MODESTUM

Research Paper

Secondary School Mathematics Teachers' Views on E-learning Implementation Barriers during the COVID-19 Pandemic: The Case of Indonesia

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Abstract

School closures in Indonesia during the COVID-19 pandemic have left 45.5 million school students and 3.1 million teachers dependent on online teaching and learning. Online teaching and learning are an unprecedented experience for most teachers and students; consequently, they have a limited experience with it. This paper examines the views of secondary school mathematics teachers on E-learning implementation barriers during the COVID-19 pandemic at four barrier levels, namely teacher, school, curriculum and student. Furthermore, it assesses the relationship between barrier levels with teachers' demographic background. Data was collected through an online questionnaire, involving 159 participants from lower and upper secondary schools in Indonesia. The findings of this study suggest that student level barrier had the highest impact on e-learning use. In addition, the student level barrier showed strong positive correlation with the school level barrier and curriculum level barrier. The study showed that teachers' backgrounds had no impact on the level of barriers. This study stimulates further discussion on the way to overcome e-learning barriers whilst simultaneously maximizing benefits of E-learning during this pandemic and beyond it by highlighting the importance of students' voices.

Keywords: barrier to e-Learning, e-learning during COVID-19, e-Learning in mathematics education, e-learning in Indonesia

INTRODUCTION

The World Health Organization (WHO) declared COVID-19 a global emergency on January 30th, 2020 and a global pandemic on March 11th, 2020. Currently, COVID-19 is affecting 213 countries and territories (WHO, 2020). In response to COVID-19, several countries have applied strict social distancing measures and a lockdown policy. Obviously, this pandemic has had a tremendous impact on schools, students and teachers. As of March 12th, 2020, 46 countries in five different continents have declared school closures and 26 of these countries have fully closed schools nationwide (Huang, Liu, Tlili, Yang, & Wang, 2020). In Indonesia, the Government has restricted community mobilization in an attempt to prevent the spread of the disease and keeps promoting an agenda of: work from home, study

from home and worship at home. Schools and Higher Education Institutions (HEIs) in Indonesia have been temporarily closed since March 14th, 2020.

To deal with schools and HEIs closures in Indonesia, the teaching and learning process has been maintained remotely using Information and Communication Technologies (ICT). Electronic learning (e-learning) has been considered the best possible approach to continue the teaching and learning process during the pandemic. In Indonesia, the e-learning platforms recommended by the government are *Rumah Belajar* and *SPAD*. *Rumah Belajar* is a free online learning platform developed by the Ministry of Education and Culture of Indonesia as an alternative learning resource for school teachers and students. *SPADA* is an e-learning platform developed by the Ministry of Research, Technology, and Higher Education for HEIs. In addition to that, the Ministry of

Education and Culture of Indonesia partnered with several online learning applications, such as, *MejaKita, ICANDO, Ganeca Digital, Kelas Pintar, Quipper School, Ruang Guru, Sekolahmu, Zenius, Cisco Webex*, and *Pahamify*. All these resources support students and teachers so that students can learn from home.

However, the *implementation* of e-learning is not always smooth and effective. During the COVID-19 outbreak, schools and universities have rapidly implemented e-learning. Therefore, schools that have limited or no experience with e-learning and schools that have not prepared e-learning resources experience difficulties, especially, when teachers do not understand how to use online applications (Zaharah & Kirilova, 2020).

The majority of studies on e-learning implementation barriers were conducted in normal situations (e.g., Assareh & Bidokht, 2011; Hadijah & Shalawati, 2017; Juliane, Arman, Sastramihardja, & Supriana, 2017; Quadri, Muhammed, Sanober, Qureshi, & Shah, 2017), where e-learning use is optional to enhance the teaching and learning process. Studies investigating e-learning use during pandemics are scarce (e.g.,Ash & Davis, 2009). Most studies conducted do not focus on mathematics (e.g., Al-Harbi, 2011; Astri, 2017; Kabilan & Khan, 2012). In addition, it seems that most studies on e-learning barriers were conducted in the HEI context (e.g., Osman, 2018; Panda & Mishra, 2007; Rabiee, Nazarian, & Gharibshaeyan, 2013). This poses many challenges but at the same time highlights the importance of investigating e-learning barriers for mathematics teachers during pandemics.

This study was conducted in Indonesia where three prevailing challenges for mathematics teachers exist: First, Indonesian students consistently underperformed in international assessments (e.i., PISA and TIMSS) (Patahuddin, Suwarsono, & Johar, 2018). Second, Indonesian mathematics teachers' content and pedagogical knowledge need improvement (Ng, 2011). Third, Indonesia has the fourth largest student population in the world consisting of 45.5 million students and 3.1 million teachers (Suryadarma & Jones, 2013). Even though the country employs a decentralised education system, the central government still plays a major role in administering most educational policies such as curriculum and national exams. As one of the

many education systems in the world that has implemented e-learning during the virus outbreak, it is important to investigate e-learning integration barriers from teachers' perspective.

The current study aims to investigate e-learning barriers experienced by Indonesian secondary mathematics teachers amid the COVID-19 pandemic. The study examines the relationship between each level of barriers as well as assesses differences in teachers' views on the barriers according to their demographic backgrounds. Findings from the present study will help to advance our understanding of e-learning integration barriers amid the COVID-19 pandemic in the context of developing countries at the secondary school level. Therefore, this study adds valuable insight to the e-learning literature and provides important suggestions to improve e-learning practices. To achieve those aims, this study aspires to answer the following research questions:

1. What are the barriers that mathematics teachers view as significant to e-learning use during the COVID-19 pandemic?

2. What is the relationship between each level of barrier to e-learning use?

3. Are there any significant differences in teachers' views on barriers to e-learning use according to their backgrounds?

RELATED LITERATURE AND CONCEPTUAL FRAMEWORK

What is a Barrier?

e-learning integration in teaching and learning is a complex phenomenon; consequently, many teachers may encounter various difficulties or challenges. These difficulties are also known as 'barriers' (Schoepp, 2005). According to the Oxford Dictionary (2015), a barrier is "a fence or an obstacle that prevents movement or access". Furthermore, another definition of a barrier is offered by Schoepp (2005, p. 2), which is "any condition that makes it difficult to make progress or to achieve an objective". In this study, Schoepp's (2005) definition of the barrier was adapted.

Table 1. Classification of barriers faced by teachers in using e-learning

Type of Barrier	Description
School Level	Availability of software and hardware, internet, textbooks, school policy, time and technical support
Teacher Level	Confidence, knowledge, belief and experience
Curriculum Level	Structure of contents, assessment, e-learning resource that is in line with the curriculum
Student Level	Skill and knowledge, motivation, e-learning infrastructure

Levels of E-Learning Integration Barriers

Various classifications for e-learning integration barriers have been proposed. For instance, Ertmer (1999) identified two sets of barriers, namely first order and second order barriers. First order barriers include hardware, access, and technical support while the second order obstacles relate to pedagogy, belief or personal preferences. Pelgrum (2001) proposed two classifications for e-learning barriers: material and non-material barriers. Material barriers refer to lack of Information and Communication Technologies (ICT) resources while non-material barriers relate to teachers' knowledge and skills. Balanskat, Blamire and Kefafa (2006) categorized barriers into teacher level, school level and system level.

Assareh and Bidokht (2011) classified e-learning barriers based on four areas they affect: learners, teachers, curriculum and schools. e-learning barriers related to learners include financial problems, motivation, assessment, isolation from peers, inadequate e-learning skills and experience, affection and social domain. Teachers e-learning barriers consist of various aspects such as knowledge limitations and assessment challenges. Regarding e-learning curriculum barriers, they encompass ambiguity, quality, resources, teaching process, and evaluation. Finally, barriers faced by schools comprise organizational and structural factors.

Quadri et al. (2017) investigated barriers affecting e-learning implementation. They classified barriers into four areas: students, instructors, infrastructure and technology, and institutional management. The study reported that the most significant barrier is infrastructure and technology while the least significant is students. Their study showed that limited time to develop e-learning was the most significant factor that hinders e-learning implementation, whilst lack of students' ICT skills is the least significant factor.

Hadija and Shalawati (2017) investigated barriers that teachers encountered when using e-learning. Lack of time to prepare a lesson using technology was a major challenge that teachers experienced. Other important limitations were lack of adequate professional development concerning technology, limited physical resources, inadequacy of resources, limited access to technology, lack of technical support, competence and confidence.

In this study, we classified e-learning integration barriers based on Assareh and Bidokht (2011)

classification, namely, teachers, schools, curriculum, and students. The barriers in terms of teacher level barrier included: lack of teacher confidence (Balanskat et al., 2006; Bingimlas, 2009; Scrimshaw, 2004); teachers' unwillingness to change their practice (Hew & Brush, 2007; Scrimshaw, 2004); teachers' lack of understanding of e-learning advantages (Scrimshaw, 2004); teachers' attitudes and beliefs to ICT (Ertmer, 1999; Hew & Brush, 2007); and teachers' knowledge and experience (Bingimlas, 2009; Marwan, 2008; Scrimshaw, 2004).

School-level barriers relate predominantly to hardware and software availability, access to internet connection and school policy. Teachers considered time to prepare lessons, textbooks and lack of technical support as major barriers (Bingimlas, 2009). Moreover, curriculum barriers include mismatch between students' assessments and e-learning (Hew & Brush, 2007). Another issue is that curriculum may not support technology-based application (Hew & Brush, 2007). Regarding student level barrier, this included students' inadequate e-learning skills (Assareh & Bidokht, 2011), student's lack access to technology infrastructure and internet connection, and students' lack of motivation to use e-learning. The classification of barriers in the present study is presented in Table 1.

As we can see from the literature, barriers to e-learning can include a number of both material and non-material issues. Technology and internet accessibility and lack of an e-learning curriculum and assessment tools to effectively evaluate student growth limit what teachers can teach. Motivation in learning online, confidence in using e-learning technology, and teachers' attitudes to online instruction impact how and if learners will learn. All these barriers need to be considered when faced with an event such as a pandemic that forces teachers and students to immediately adjust to a different mode of teaching and learning.

METHOD

Research Design

In this study, a quantitative approach was followed using a cross-sectional questionnaire (Fraenkel, Wallen, & Hyun, 2011). According to Fraenkel et al. (2011) quantitative methods are considered capable of providing reliable, valid, objective and generalizable findings. Moreover, questionnaires, one of most widely used quantitative instruments, may be administered to a large number of participants. If the researcher collects

Table 2. Demographic Background of participants

Demographic Background		Number of Participants	Percentage
Gender	Male	83	52.2%
	Female	76	47.8%
Level of Education	Undergraduate Degree	140	88.1%
	Postgraduate Degree	19	11.9%
Teaching Experience	0-5 Years	32	20.1%
	6-10 Years	58	36.5%
	11-15 Years	47	29.6%
	16-20 Years	13	8.2%
	More than 20 Years	9	5.7%
Teacher Certification	Yes	115	72.3%
	No	44	27.7%

Table 3. Devices and Internet connection used for e-learning

Devices for e-learning activities	Type of Internet Connection	Number of Participants	Percentage
Device	Mobile/Handheld Device	81	50.9 %
	Computer/laptop	78	49.1 %
Internet Connection	Mobile Phone	136	85.5 %
	Landline Connection	20	12.6 %
	Modem	3	1.9 %

data based on a representative sample of the population, generalisations can be made about the whole population (Fraenkel et al., 2011).

Participants

Random sampling was employed in this study. The sample consisted of 159 participants (83 male and 76 female) who were upper and lower secondary mathematics teachers.

Moreover, the majority of participants had undergraduate degrees in mathematics education (88.1%), whilst the remaining had post-graduate degrees (11.9%). Most of the participants had more than 6 years of teaching experience (79.9%) and most of them (72.3%) had been certificated as professional teachers by the Indonesian Ministry of Education. Further details of participants' demographic information are presented in Table 2.

Nearly half of the participants (49.1%) used a computer/laptop for e-learning whilst the remaining used mobile/handheld devices. Furthermore, the majority of participants (85.5%) used mobile phones for internet connection and the rest used landline connections (12.6%) and Modems (1.9%).

Research Instruments

The questionnaire used was based on a conceptual framework developed specifically for this study. It consists of four scales, namely school level barrier, teacher level barrier, student level barrier and curriculum level barriers. To validate the questionnaire, we used convergent and divergent validation methods. Moreover, in terms of reliability, we utilized composite reliability and variance extracted value.

Table 4. Cronbach's alpha coefficient of the questionnaire constructs

Construct	Cronbach's Alpha Coefficient
Teacher Level Barrier	.843
School Level Barrier	.775
Curriculum Level Barrier	.784
Student Level Barrier	.816
Total	.846

Cronbach's alpha was calculated to assess reliability and it was .846, which indicates that all items exhibit high levels of reliability and measure the same concept. Table 4 presents Cronbach's alpha coefficient of multi constructs that indicate adequate reliability.

Data Collection and Data Sources

An online questionnaire was used to collect data. A crucial reason for using an online questionnaire was compatibility with teachers' online work during the pandemic. Moreover, the online questionnaire was also easy to be administered and accessed using various devices (Fraenkel et al., 2011). The questionnaires were distributed after schools had been closed and the participants had been requested to use e-learning methods. The majority of participants were approached through WhatsApp groups and Indonesian teacher mailing lists, with a few teachers being approached through personal email. Participants were sent a link to a questionnaire hosted on Survey Monkey, an online questionnaire tool, and they were offered a chance to win USD20 vouchers as an incentive. The questionnaire was open for three weeks.

Table 5. Guidelines for the interpretation of a correlation coefficient (Cohen, 1992)

Strength of Association	Correlation coefficient value	
	Negative	Positive
Weak	-.3 to -.1	.1 to .3
Moderate	-.5 to -.3	.3 to .5
Strong	-.9 to -.5	.5 to .9
Very Strong	-1 to -.9	.9 to 1.0

Data Analysis

All responses on teachers' level barriers were coded on a 5-point scale. Descriptive and inferential statistical analysis were employed to answer the research questions. Regarding descriptive analysis, a mean and standard deviations of responses for all the items of barrier were calculated and presented in tables. For inferential statistical analysis, a repeated measure of ANOVA was employed to examine significant differences in barrier across the categories. Furthermore, an independent t-test and ANOVA were employed to examine difference in barrier according the participants' demographic background. Spearman correlation coefficients were calculated to assess relationships between barriers across the levels, and Cohen (1992) guidelines for the interpretation of a correlation coefficient was used to interpreted the correlation.

RESULTS

This section presents a descriptive result of the barriers and it is followed by a presentation of the results of repeated measure analysis. This section also presents results from Pearson Correlation analysis as well as the independent t- test and ANOVA test.

Teacher E-learning Use Barriers

As mentioned earlier, barriers were divided into four categories, namely teacher, school, curriculum and student barrier. The results are presented in Table 6.

Regarding the teacher level barrier, the results showed lack of teachers' knowledge as the top barrier (mean =3.0) and lack of confidence ranked second (mean = 2.9). Furthermore, teachers' bad experience with e-learning (mean = 2.8) and the convenience of e-learning use (mean =2.7) ranked third and fourth respectively, whilst their beliefs about e-learning (mean = 2.6) was the lowest barrier in teacher level barriers.

In terms of the school level barriers, the result revealed that the top two barriers were lack of e-learning systems (mean = 3.5) and not having internet connection (mean = 3.5). Furthermore, lack of technical support (mean = 3.1) and incompatibility of textbooks with e-learning (mean = 3.1) ranked second and third respectively. In addition, schools' regulations (mean = 2.8) and teachers' time for preparing e-learning materials

Table 6. Descriptive results of e-learning implementation barriers

Construct	N	Mean	St Dev
Teacher Level barrier			
I do not have sufficient knowledge and skill to use e-learning during the Covid-19 pandemic	158	3.0	1.05
I am not confident in using e-learning during the Covid-19 pandemic	158	2.9	1.05
I have experience in using e-learning	158	2.8	1.03
I believe that the use of e-learning in teaching is not useful during this pandemic	158	2.6	1.07
The use of E-learning during this pandemic is not convenient for me	158	2.7	1.09
School Level Barrier			
My school does not have an e-learning system	158	3.5	1.01
My school does not have internet connection	158	3.5	1.16
School regulations do not support the use of e-learning during the Covid-19 pandemic	158	2.8	1.07
Textbooks are not in line with e-learning use	158	3.0	1.00
My school does not provide technical support for e-learning use	158	3.1	1.05
Because of workload, I do not have enough time to prepare e-learning materials	158	2.8	1.03
Curriculum Level Barrier	158		
Learning and teaching resources that are available on the e-learning system are not in accordance with the curriculum	158	2.9	0.87
Schools require students' assessments that are not in line with e-learning use	158	2.9	0.91
The contents of my subject cannot be taught using e-learning	158	2.8	0.89
The contents of my subject are difficult to be taught using e-learning	158	2.9	0.93
The contents of my subject are difficult to be understood by students through e-learning	158	3.0	0.96
Student Level Barrier	158		
My students do not have sufficient knowledge and skill in the use of e-learning	158	3.6	0.86
My students do not have devices (i.e. laptop and tablet) for the use of e-learning	158	3.6	0.91
My students are not interested in using e-learning	158	3.1	0.79
My students do not have internet connection	158	3.5	1.01
My students are not able to access the e-learning system	158	3.4	0.92

Table 7. Summary of barriers at each level

Construct	Mean	Std. Deviation	N
Teacher Level Barrier	2.78	.9548	158
School Level Barrier	3.04	.8546	158
Curriculum Level Barrier	2.94	.8217	158
Student Level Barrier	3.47	.7560	158

Table 8. Summary of correlation matrix

	Teacher Level Barrier	School Level Barrier	Curriculum Level Barrier	Student Level Barrier
Teacher Level Barrier	1.00			
School Level Barrier	.556**	1.00		
Curriculum Level Barrier	.572**	.669**	1.00	
Student Level Barrier	.468**	.652**	.579**	1.00

Correlation is significant at the 0.01 level (2-tailed)

Table 9. Results of Independent t-test

Teacher Background	Results
Gender	Mean (Male = 3.11; Female =2.99), Sig. = .077. df=155.859, t= 1.124
Education Level	Mean (Undergraduate = 3.08; Post-graduate = 2.85), Sig.=.693, df=23.215, t = 1.336
Certification	Mean (Certificated = 2.99; Non-Certificated=3.20), Sig.=.841, df=71.162, t=-1.583

(mean = 2.8) were the least significant barriers in the school level.

Results of the curriculum level barriers showed that the top barrier was the difficulty faced by students to understand the content through e-learning (mean = 3.0). This was followed by mismatch between e-learning and the curriculum (mean = 2.9), mismatch between requirements of assessment and e-learning (mean = 2.9) and difficulty to teach content through e-learning (mean = 2.9).

At the student level barriers, the two top barriers were students' lack of e-learning knowledge (mean 3.6) and students' lack of access to a computer/laptop (mean=3.6). Moreover, students' lack of internet connection (mean =3.5) and lack of access to e-learning (mean =3.5) were ranked second and third respectively, whilst the lowest barrier was students' lack interest in e-learning.

Table 7 summarizes e-learning barriers at each level. The results revealed that the most significant e-learning barrier was at the student level (mean= 3.47). Moreover, the school level barrier (mean=3.04) and the curriculum level barrier (mean=2.94) came second and third respectively. The lowest barrier was the teacher level barrier (mean=2.78).

As mentioned previously, a repeated measure of ANOVA was used to examine if there was a significant statistical difference of factors within each level barrier. Mauchly's test indicated that the assumption of sphericity had been violated; therefore, degree of freedom was corrected using Huynh-Feldt estimate of sphericity. The results show that there were significant differences in teachers' view on e-learning barriers in across the level, F (2.754, 432.362) = 14.90, p<0.05). Therefore, we can conclude that the student level barrier

was the most significant barrier faced by the Indonesian secondary mathematics teacher in the use of e-learning during COVID-19 outbreak.

Correlation between Each Level of the Barriers

A Pearson product moment correlation coefficient was computed to assess correlation between categories of the barriers. As shown in Table 8, there were strong and moderate positive correlations across the levels. The strongest correlation was between the school level barriers and curriculum level barrier, r = .669 and p = .000. Furthermore, the second strongest correlation was between the school level and student level barriers, r = .652 and p= .000. In addition, the third strongest correlation was between the student level and curriculum level barriers, r = .579 and p= .000.

Teacher Level Barriers According to Their Background

To assess differences in barriers according to teachers' backgrounds (Gender, level of Education, Certification) we performed an independent t-test, whilst One-Way ANOVA was administered to examine differences in barrier according to teachers' teaching experience. Results of the independent t-test is presented in Table 9 and the results of One-Way ANOVA is summarized in Table 10.

Table 10. Results of ANOVA

Teacher Background	Results
Teaching experience	Mean (0-5 Years = 2.99; 6-10 Years =3.11; 11-15 Years = 3.0; 16-20 Years = 2.98; More than 20 Years = 3.11), Sig. = .923. df between groups= 4, df within groups = 154, F= .228

The results showed that there were no significant differences in barriers between male teachers and female teachers ($t_{155.859}$ = 1.124, p > .05). Furthermore, there was no a significant difference in barriers between teachers with an undergraduate degree and teachers with a postgraduate degree ($t_{23.315}$ = 1.336, p > .05). In addition, there was no significant difference in barriers between certificated teachers and non-certificated teachers ($t_{71.162}$ = -1.583, p > .05).

The results showed that there was no statistically significant difference between groups of teaching experience as demonstrated by one-way ANOVA (F (4,154) = .228, p = .923) and there was no statistically significant difference in barriers according to teachers' backgrounds.

DISCUSSION

This study examined mathematics teachers' views on e-learning use barriers during the COVID-19 pandemic, the relationship between each level of the barriers, and the differences in teachers' views according to their backgrounds. The findings show three important points of discussion.

First, this study suggests that the top e-learning implementation barrier was at the student level. This is evidenced by the fact that the majority of participants agreed that students did not have sufficient knowledge and skills in using of e-learning applications. Furthermore, most participants also agreed that their students lacked access to devices and internet connection for e-learning purposes. The present study contributes to the literature on the most significant barrier of e-learning use during school closure. As a developing country that has the fourth largest education system in the world, the findings of this study have implications not only for Indonesia but also for other developing countries that have experienced school closure and encourage e-learning use. The findings indicate that students were not well prepared for e-learning use before this pandemic. Therefore, when it comes to this emergency, it is challenging for teachers to get their student ready for learning in an online environment. Existing work has predominantly focused on the e-learning integration barriers during the normal academic term when schools are open and students have been prepared (Assareh & Bidokht, 2011; Hadijah & Shalawati, 2017; Juliane et al., 2017; Quadri et al., 2017). We believe that this finding is novel given that the current situation is completely different to the normal school term. Furthermore, this study focuses on mathematics where e-learning is challenging due difficulty in explaining mathematical concepts online

(Frid, 2002). However, the participants think that impact of the mathematics curriculum barrier is less significant than the student barriers.

Second, this study suggests that there was a strong positive correlation between the student level barrier and the school level barrier as well as the curriculum level barrier. This strong correlation, to some extent, might explain why the student level became the top barrier of ICT integration in the classroom as it has been widely known that there was a strong correlation between school culture and students achievement (e.g., Demirtas, 2010; MacNeil, Prater, & Busch, 2009). As a result, this finding indicates that, as one of the most important education stakeholders, schools need to play an important role to overcome students' difficulty in e-learning use in this challenging time.

Third, this study revealed there are no differences in barriers according to teachers' demographic background. This finding highlights two important points. First, in terms of gender, the dominant of male teachers over female teachers in e-learning use is no longer valid (Mailizar, 2018). These findings contradict the idea that technology-related activities have been viewed as a 'male domain' (e.g., Markauskaite, 2006; Tezci, 2010; Vitanova, Atanasova-Pachemska, Iliev, & Pachemska, 2015). Second, it is widely believed that more advanced teaching experience is important to develop the skills required for effective teaching. This common belief is not in line with teachers' views on e-learning integration barriers as teachers with different levels of teaching experience expressed relatively similar views on the barriers.

CONCLUDING REMARKS

Overall, this investigation demonstrates that Indonesian secondary mathematics teachers faced a great challenge in using e-learning as a tool of instruction during school closures as a result of the COVID-19 pandemic. Their most significant barriers were at the student level including student lack of knowledge and skill in e-learning use, and their lack of access to devices and internet connection. Student barriers had a strong correlation with the barrier at the school level. This study expands the existing studies relating the e-learning use in secondary schools, particularly in aspect of barriers to e-learning use during the time of a pandemic. It implies that the current use of e-learning in Indonesia faces huge challenges that might result in students' failure to learn in this difficult time and even beyond. It is crucial to overcome these challenges faced by developing countries. As Kohn, Maier, and Thalmann (2010) argue,

knowledge transfer with e-learning in developing countries often fails, resulting in students being left behind at a crucial time in their education cycle. The findings of this study suggests that policymakers, particularly schools, should establish comprehensive strategies that prepare students to use e-learning. These strategies might include providing students vouchers for internet connection as well as incremental training of the use of e-learning prior to a crisis such as a pandemic as a way of being proactive with student education. Given the reality of the internet world, students will likely have to learn one thing or another through e-learning at some point in their adult life, and giving them the skills now will help them as working adults in the future.

The present study is subject to two major limitations. First, although all participants self-reported that they were secondary school teachers, we were unable to verify their teaching registration as the questionnaire was conducted online. Second, the only participants in this study were teachers. We believe that students' voices are also crucial to be raised in this issue. Nevertheless, the findings of this study may serve as an alert to teachers, schools and policymakers about the barrier in the use of e-learning in this difficult time. Therefore, further research is important to raise students' voices on this issue to examine to what extent students' barriers of using e-learning hinders them from achieving their learning goals, and exploring their voice on how to overcome the challenges they face.

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