HTMT (Challenges, Perceptions) is 0.2406 while

the value in respect of HTMT (Perceptions, Coping Strategies) is 0.3761. Based on these values, it is concluded that the discriminant validity criterion is duly established in this study.

Hypotheses Testing

To test the hypotheses generated from the study, the bootstrapping procedure, with 5000 subsamples, was computed (Garson, 2016) at 0.05 significance level. The results are shown in Figure 3 and Table 6.

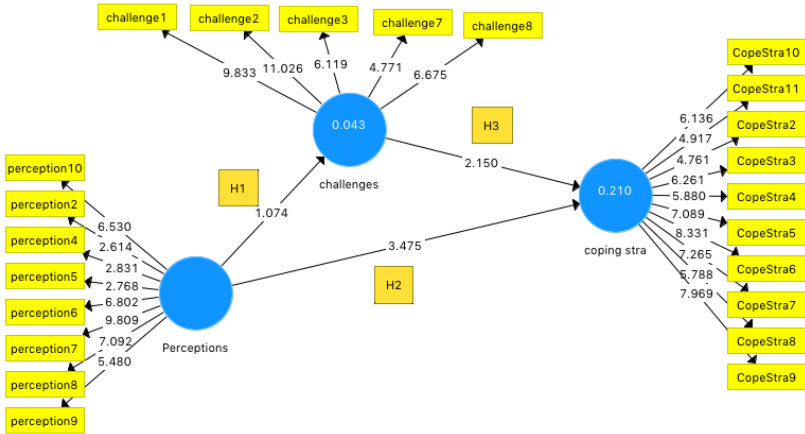


Figure 3. Bootstrapping Results.

Table 6
Bootstrapping Results Showing Mean, STDEV, T-Values, P-Values.

Path	Original Sample (O)	Mean	SD	T	p
Challenges ->Coping Strategies	-0.301	-0.291	0.140	2.150	0.032
Perceptions ->Challenges	0.207	0.202	0.193	1.074	0.283

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Table 6 continued

Perceptions ->Coping Strategies	0.413	0.439	0.119	3.475	0.001
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Ho1: There is no significant relationship between students' perceptions and challenges during ERT

The first hypothesis sought to find whether a significant relationship exists between students' perceptions and challenges encountered during the ERT. The data presented in Table 6 demonstrates that although some relationship exists between the two variables, it was not significant ($M=0.202$, $SD=0.193$, $t=1.074$, $p=0.283$) as recommended by Wong (2013). The hypothesis stands rejected at a 0.05 level of significance.

Ho2: There is no significant relationship between students' perceptions and coping strategies during the ERT.

The second hypothesis sought to determine the relationship between students' perceptions and coping strategies adopted during the ERT. The results (Table 7) suggest that there is a significant relationship ($M=0.439$, $SD=0.119$, $t= 3.475$, $p<0.01$) between perception and coping strategies during the ERT. The null hypothesis was rejected at a 0.05 significance level as recommended by Garson (2016) and Wong (2013).

Ho3: There is no significant relationship between challenges and coping strategies during ERT.

The third hypothesis intends to explore whether a significant relationship exists between challenges and coping strategies adopted during the ERT. Interestingly, the result revealed a significant relationship ($M=-0.291$, $SD=0.140$, $t= 2.150$, $p=0.032$) between challenges and coping strategies. This is in line with the recommendations of Garson (2016) and Hair et al. (2017) who stated that t-values above 1.96 are significant at the 0.05 level.

DISCUSSION AND CONCLUSIONS

The focus of this study was to explore students' perceptions, challenges and coping strategies adopted during the ERT amid the devastating COVID-19 pandemic and the relationships among these constructs. The study was carried out using non-regular (sandwich) postgraduate students as respondents. It was established that although the technology was adopted as an emergency response measure during the pandemic (Covid-19), students held positive perceptions about it (ERT). This finding agrees with Tabatadze and Chachkhiani

(2020) who posit that ERT has enabled teachers and students to develop best practices and procedures towards technology. Besides, [Mohammed et al. \(2020\)](#) are of the view that ERT during the pandemic has provided the opportunity for students to take charge of their learning, and thinking, and develop their digital skills.

Of course, such a sudden change in approach to learning would come with some exigencies due to the rapidity of the deadly virus. Most of the students affirm that they encountered some challenges during the ERT. This is an indication that access to technology remains the main challenge confronting students during technology uptake ([Arthur-Nyarko & Kariuki, 2019](#)). In this study, the two major access-related challenges were digital device access and internet access. Students struggled to gain access to devices such as computers, tablets, and other digital devices by purchasing them through loans. This is not far from [Shambere's \(2014\)](#) and [Stork et al. \(2013\)](#) assertion that the main obstacle to technology-supported learning in Africa is two-fold: access and affordability and the difficulty in attracting users. The current finding also corroborates [Lake's and Makori's \(2020\)](#) finding which revealed that students' lack of access to technological tools and students' lack of access to high-speed internet was a serious challenge to the effective introduction of remote learning during the pandemic.

It is not surprising that both students and lecturers adopted numerous strategies to survive the pandemic ([Frydenberg, 2017](#)). This study revealed that the students, realizing the raging and unpredictable ending of the pandemic, employed cleverly coping strategies to combat the challenges associated with emergency remote teaching. These include their ability to critically evaluate possible alternative solutions and choose the best option to solve the problem, remaining focused and resolute in the face of challenges. Similarly, [Ancho \(2020\)](#) studied the experiences of students during the COVID-19 pandemic in the Philippines and identified that internet access was a big challenge to successful ERT implementation. According to the study, some students complained of poor internet connection in their homes.

Interestingly, the result from hypothesis testing demonstrated that there was significant negative relationship between students' challenges and coping strategies. This suggests that students who had a lot of challenges found it difficult to develop effective strategies towards dealing with the challenges ([Subedi et al., 2020](#)). The hypothesis was therefore supported that the more students perceived technology as challenging the lesser their ability to develop effective coping strategies. Student perceptions and challenges did not yield a significant relationship, though it was positive. It was therefore not supported. In addition, the study found a significantly positive correlation between perceptions and coping strategies. What the results depict is that

students who held positive perceptions about ERT during the pandemic were better placed to develop effective strategies to combat the challenges compared to their other counterparts. For the students, the ERT model provided an opportunity for them to take charge of their learning, and thinking, and develop their digital skills to explore social networking tools, though it did not come easy. ERT continues to be a potent model in times of crises and emergencies such as Covid-19.

RECOMMENDATION

It is recommended that although ERT was adopted during the emergency, the university should take appropriate steps to improve student satisfaction which in turn would improve student perceptions of ERT. Concerning the challenges such as lack of access to digital devices and high-speed internet, the university should collaborate with the Telecommunication companies to address it as a matter of urgency. The inverse correlation recorded between challenges and coping strategies is a clear indication that, if the university puts measures in place to reduce the challenges associated with ERT, students' coping strategies would be improved.

LIMITATIONS

The current study was limited in the sense that factors used in this study were delimited to students' perceptions, perceived challenges, and coping strategies. Other factors such as students' demography, digital skills and technology self-efficacy were not considered. Additionally, the study used only a quantitative approach with a small sample size to ascertain students' challenges, perceptions and coping strategies during the pandemic and use of mixed method approach would have provided more detailed information on these constructs.

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