

## How the COVID-19 outbreak shapes the Education of School Children: A case of Engineering Technology students in the Mulatiyana Educational Zone, Matara, Sri Lanka

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### Abstract

In Sri Lanka, the conventional learning in schools has been disrupted with the COVID-19 lockdowns. Even though the government has introduced an online learning system with the hope of making a concerted effort to maintain the continuous learning of school children, the grass-root level's feedback has not been adequately explored yet. Therefore, the present study was designed to examine the effects of the COVID-19 pandemic on Sri Lankan school education system and locate the obstacles of the online education system with special reference to the Advanced level Engineering Technology students in the Mulatiyana Educational Zone, Matara, Sri Lanka.

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Primary data were collected through a questionnaire survey directed to the purposively selected 84 Engineering Technology students in the selected educational zone. Data analyzed using SPSS showed that 88% of the students have continued their academic process via online learning. Among these students, 39% had the capability to learn 02 hours per day.

Student exhibited their highest consent (48%) to use mobile apps for online learning while illustrating a significant gender difference ( $M_{\text{male}}=4.38$ ,  $M_{\text{female}}=3.50$ ;  $t=2.553$ ,  $p=0.015$ ). Interestingly, the majority of the students (59%) were satisfied with online education though with a significant gender difference ( $M_{\text{male}}=2.84$ ,  $M_{\text{female}}=3.75$ ;  $t=3.716$ ,  $p=0.000$ ). The study revealed that lack of access to devices is the major drawback for the majority (40%) of students for online learning. Accordingly, the study adds Asians' voice to the existing literature to implement future online classes in a more efficient and effective manner. Present study suggests the need for future research in this direction while addressing representative samples from whole country, if possible, to generalize the current findings.

**Keywords:** Advanced level students, COVID-19, Online learning

## **Introduction**

The outbreak of COVID-19, also known as the coronavirus disease, in the world was declared on 30th January 2020, by the Director-General of the World Health Organization (WHO) (Upoalkpajor & Upoalkpajor, 2020). It has changed lives of the people in the world by forcing them to self-isolation at homes that limited their social interaction. With the lockdowns, social gatherings were suspended and people from most parts of the world were asked to work and learn from home (Agung & Surtikanti, 2020). First and most critically, the COVID-19 epidemic is a critical health problem where children and elders seem more susceptible. 1.2 billion children have been affected by the virus in 186 nations globally (Upoalkpajor & Upoalkpajor, 2020). Protection of children has become the main aim of all nations in particular. Many nations around the world have agreed to shut schools, other academic institutions and universities. The shutting down of schools (objectives: reducing interaction and protecting lives)

and leaving them open (so as to permit teachers to work and protect the economy), the crisis offered dilemmas for policymakers. The closing of schools worldwide was one of the main attempts taken to thwart the spread of COVID-19. On 12<sup>th</sup> March 2020, the abrupt closing of schools to counter the spread of COVID-19 showed how the education sector responded rapidly to the crisis. Consequently, they undertook a radical transition from face-to-face mode of teaching to online and other distance education methods.

## **Review of Literature**

### ***Education amidst COVID-19: Global Responses***

It is critical for the whole world to respond immediately in order to mitigate the impact of COVID-19 pandemic because most nations were not initially prepared for this epidemic condition. Onyema, Sen & Alsayed (2020) revealed that various schools were shut and the examinations were cancelled in the United State which affected 60 million school children in the country. In Spain, school closure affected 11 million students and as well as those employed in jobs related to educational institutes. Lots of self-governing schools were closed in New South Wales in order to alleviate the spread of the COVID-19 pandemic. The beginning of schools during the outbreak period was monitored and facilitated by the Australian government. All educational institutions were shut down in India due to the curfew imposed by the Indian government. In France, all the schools were closed in response to the critical health situation in the country. Even though the death rate was low in Germany, they closed all schools while moving to online classes. The federal government in Nigeria ordered a total closure of all schools along with a lockdown of the country to control the spread of Coronavirus. Agung & Surtikanti (2020) showed that Indonesia's education system has moved from the physical classroom to the internet-based classroom with the temporary closure of the school and other educational institutes according to the Circular Note issued by the Indonesian Minister of Education and Culture.

### ***School Education and the effects of School Closures***

From primary to tertiary levels, free public education system was introduced to Sri Lanka in 1943. It paved the path for students from

economically deprived families to access greater educational opportunities and ensure their right to education. The conventional classroom is the core of this structure where students from various economic and cultural backgrounds share a common physical space. Moreover, it has helped to mitigate and balance many institutional and regional differences among students over time. It is recommended that for learning skills the best public policy means available is learning at a school. Even a comparatively short amount of school time achieves this; even a relatively short amount of missing education would have consequences for the advancement of skills. It is not easy to guess how much learning will be compromised by the COVID-19 interruption.

The lively classroom dynamics can never be replaced by any online forum. Not only is the classroom a learning area, but it is also a place where students connect with each other through the social and cultural barriers that divide them and develop lifelong relationships, connections and unity (Chandasiri, 2020). This shared physical environment that has nourished thoughts and interactions of students over the decades can in no way be harmed by the steps taken today to overcome the problems created by the pandemic.

Over 100 countries initiated nationwide closures of schools according to the United Nations Educational, Scientific and Cultural Organization (UNESCO). This move affected over half of the world's student population, parents, teachers and the society at large. It led to a loss of students' interest in learning and thus reducing their academic performance (Onyema et al., 2020). School closings have an impact on society as well as the economy of countries. Transition to online education during school closings may increase the pressure on the students and teachers due to their lack of digital skills and unequal access to technology. It is an extra burden to parents as they have to engage in supervision tasks to ensure that their children participate in their studies at home. Unscheduled school closure also disrupts students' academic goals. It could delay students from graduating and starting their chosen careers. Closure of schools also leads to social isolation of children thus reducing opportunities for growth, development and learning within a micro society. Some lessons can only be taught in the conventional classroom through

face-to-face learning. Therefore, online learning is a barrier to improve the practical skills of school children by providing instructions and guidance through digital devices (Upoalkpajor & Upoalkpajor, 2020).

Upoalkpajor & Upoalkpajor (2020) argued that education and the social lives of children have been greatly affected by the home education method. Moreover, it has negatively affected the efficiency of parents. Both parties have to undergo uncertainties and different trials and errors to cater the online student evaluations. Most exams were cancelled. Importantly, not only these interruptions have become problems in the short-term, but they may also have long-term consequences for the populations affected and are likely to exacerbate inequalities.

According to studies by Chandasiri (2020), the mentality of students is highly affected during the pandemic period expressing symptoms of stress, depression and anxiety. This is due to the problems caused by delays in their academic work due to the closure of education institutes. Research studies that are associated with schools are also negatively affected due to lockdown since the researchers are unable to conduct their field work within the school premises.

### ***Concept of Online Education***

Online education is a universal concept for learning and teaching with the assistance of technology tools and platforms (Onyema et al., 2020). According to Ramasamy & Sundarraj (2020), online learning was first recognized in South-Saharan Africa in 1976 by the National Teachers' Institute, Kaduna. This was an initiative supported by the Federal Government of Nigeria. This method became popular among many countries thereafter, and particularly during the COVID-19 pandemic period. It facilitates a flexible learning approach that motivates students to participate and learn at home. It features: continuing teaching and learning experiences, sharing lectures, providing assignments and obtaining feedback while maintaining constant student-teacher collaboration and relationship. Online learning is a practical approach for school children during an outbreak. They can continuously engage in their educational activities through visual presentations without any physical

boundaries (Ramasamy & Sundarraj, 2020).

About 80–85 percent practice distance learning in high-income countries, while these declines to less than 50 percent in low-income countries (Onyema et al., 2020). This shortfall may be largely due to the inadequate technology facilities, cost of accessing online education and poor digital literacy among students, parents, and teachers in the developing countries. Students who do not have the financial resources to afford the requisite equipment to engage with their classmates and instructors are unable to benefit from online education.

After Access Nationally Representative Survey conducted in 2020 revealed that only 34% of Sri Lankan households with children (aged 18 and under) have any kind of internet computer connectivity by the start of 2019 (this includes connections via fiber connections, dongles, mobile phones etc.) to access online learning. The services studied range from the basic tutorials sent over WhatsApp to synchronous classroom experiences on approaches like Google Classroom. Poorer rural households are methodically worse off, in fact, the number declines to 21% in the lowest socioeconomic group households. Clearly, this means that the vast majority of students after the COVID-19 school closures were unable to use e-learning (Amarasinghe, 2020).

According to the After Access Nationally Representative Survey (2020), though online learning is a necessity but there are no sufficient devices to connect to this mode of learning as the data affordability remains a barricade for many again, especially the poor. This is in spite of the fact that Sri Lanka has always remained high up in data usability metrics among the top five nations. Similarly, to access the web experience pupils, parents and teachers alike need to be technologically literate; where children are involved, this requires not only being able to locate details, set up and log into teaching sites, but also to manage their internet environment in a safe and stable manner.

Therefore, the move to online learning has earned conflicting reactions, magnifying the current socio-economic gaps inherent in

the educational system of the state. Because access to the internet and computing services for all students is not universal current disparities have been identified (Kitnasamy & Vincent, 2020). Even though online education has reformed the way of learning, it also comes with certain demerits (Ramasamy & Sundarraj, 2020). Lack of research studies at grassroots level creates a knowledge gap in this area which denies accessible education for school children who are metaphorically considered as the backbone of any nation. Hence, further studies are required to examine the impact of current online education system on Sri Lankan student in order to design future online classes in an effective and efficient way while facilitating equal access to all students and addressing all the barriers and the negative consequences of online learning.

Therefore, this research study focused on assessing the effect of COVID-19 pandemic on the education of school children in Sri Lanka with the objectives of exploring the students' engagement with online learning, identifying their preference towards various modes of online learning and examining the barriers faced by students while adapting online learning during COVID-19. Accordingly, the study aims to provide suggestions to the academic and policymaking authorities to enhance online learning system in Sri Lanka.

## **Methodology**

A pre-tested questionnaire survey was designed for the present study and it mainly focused on the Mulatiyana Educational Zone in the Matara district, Sri Lanka as it is an area of limited resources for online learning. By selecting a sample of Advanced Level Engineering Technology students, the study mainly focused to examine the impact of online learning on a particular category of students (Engineering Technology) whose subjects depended on practical components. Therefore, the sample does not represent a larger segment of the population and thus limits the researcher's ability for generalization.

Data were primarily collected through the questionnaire survey directed for the purposively selected 84 Engineering Technology students in the Mulatiyana Educational Zone, Sri Lanka. The questionnaire was designed to assess the demographic features of the

school children and their preferences and perceptions towards online learning during the outbreak. Accordingly, the respondents' preference for different modes of the online education system was assessed using a 5-point Likert scale. Furthermore, the problems faced by the students when engaged in online education during the pandemic period were also evaluated. Cronbach's alpha was used to measure the reliability of the questionnaire and each questionnaire item has more than 0.7 Cronbach's alpha value confirming high reliability (Taber, 2018).

Secondary data were collected using research paper articles, journals, newspaper articles and other websites etc. IBM SPSS version 25 was used as the main analytical software in the present study. The study used descriptive analytical tools such as sample mean, standard deviation etc. and inferential analytical tools such as independent sample t-test to analyze data.

## Findings and Discussion

### *Demographics of the sample*

When considering the gender of the sample, 55% of the respondents were females and 45% males. This denotes that majority of the respondents were females. Majority of them were 18 years old occupying 60% of the sample while there were 30% of 17 years old students and 11% of 19 years old students. Majority of the respondents were from Narandeniya National School that comprised 48% of the sample. Out of these respondents, the majority were from Kmburupitiya comprising 38% whereas 21% of respondents were from Hakmana and 17% from Deyyandara (Table 1).

**Table 1.** Demographic Factors of the sample

		<b>Frequency</b>	<b>Percent (%)</b>
Gender	Male	38	45.2
	Female	46	54.8
Age	17	25	29.8
	18	50	59.5



	19	9	10.7
School	Thihagoda National School	6	7.1
	Narandeniya National School	40	47.6
	Deyyandara National School	18	21.4
	Hakmana Methodist School	20	23.8
Place of residence	Kamburupitiya	32	38.1
	Makandura	6	7.1
	Mawarala	4	4.8
	Akuressa	1	1.2
	Hakmana	18	21.4
	Narandeniya	1	1.2
	Deyyandara	14	16.7
	Kirinda	3	3.6
	Thihagoda	1	1.2
	Mulatiyana	4	4.8

### ***Students' engagement with online learning during the COVID-19 outbreak***

According to the respondents, 88% of the students stated that they have engaged with different online learning methods while 12% stated that they have not engaged in any online learning methods during the pandemic period.

Five-point Likert scale was used to assess the perspective of students towards different education methods that they have used during the pandemic period. According to the results, the majority of the students, accounting 77% of the sample, have used e-learning as their learning method during the outbreak ( $w=4.495$ ,  $p=0.000$ ). Out of them only 37% of the students strongly liked to use e-learning such as Learning Management System (LMS), e-thakshalawa etc. 72% of the respondents have used mobile apps such as WhatsApp/Viber to obtain their continuous learning ( $w=5.279$ ,  $p=0.000$ ). Out of these respondents, 48% of the students notified that they strongly liked to use them. 69% of the student have accomplished their education with

the help of public media such as television, radio etc. ( $w=5.188$ ,  $p=0.000$ ) and out of them 42% stated that they strongly liked to use them for their learning. Furthermore, 63% of the students utilized software like zoom, Google Classroom etc. ( $w=4.722$ ,  $p=0.000$ ). Out of them, 43% strongly liked to use these modes of learning. According to the results, most of the learners (48%) showed higher consent to use mobile apps. It may be due to the convenience, flexibility and cost-effectiveness of using mobile apps for online education.

Students' capacity for online learning was assessed in terms of the maximum hours they have spent per day for online learning activities. Out of the students who engaged in online learning during the pandemic period, 39% of school children have engaged 2 hours per day on their learning. 24% of students have the capacity to engage in their online learning for more than 2 hours per day. 30% of respondents have selected 1 hour as their most preferred duration for online classes while 0.5 hours were selected by 7% of respondents ( $\mu=2.81$ ,  $SD=0.886$ ). There was a significant gender difference for the maximum hours that the students spent on their education during COVID-19 pandemic period ( $t=2.234$ ,  $p=0.029$ ) (Table 2). The results revealed that male students preferred ( $M=3.06$ ) to spend more on their online learning activities than female students ( $M=2.61$ ).

### ***Students' preference towards various modes of online learning***

Independent samples t-test was done to examine the students' preference to study through various modes of online learning during COVID-19 pandemic period. Additionally, the homogeneity of variances was tested via Levene's Test (Table 2). There was a significant difference between the perception of male and female students for the usage of WhatsApp/Viber ( $t=2.553$ ,  $p=0.015$ ). The male student ( $M=4.38$ ) showed their highest preference to study through mobile apps than their female ( $M=3.50$ ) counterparts (Table 2). Further, independent sample t-test revealed that there was not a significant difference between the perception of male and female students for the usage of e-learning ( $t=0.587$ ,  $p=0.560$ ), public media ( $t=-1.289$ ,  $p=0.205$ ) and different software ( $t=1.990$ ,  $p=0.053$ ) for their online learning (Table 2).

Moreover, the results showed that majority of the students (59%) were

satisfied with online learning while 41% of the respondents were not satisfied ( $\mu=3.33$ ,  $SD=1.204$ ) which could pose a threat to the expected outcomes of online teaching. The independent sample t-test showed the significant gender difference towards the satisfaction of online learning ( $t=-3.716$ ,  $p=0.000$ ) at the 0.05 level of significance (Table 2). Female students ( $M= 3.75$ ) were more satisfied with online learning than male students ( $M=2.84$ ). Moreover, results suggested that the COVID-19 has affected students' education with a significant gender difference ( $t= 2.667$ ,  $p=0.010$ ) (Table 2). Comparatively, female students were affected more ( $M= 4.41$ ) than male students ( $M=3.78$ ).

**Table 2.** Independent sample t-test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Preference for e-learning	Equal variances assumed	0.008	0.929	0.587	0.560	0.222	0.379
	Equal variances not assumed			0.587	0.560	0.222	0.379
Preference for public media	Equal variances assumed	0.710	0.404	-1.289	0.205	-0.455	0.353
	Equal variances not assumed			-1.352	0.186	-0.455	0.336
Preference for software	Equal variances assumed	3.243	0.079	1.990	0.053	0.762	0.383

e	Equal variances not assumed			1.912	0.066	0.762	0.399
Preference for WhatsApp/Viber	Equal variances assumed	4.527	0.039	2.602	0.013	0.875	0.336
	Equal variances not assumed			2.553	0.015	0.875	0.343
Maximum duration on online learning	Equal variances assumed	1.472	2.229	2.234	0.029	0.451	0.202
	Equal variances not assumed			2.197	0.032	0.451	0.205
Satisfaction level on online learning	Equal variances assumed	4.121	0.046	-3.648	0.000	-0.91216	0.25005
	Equal variances not assumed			-3.716	0.000	-0.91216	0.24547
Effect of COVID-19 on education	Equal variances assumed	8.968	0.004	-2.759	0.007	-0.631	0.229
	Equal variances not assumed			-2.667	0.010	-0.631	0.237

**Barriers faced by students during online learning**

Different attributes were assessed to locate the problems faced by students in adapting online learning during COVID-19 pandemic period. According to the responses, majority of the students, 40%, stated that lack of devices ( $\mu=1.60$ ,  $SD=0.494$ ) was the major barrier for engaging in online learning because they did not own mobile phones or personal computers. When considering the usage of digital devices of the respondents, 50% of the students owned mobile phones

( $\mu=1.56$ ,  $SD=0.499$ ) and 44% of students had access to personal computers ( $\mu=1.50$ ,  $SD=0.503$ ). It shows that majority of the school children in Sri Lanka do not have digital devices for their online education. Network issues ( $\mu=1.75$ ,  $SD=0.434$ ) have been a barrier for 25% of the respondents while lack of digital skills ( $\mu=1.75$ ,  $SD=0.438$ ) has been a barrier for 25% of the students. The lowest number of students (10%) stated that undesirable weather conditions ( $\mu=1.90$ ,  $SD=0.307$ ) as the main problem in online learning as it leads to electricity problems and lack of connectivity.

## **Conclusions**

Majority of the students (88%) followed their education through online learning during the COVID-19 pandemic period. Respondents showed their highest consent to use mobile apps as the learning mode and male students showed the highest preference than females. However, the majority stated that lack of devices is the major barrier to engage in online learning. Moreover, 59% of students were satisfied with online learning, but with a significant gender difference. Accordingly, female students were more satisfied with online learning than male students. Even though online education is a good approach to learning, the preferred requirements are not equally distributed among all the students in Sri Lanka. Therefore, identified problems must be taken into consideration by policymakers in designing future online educational pathways effectively, while giving equal access to all students with minimum disparities.

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