

# **CAMBODIAN TEACHERS' PERCEPTIONS OF ONLINE TEACHING: DURING AND BEYOND THE COVID-19 PANDEMIC**

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## **Abstract**

This limited topical life history study aims to gain insights into COVID-19's impacts on teaching at upper secondary schools through Cambodian teachers' perceptions of online teaching. It presents teachers' current challenges and needs as well as future impacts on their teaching practices. Online semi-structured interviews were conducted to collect data from twenty-nine subject teachers and their school directors. This study concluded that the COVID-19 pandemic reduced the quality of teaching and learning due to the limited functions of monitoring students rather than limited digital knowledge and skills. Classroom management is still required although the learning is online. The empirical evidence suggests this effect in science disciplines; especially for calculation-related subjects. However, COVID-19 was viewed as providing secondary education with a great deal for implementing the digital revolution of education 4.0 and created some practical issues for policymakers and implementers. Although the findings concur with previous literature on online teaching during the pandemic, they also draw context-specific features of the issue.

**Keywords:** blended learning, Cambodia; COVID-19, post pandemic, online teaching, life history

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## **Introduction**

Traditional teaching and learning in Cambodia were disrupted when the nation shifted to online learning during the COVID-19 pandemic. This immediate shift increased various challenges to both teachers and students, especially in countries (e.g., Buthan,

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Cambodia, Indonesia, Jordan, and Pakistan) with limited technology-readiness programs due to limited technology infrastructure as well as teacher's limited digital skills and proper online teaching pedagogies (e.g., Adnan & Anwar, 2020; Chea et al., 2020; Dahoud, 2020; Heng & Sol, 2020; Leng et al., 2020; Sothy, 2021; Rasmitadila et al., 2020; Wangdi et al., 2021). Therefore, this empirical study aims to explore and compare Cambodian teachers' perceptions of online teaching to gain insights into current and future impacts of COVID-19 on Cambodian education. This study's findings will give personnel at the central levels insightful understanding on real issues and needs at school level in both Cambodia as well as other countries with limited digital resources or instruments and lack of technologies-readiness program. Although previous studies' findings and media reported impacts of COVID-19 on education since its rise, more empirical studies are still required. By exploring teachers' experiences, this paper attempts to enrich our understanding of teaching and learning during the COVID-19 pandemic.

### **COVID-19 Pandemic and Online Learning**

Since the rise of COVID-19, about 1.6 billion students in more than 190 countries have been affected as many schools were directed to close. It impacted 94% of world's student population and about 99% in low and middle-income countries (United Nations, 2020). Regardless of income level, each country had to adopt a new 'normal' way of teaching through online platform to ensure educational continuity for its people (UNESCO, 2020a). This way of teaching took a crucial role during this outbreak (Subedi et al., 2020).

Numerous challenges towards learning quality were encountered as this teaching and learning mainly rely on reliable internet connection and digital competency of teachers and students (e.g., Heng & Sol, 2020; Jalli, 2020; Muthuprasa et al., 2021). The rapid change in the teaching and learning process due to COVID-19 was confirmed having effects on teachers' performance and educational quality in Indonesian context. Additionally, Indonesian teachers showed less interest in online teaching than the traditional classes due to less physical interaction and inability to gauge students' understanding (Rasmitadila et al., 2020). In the same line, Adnan and Anwar (2020) and Wangdi et al. (2021) found that learning in traditional classroom was more effective and motivating than online learning in Pakistan and Bhutan respectively. Dahoud (2020) reported that some Jordanian teachers had limited knowledge in using online learning tools or programs. This issue was also found in Spanish context; teachers did not seem to use digital sources which students preferred, but texts and papers during the lockdown (Tejedor et al., 2020).

Although online teaching during this pandemic spawned numerous challenges in teaching and learning, it brought some advantages since teachers could teach, interact, and reinforce students' learning from their home (Surkhali & Garbuja, 2020). Additionally, online teaching provides both teachers and students with flexibilities (Smedley, 2010; Hasan & Khan, 2020) as well as interactivities (Leszczyński et al., 2018); it creates strong cooperation among all stakeholders through peer feedback and support as well as opportunities to learn from each other (Doucet et al., 2020).

Digital competencies tended to differ across age groups. Prensky (2001) found that young students seemed to adapt themselves faster towards digital usage as they grew up in the digital era. For instance, Chinese students had a significantly more positive attitude towards the use of mobile devices, perceive usefulness as facilitating conditions in English learning during this pandemic (Guo et al., 2020). Additionally, Italian learners improved in both their learning ability in using online resources and becoming independent learners (Prati et al., 2020). Besides age, lack of prior training in digital technology was another factor impacting teachers' digital competencies and teaching

skills in Brazilian higher education institutions and it made teachers' work more challenging (Spanemberg et al., 2020).

### **Cambodia and Schooling during COVID-19**

The Cambodian education experience during the pandemic was no exception with 13,482 schools directed to close in mid-March 2020 to cut the chain of the outbreak. This closure disrupted 3.2 million students across the country (Ministry of Education Youth and Sport [MoEYS], 2021a). Responsibility for student learning was greatly increased for parents through online teaching (Khut & Chheang, 2020) – a factor that raised concerns about learning quality (World Vision, 2020). However, Cambodia's Ministry of Education Youth and Sport (MoEYS) believed parent involvement in student learning was vital since teacher supervision was limited (MoEYS, 2021a, p. 79).

It is worth highlighting that online learning was maximized for only diploma-granting grades (9<sup>th</sup> and 12<sup>th</sup> graders) following the first school closure in March 2020 (MoEYS, 2021a). Local studies and reports pointed out some key challenges when implementing online learning such as digital infrastructures and skills, shortage of proper teaching pedagogies and unreliable internet connection (Chea et al., 2020; Leng et al., 2020; Sothy, 2021). MoEYS committed to maximize online learning exposure for students in April 2020 through various ways such as its official Facebook page and e-learning websites, WiKi TV, and YouTube as well as other partners' Facebook pages. MoEYS also broadcast pre-recorded teaching videos on 54 cable television channels throughout Cambodia, and teachers and students were given free data connectivity through learning portals until the end of 2020 (MoEYS, 2021a).

However, Flynn and Himel (2020) reported online learning tended to put rural areas at disadvantage and the United Nations Educational, Scientific and Cultural Organization (UNESCO) (2020b) reported that low number of students accessed these online learning platforms - particularly in rural areas. MoEYS with Ministry of Post and Telecommunication, Union of Youth Federation of Cambodia, and E-school Cambodia provided a 'Cellcard Free Data Distance Education Program' and MoEYS E-learning application for all students in mid-July 2020, and 'Distance Education' for students from 9<sup>th</sup> to 12<sup>th</sup> grades (Dara, 2020; MoEYS, 2021b). To ensure continuity of education and inclusiveness, MoEYS encouraged schools to implement offline delivery of teaching such as delivering handouts and conducting small fact-to-face sessions to students who had no access to smartphone or internet. Also, MoEYS integrated sign language into digital contents and developed a broadcasting radio channel for a multilingual language program for indigenous students (MoEYS, 2020).

### **Methodology**

This empirical study employed the limited topical life history approach since it does not aim to understand the entire life history of individuals but to obtain insights into a specific issue (Ward, 2003). The study's issue is online teaching during COVID-19 pandemic.

Three public upper secondary schools located in Phnom Penh were conveniently selected due to accessibility for ethical approval and available connection during lockdown. Non-stratified random sampling was done to select informants from each school. Ten teachers teaching core examination subjects for twelfth grade were selected per school resulting in 30 teachers being recruited as study samples. This group of teachers were selected because twelfth grade is the only grade which students are called to sit for the national examination. Additionally, the 12<sup>th</sup> grade's teachers have had experienced in this 'new normal' way of teaching more intensive than their counterparts who were in other grades. Therefore, the findings from this group may be more beneficial for policy makers in preparing in-service and pre-service trainings for teachers.

Additionally, school director of each school was invited to contribute to the data triangulation of school support and teachers' teaching professional behavior.

### Data Collection

Semi-structured interviews were used to collect data for this study through online and social applications (i.e., Google Meet, Zoom, Telegram and Facebook Messenger) due to the school closure following the COVID-19 pandemic in Cambodia, known as February 20 Community Event (MoEYS, 2021c; 2021d). The interviews were done separately according to the available schedule of each informant. First, each informant was contacted through Telegram using the contact list obtained from each School Director and told the study's purpose and reasons why they were selected. When they agreed to participate voluntarily, a convenient interview time was arranged, and they were given a written consent form. The result was that 26 selected teachers chose to be interviewed since four declined to submit the consent form (Table 1). Each interview was done in native language, Khmer, and it lasted about 60 to 80 minutes. Recordings and notes were made during the online interview process which respondents believed allowed more confidence and freedom for open sharing than an on-site interview conducted on school campus. The data collection was conducted during March 2021.

**Table 1**  
*Demographic information of the informants*

Category	Attribute	Frequency (%)	
Teacher (n = 26)	Gender	Male	17 (65.38)
		Female	9 (34.62)
	Age	25-30	8 (30.77)
		31-35	4 (15.38)
		36-40	4 (15.38)
		41-50	8 (30.77)
		>50	2 (7.69)
	Specialization	Sciences	11 (42.31)
		Mathematics	2 (7.69)
		Social sciences	8 (30.77)
		Khmer composition	2 (7.69)
		English	3 (11.54)
	Work for	Public school only	7 (26.92)
		Public & Private school	19 (73.08)
School director (n = 3)	Gender	Male	3 (100)
		Female	0 -
	Age	41-50	1 (33.33)
>50		2 (66.67)	
Total (N = 29)	Gender	Male	20 (68.97)
		Female	9 (31.03)

*Note:* Sciences (i.e., physics, chemistry, biology, earth-environment)  
Social sciences (i.e., geography, moral-civics, history)

### Data Analysis

Recorded interviews were transcribed after each interview. The transcripts were sent to individual informant to verify. This phase is noted as a crucial process in a qualitative study to guarantee accurate and complete information before proceeding to

data analysis stage (Hagens et al., 2009). Data analysis process was done from March to April 2021.

To analyze the data, conceptual content analysis was employed to code concepts manually based on words and phrases that frequently appeared in the scripts. The rational content analysis was performed to examine the relationships between the analyzed concepts (Busch et al., 2012). To ensure validity and reliability of the data, code and re-code strategy were employed. Data were encoded twice within one or two weeks. Then both encodings were compared to see similarities and differences (Anney, 2014).

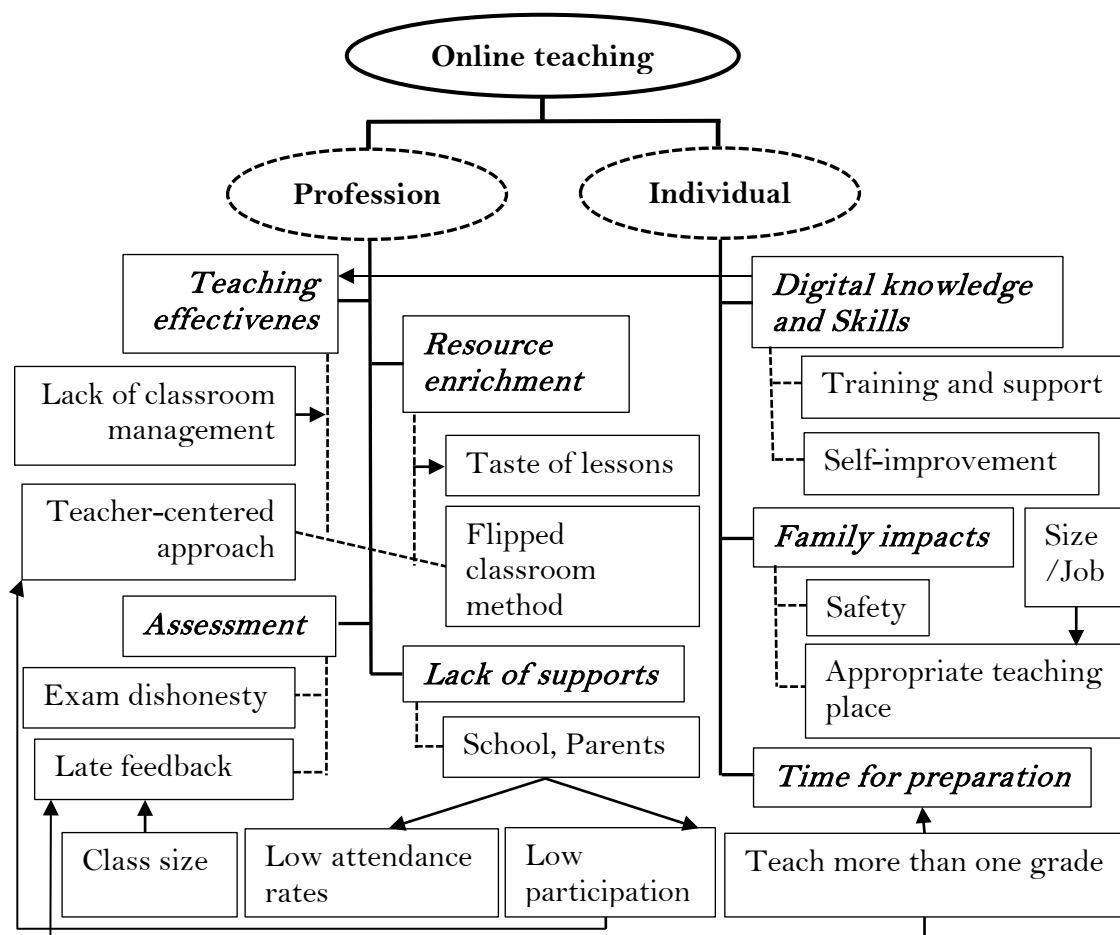
### Findings and Discussion

The study's findings were reported in two sections, namely teaching during pandemic and teaching beyond pandemic. Additionally, data obtained from school directors were combined alongside discussion with previous studies' findings accordingly.

Analysis of the narrative data from subject teachers unveiled seven major themes of teachers' perceptions towards online teaching during COVID-19, which were embedded into two main factors: profession and individual as seen in Figure 1.

**Figure 1**

*Thematic network of teachers' perceptions towards online teaching during COVID-19*



### Teaching during the Pandemic

#### *Profession-related Factors*

Four main themes were thematized in this factor. First, *teaching effectiveness* when teaching online was perceived by all upper secondary school teachers as a major concern

- a finding that largely aligned with previous studies (e.g., Adnan & Anwar, 2020; Wangdi et al., 2021). Informants had different thoughts about causes of the low teaching effectiveness with 57.69% of respondents believing the absence of classroom management and monitoring functions during lessons were the major cause, followed by limited digital knowledge and skills (26.92%) and both impacts (15.38%). One informant, for example, commented that:

I don't think [online] teaching is effective as teaching in [traditional] classroom because we [teachers] cannot know what is going on in the learning process through the [computer]screen as we walk around in the classroom. When teaching in [traditional] classroom, we can realize students' misunderstanding and their attention through many ways such as facial expression and behavior/attitude. Also, we can help them on time during the task while we walk around to monitor the class. (Teacher HS205: Earth Science)

Although some studies pointed out that teacher's limited digital competencies have been noted to negatively impact learning quality (Jalli, 2020; Muthuprasa et al., 2021), this study found that digital knowledge and skills was not a major challenge towards teaching quality at upper secondary school in Cambodian context, but limited opportunity to supervise and support students during learning activities was. It seemed to echo finding in Indonesian context that teachers felt demotivated toward teaching due to limited physical interaction and being unable to support students' understanding (Rasmitadila et al., 2020).

Having limited knowledge and skills of the technological device is not important, I think. To me, 'attention and concentration' are crucial in learning. We cannot hold or re-draw their [attention and concentration] through screen. We can do much during [traditional] classroom, yet some students still cannot stay focus or do the assigned tasks/activities. We need to re-explain or pay more attention to some students by going close to them or to work with them. (Teacher HS110: English)

The present study found that online learning pushed teachers to practice an unprescribed teaching pedagogies, namely teacher-centered approach, while Cambodia's MoEYS has been promoting student-centered one. This was caused by limited classroom management and student-teacher interaction. As Emmer and Sabornie (2015) explained that teachers faced challenges in promoting students' engagement and prosocial behaviour without classroom management.

... [I]nstead of learning through discussion, thinking and practice, students are now learning through listening. I can teach my students some content knowledge but very limited thinking skills which is important skills we would like them to gain beside knowledge. Students have to use [so], [che], [po], [le]: [Pali words which mean 'listen, think, ask, and note'] skills during their learning process (Teacher HS103: Chemistry)

Second, although all teachers agreed on resource enrichment from online sources (e.g., Google, YouTube), they had different views on its usefulness during online teaching. Teachers who were teaching social science disciplines seemed to have better satisfaction towards online teaching than their counterparts in mathematics and science subjects except Biology and Earth environment. This implies that online teaching seemed to be

more compatible with social science disciplines than science ones specifically for subjects which require complex calculation. This echoed Leszczyński et al.'s findings (2018). Nine (69.23%) out of 13 teachers in social science including all teachers of Biology and Earth environment thought that they could make their lessons more interesting through showing online illustrations or playing short videos - something not possible in traditional classroom formats due to limited technology infrastructures. They believed online resource enrichment (e.g., Google, YouTube) helped them to promote students' self-learning through practicing flipped classroom methodology. Two teachers made it explicit that:

Using videos and pictures can assist students to learn better. I felt class is more interesting as students do most of the work before the class as I assigned. Then they present what they learned in their group to the class. ...; however, I do not think it works this way when I am teaching Biology exercises. (Teacher HS304: Biology)

I am not really confident in students' ability of my subject [Mathematics]. It [this subject] needs more guidance and practices. I heard from my students that they could not learn well [through online class]. It is not easy to guide and assist students to learn better through online teaching. I think it works only with good achievers, but not the below average or average ones. (Teacher HS301: Mathematics)

Third, this study unveiled that assessment was one factor which was more challenging due to examination dishonesty and a time consuming for assessment feedback. Similarly, Spanemberg et al. (2020) revealed that teacher's works became more challenging during COVID-19 as there is a need to find alternative ways to develop students' skills and competencies. One informant, for example, stated:

I thought that students send answers of the examinations or of homework to each other. So, their results cannot reflect their understanding, and their results cannot tell me what knowledge or skills I should re-explain or re-teach. It doesn't seem to benefit my teaching at all. (Teacher HS203: Chemistry)

Teachers were not able to use assessment results to reflect the real teaching and learning outcomes due to students' examination dishonesty. It implies that teachers still commit to employ 'backwash' effect from the assessment results to enhance teaching and learning quality although classes were online. This point raised a good signal to policy level about teachers' caring attitude towards teaching and learning effectiveness. Teachers attempt to improve teaching and learning process from all aspects to secure students' knowledge and skills in the intended syllabus. MacNamara (2000) and Shohamy (1993) claimed that the backwash effect has good impact on teaching and learning quality. Although this effect was largely used in language testing, its principles and benefits have been adapted in all disciplines since it significantly links to reliability and validity of the assessment.

Online learning created more works for teachers when grading assessments and was more difficult due to the limitation of technology. Teachers were, also, responsible for more classes and/or more grades. However, teachers who used technology (e.g., Google Form) to support their delivery of assessment found there was little impact in the time or effort they spent; in contrast to those who did not. Of these were teachers of non-calculation related subjects (Social sciences = 8; Earth environment = 2).

It takes me much time to mark students' monthly examinations as I need to mark their examinations on the computer [or phone] screen. I made the test using Microsoft Word and converted it to PDF [to avoid any font or format errors] before sending to students. ..., students have to write answer on pieces of paper and take photographs of their answers and then send to me through Telegram. (Teacher HS306: Khmer)

I created my tests in Google Form. I send the link to my students. It does not take much time for me to check the answers. (Teacher HS209: History)

Fourth, the study unveiled that lack of supports from school administration and parents brought challenges to online teaching and its quality. On the one hand, it spawned low attendance rates and low participation in learning process. It was not necessarily that parents were not interested, but that they may not have had capacity due to work commitments. This finding was in line with MoEYS' large-scale study (2021a) that when there was limited supervision of schools, parents' engagement was crucial in students' learning. Adding to this, some students did not participate or join online classes if there was no parents' supervision. Informants who worked for private schools<sup>2</sup> highlighted how stakeholder support was greater at private schools. It should be noted that 73.08% of this study's respondents reported to work for at least one private school.

Almost 100% of students at private school attended their [online] classes. If they do not present in class, [private] school will contact their [students'] parent. Also, if they do not participate or do not respond when teachers called them to answer questions, their parents will be contacted after teachers inform the program coordinator. (Teacher HS108: Moral-Civics)

Although the study does not aim to compare private and government schools, this finding illustrates how good communication with parents may increase class attendance and participation. All school directors in this study reported that they did not have contact numbers for every parent/guardian. However, they agreed that communication channel between school and parents was crucial as reported by MoEYS (2021a).

Some parents changed their contact number without informing us [school]. Also, number of our students are double or triple more than that of in private school. Thus, if we contact only two students' parents in each class, it will take us all morning. ...; however, if we can communicate with parents and they can cooperate with us, the quality of learning will be better both in traditional and online class. (Director HS202)

#### *Individual-related Factors*

This current study thematized three major impacts related to individuals' concerns about online teaching during COVID-19.

*Digital knowledge and skills.* This current study unveiled that further technology training is required. This can be implied that teaching professional development on digital teaching skills through both synchronous and asynchronous teaching and learning methods should be provided regardless of teachers' technology competencies. This

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<sup>2</sup> Cambodian teachers at all levels of education are allowed to work for private educational institutions outside their official hours according to Article 25 of Ethics Code for Teaching Profession (MoEYS, 2008).



finding was in line with previous studies in Brazil (Spanemberg et al., 2020), Indonesia (Rasmitadila et al., 2020) and Italy (Prati et al., 2020). These studies claimed that immediate change of teaching and learning without prior training brought ineffectiveness and reduced teaching quality.

I think MoEYS should provide us with a series of training on how to use either Zoom, Google classroom or Google meet. Although we have some technology background, it does not mean we are capable enough to use those specific [online and technology] applications for teaching purpose. We should be informed who we can contact when we face challenges in using these applications. (Teacher HS306: Khmer)

We were trained on teaching pedagogies for teaching in traditional classroom only at National Institute of Education<sup>3</sup>, not for this [online] teaching. Therefore, MoEYS should provide us with in-service training on [online teaching] pedagogies and [online] assessment strategies. (Teacher HS207: Geography)

Additionally, teachers reported that their knowledge and skills about digital teaching applications (i.e., Zoom, Google Meet, Google Classroom and Telegram) had gradually improved through self-learning and learning among peers, and reflects similar findings from an Italian context (Prati et al., 2020). Table 2 illustrates how teachers aged between 25 to 40 (57.69%) tended to acquire digital knowledge and skills faster and felt more confident to use in teaching than their peers (34.61%) who were older than 40. However, there was little difference between teachers in sciences included mathematics (69.23%) and social sciences included Khmer and English (53.85%) disciplines. Teachers in science disciplines tended to gain some benefit. This can be implied that age and not the discipline impacts the ability of staff to acquire digital knowledge and skills in using teaching applications. This supports findings by Prensky (2001) that younger audiences can adapt faster in using digital devices and applications.

**Table 2**

*Disparities of confidence level in using digital application by age and discipline*

Factors	Categories	Use digital applications in teaching	
		confidence (%)	less confidence (%)
Age (n = 26)	25 - 30	8 (30.77)	-
	31 - 35	4 (15.38)	-
	36 - 40	3 (11.54)	1 (3.85)
	41 - 50	1 (3.85)	7 (26.92)
	Over 50	-	2 (7.69)
Discipline	Sciences & mathematics	9 (69.23)	4 (30.77)
	Social sciences, Khmer & English	7 (53.85)	6 (46.15)

School directors agreed that younger teachers were more driven to learn and adapt themselves faster in online teaching. Furthermore, peer cooperation and collaboration

<sup>3</sup> National Institute of Education (NIE) is the government-run teacher training institute which provides a one-year training program to future upper secondary school teachers. During their training program, pre-service trainees are required to study computer related courses [MS Word, Excel, PowerPoint, and Search engines] for 2 hours per week (National Institute of Education, 2019).

increased when staff were teaching online – agreeing with earlier findings by Doucet et al. (2020).

It [online teaching] is a new experience for everyone including me. I observed that all [teachers] are trying their best to learn [and to use digital applications] for their teaching. Surely, young teachers adapt themselves better and seemed to enjoy it [online teaching]. They [young teachers] assist elder teachers to use digital applications. I am so happy to see them work together and support each other. (Director HS101)

*Family impacts.* Offering online lessons from home was found to reduce the infection and spread of COVID-19 in teachers and their family members. One informant (Teacher HS106: Khmer) stated that “We do not have good place for this [online] teaching. If we have one room each at home, it will be better when teaching or learning online. My wife and I are teachers, and we sometimes have to teach at the same hour. Also, I have two children [who are in fourth and seventh grade] who study online every day.” Unreliable internet connectivity was found to have negative impact on online teaching and learning in this study as well as in the previous literature (e.g., Jalli, 2020; Muthuprasa et al., 2021; Sothy, 2021). However, this study unveiled that teachers faced challenges of not having a good place at home for their online class. Both teachers who lived in extended and nuclear family reported facing this issue and noisiness. This was most prevalent when both parents were teachers and their children also studied online.

However, this issue was noted to have temporary effect due to the country lockdown. Cambodian teachers were encouraged to come to school at their assigned schedule for online teaching during COVID-19 outbreak due to a matter of fact that Internet connection at school is more reliable in comparison to at home, and school have more spaces for teachers. It might be an ease for school administrators to monitor teaching and learning process as schools do not seem to have any digital system to follow the daily class operation.

I think MoEYS also considers this type of [place] issue. They [MoEYS] know this may happen when offering classes from home. However, it will not be a big issue if the lockdown comes to an end. We were encouraged to come to school to work and teach because internet [at school] is better and there are more places for them. (Director HS101)

*Time for preparation.* This study found that online teaching consumed more time for preparation. It was in line with the findings of Muthuprasa et al. (2021) who noted that time consumption was even more significant for teachers who taught different grades or had more classes. Teachers tended to prepare more resources to make their online lessons interesting and some other tasks (e.g., lesson summary) which had been previously done by students during traditional class through activities in a student-centered approach. This implies that online teaching not only makes teachers' works more challenging (Spanemberg et al., 2020), but also consumes more teachers' time to search for alternative ways to ensure students could learn better.

I feel that it takes me more than double of the time I spent on preparing my lessons for traditional class. It takes more than two hours with some practical exercises. It takes longer if my lesson is to present more formulas. (Teacher HS101: Mathematics)

Umm! I spent about one hour and a half or less, I think. There are more tasks to prepare for a one-hour online lesson such as preparing a lesson summary, typing homework, searching for materials (i.e., pictures, video) and preparing questions for that video or pictures .... I did not do this for a traditional class because by the end of the class, a lesson summary is made through learning activities. I sometimes told students the page numbers for homework or copied homework from other books for them. [there is] no video, but I sometimes used pictures in textbook. (Teacher HS204: Biology)

### Teaching beyond the Pandemic

The empirical study unveiled that both teachers and school directors believed there were opportunities for Cambodian education to shift itself from a traditional learning and working environment to a blended learning (82.76%) and digital working (75.86%) one as indicated in Table 3. This finding was aligned with what had been stated by the minister of Cambodia's MoEYS: although COVID-19 pandemic spawned numerous challenges, it assisted Cambodia's education to speed up towards the digital revolution of education 4.0; Cambodia is now 10 years ahead in this implementation (Dara, 2020). Adding to this, teachers believed that the pandemic assisted Cambodians to prepare future manpower with digital competencies for the years 2030 and 2050 as well as to modernize its education system through strengthening the utilization of ICT and technologies (Heng, 2021). It is worth highlighting that Cambodia aims to transform itself to higher-middle income country in 2030 and high-income one in 2050 by enhancing domestic industries as well as technology and knowledge-driven economy (Royal Government of Cambodia, 2015).

**Table 3**

*Perceptions of teaching and working environment beyond COVID-19*

Themes	(N = 29)	Opportunity (%)	Did not state (%)
Blending learning	Teacher	<b>82.76%</b> 22 (84.62)	17.24% 4 (15.38)
	School director	2 (66.67)	1 (33.33)
Digital working environment	Teacher	<b>75.86%</b> 19 (73.08)	20.69% 7 (26.92)
	School director	3 (100)	-

*Blended learning environment.* This study found that 84.62% of the teachers were willing to continue to use online teaching after traditional teaching restarts. This combination would help both teachers and students to keep practicing and enhancing their new digital skills in teaching and learning. They believed blended teaching and learning could help make teaching and learning more effective and efficient and echoed Garrison and Kanuka's (2004) findings that blended learning provides students with great potential to learn and experience better in their learning.

It will be great if MoEYS or school allows us to combine online teaching and teaching in classroom after the end of COVID-19. This will help us [teachers and students] learn more about teaching through digital applications. (Teacher HS209: History)

Similarly, two out of three school directors concurred with teachers on the implementation of blended learning when school resumes.

Learning environment should not be like before COVID-19 pandemic. I think teaching through technological devices and using some applications together with teaching in classroom will help teachers and students have more time to interact. Also, it gives teachers more time to support students and enhance their digital competencies. (Director HS202)

*Digital working environment.* After experiencing this pandemic, about 73% of teachers across teaching disciplines and all school directors tended to favor using learning management systems (LMS) and electronic/soft copied learning materials. On the one hand, the demand for using LMS can reduce great deal of administrative works and ease teachers and students in managing their teaching and learning (e.g., assignments, academic grades). On the other hand, it might be a financial burden for schools and relevant educational bodies to develop one LMS that serves for its purposes well.

Director HS303: ...[H]owever, MoEYS should develop a management system for school level which can assist school management team, teachers, and students.

Moderator: Can you give me some examples or more information about this[management] system?

Director HS303: It is like a database which can store learning and teaching tasks. Also, students and parents can assess to see their assignment, achievement grade, school information etc. I think some schools and universities [especially in abroad] are using it. We should have it now.

Electronic/soft copied handout may be very applicable since MoEYS developed and announced to start using 'MoEYS E-learning' application for all grades in Cambodia, and it allowed everyone to download free of charge (MoEYS, 2021b). However, they need to have a smartphone to access to this free E-learning application. Thus, this might push students who cannot afford a smartphone to a disadvantage. Although MoEYS reported that 78% had smartphone, but only 32% had access to internet (MoEYS, 2021a). Regardless of this issue, the digital sources (e.g., videos, audiovisual materials) were found to be what students preferred (Tejedor et al., 2020).

Yet, regardless of these opportunities, students' knowledge and skills were highlighted as the main issue when schools reopen. Teachers and school directors seemed to evaluate that students' knowledge and skills were lower than their grades' syllabus due to online learning. As such, they considered that remedial program should be implemented before using the exact grade's syllabus, or the next schoolyear period should be expanded to provide opportunities for both teachers and students to teach and learn all intended contents.

I chatted with other teachers both in my schools and whom I know. We seemed to face the same issue. This [2020-2021] schoolyear's students have very low knowledge if we compare to last schoolyear's [2019-2020] students. They were affected from last year's school closure. Again, they are being affected this year. Thus, I think we [school and MoEYS] have to provide them enough remedial course, or this batch will be suffered for their endeavors. (Teacher HS106: Khmer)

Their syllabus should be adjusted, or the [this and next] schoolyear should be expanded, so we can maximize their understanding and better their learning quality. (Director HS303)

### **Significance and Conclusion**

The study aimed to gain insights into current and future impacts of COVID-19 on teaching at upper secondary schools through Cambodian teachers' perceptions of online teaching during this pandemic. Although findings of this current study were largely consistent to previous literature on online teaching during the pandemic, some key differences were the limited technology-readiness programs and limited digital infrastructures and instruments at schools in Cambodia. This current study concluded that COVID-19 pandemic shrank the effectiveness of teaching and learning due to the limited classroom management and teachers' monitoring rather than teachers' low digital knowledge and skills. The issues tended to be pronounced in science disciplines particularly calculation-related subjects (i.e., mathematics, physics, and chemistry). Additionally, teachers were not able to make use of students' assessment results to reinforce their teaching due to their limited time. This seemed to affect MoEYS' attempts by removing safeguards for examination dishonesty. It should be noted that Cambodia launched a critical examination reform nationwide in 2014 to gain parents and students' trust in education and ensure only qualified students pass (MoEYS, 2019).

Along the same vein, the study has found some practical implications for personnel at the central level and policy makers. Regardless of teachers' knowledge level of technology, training on how to use digital applications for teaching as well as online teaching pedagogies were found to be urgent needs by schoolteachers. To assist their teaching process, a core technical person to consult on digital applications should be assigned in each school. During school resumption, blended learning and digital working environment should be promoted at school level for both teachers and school administrative staff. Furthermore, initiating remedial program and/or expanding the schoolyear period should be considered to maximize teaching and learning process. Therefore, students can learn all contents in proper ways that they are supposed to be taught. By same token, a parent-school communication channel should be fixed and implemented to expand teachers' supervision during this pandemic, and to strengthen parent's engagement in students' learning now and then.

This study could only shed light on what should compensate for teachers and students and limited its findings from only senior grade at upper secondary school. Therefore, to offer policy makers and implementers greater benefits as well as to understand the issue better, future study should obtain more quantitative evidence and target larger number of schools as well as enlarge its scope to different areas and all levels of education.

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