Challenges and Opportunities of adapting to mLearning During Lockdown: A Study on Selected Secondary School Students in SriLanka

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Abstract

It was the recommendation of the world bodies such as UNESCO to shift to open and distance learning (ODL) to fight with the effects of COVID-19 on education which left millions of the school children worldwide away from school. Thus, it was inevitable for Sri Lankan educational context to shift the conventional classroom setting into an ODL platform with the use of Mobile Learning Environments (MLE) and Social Network Services (SNS). This exploratory study was conducted using a mixed- method approach to discover the challenges and opportunities of using synchronous mobile and SNS-based MLE to continue the education process during the lockdown, with the participation of 105 secondary school students. Data collection was done using a Google form-based survey along with the interview with teachers for comments and feedbacks while adhering to the FRAME model by Koole (2009) as the theoretical model. According to the findings, some students were unable to meet uninterrupted infrastructure requirements needed to set up an MLE as they have used shared devices (mostly their parents'). Issues on high internet charges, slow mobile internet, unavailability of reloading facility were experienced during lockdown while literacy of mobile and online technology was a challenging factor for some other. Besides, it was revealed that the duration of the mobile classes, as well as the periods used for classes, have a high impact on the students learning process. Students' comments revealed that the long screen time together with abrupt changes in the schedule makes thestudent more stressful while they expect the classes to be more interactive to prevent the possibility ofbeing easily distracted. With the suggestions from the local scholars to embrace the opportunity given by the pandemic, further research is needed with a sample representing each part of the country and also to find the most effective pedagogy for mLearning in Sri Lankan context.

Keywords: *lockdown; COVID-19; mLearning; school students; challenges; opportunities*

Introduction

The sudden burst of COVID-19 and its quick spread into a global pandemic has changed the way of things and forced to adapt to New Normal with the introduction of concepts such as Lockdown and Social Distancing. According to UNESCO estimates (2020a; 2020b), covering 180 countries and territories, it is projected that about 24 million students, including care centres, colleges, universities and other training institutions, of which 10.9 million are at the primary and secondary level, will be at risk of not returning to educational institutions by 2020. South and West Asia (5.9 million) and sub- Saharan Africa (5.3 million) account for the largest proportion of learners at risk of not returning to school. According to UNESCO, students living in poverty and marginalization are hardest hit, as well as those impacted by conflict and migration.

The COVID-19 pandemic also triggered an extensive, unexpected and dramatic digital leap in the basiceducation of children which demanded significant changes not only from children and their teachers butalso from their families, the administration of schools and society as a whole. Children and their families who unexpectedly had to have a range of talents, skills and resources were also significantly burdened (Iivari et al., 2020). Unfortunately, the digital divide was massive in the new normalcy for several groups of students. According to a study with Ghanaian students (Owusu-Fordjour et al., 2020), it came to light that the pandemic has had a negative impact on their learning, as many of them are not used to learning effectively on their own. It was due to the restricted internet connectivity and lack of literacy on the technical devices by most Ghanaian students. Therefore, the eLearning platforms were rolled out and challenged most of the students.

As Toquero (2020) has reported, educational institutions, especially in the Philippines, face increasing challenges in their planning, implementation and evaluation systems. The global pandemic, however, opened up opportunities for the country to upgrade its delivery mode of education and change its focus to emerging technology on a light note. Furthermore, Cao et al. (2020) concluded in a study in China that about 24.9 per cent of college students have developed anxiety due to the outbreak of COVID-19.Living in urban areas, living with parents, having a stable family income were protective factors for college students against experienced anxiety during the COVID-19 outbreak.

In a study in Guyana, Oyedotun (2020) says that in some developing countries where the education sector has been significantly

affected by the pandemic, the COVID-19 arrived unexpectedly with little to no initial plan in place. In the case of Guyana, online education, which has become the new standard,courtesy of COVID-19, is currently facing various types of challenges. Some of which are categorized as slower internet speed at home due to sudden and unprecedented internet traffic, lack of sufficient prior training for both students and lecturers on the requirements of online teaching and various types of violations and exposure.

Impact of COVID-19 in Sri Lankan School Education

The global pandemic crippled the education sector, mainly the school education sector because most of the universities have adhered to blended learning and the students have an exposure to online education using the Learning Management System (LMS) in the respective university. Sri Lankan schools had been shut from March but re-opened two weeks ago after authorities said they had contained the spread of the virus. However, at the moment with a new cluster reported, the governmentdecided to shut schools form forth October 2020 further to the earlier two occasions in March and Julyas a precautionary measure.

In the Sri Lankan context, Kadirgamar & Thiruvarangan (2020) argues that online teaching excludes students who do not have a sound economic background to purchase the necessary equipment to connect with their peers and teachers. As they express, there is a concern about electricity and undisrupted internet connectivity as well as to have a learning environment within their homes that is free of disturbance from other members of their families. Kadirgamar & Thiruvarangan (2020) further suggest the importance of taking steps to eliminate the cost for both students and teachers by providingequipment and connectivity. In the least, the shift to online education should not lead to aggravating theinequalities already entrenched in our educational settings.

Objectives of the Study

This study intends to find out the opportunities and the challenges faced by secondary school students of the selected sample to adapt to eLearning for the continuation of the educational activities during thetime of lockdown, using the following research questions.

- To what extent do the available mobile devices, tools and software act as the infrastructure forlearning for the students?
- Up to which level do they have sufficient mobile literacy to

manipulate with the mobile learningenvironments (MLEs)?

- What are the socio-economical restrictions and encouraging factors for the students to engagewith learning activities in MLE?

Literature Review

Kukulska-Hulme & Traxler (2005) predicted a decade and a half ago that mobile learning has the potential to challenge traditional teaching and learning practice. They further elaborated that mobile learning can take education back to the home, workplace and community, while mobile learning can be spontaneous, portable, intimate, situated; it can also be informal, unobtrusive, ubiquitous. Besides, Kukulska-Hulme & Traxler clarified that it brings us much closer to learning anywhere, but they assumed that it was still too early to predict how our mobile learning and teaching understandings are understood. At that time, they were intended to evolve mobile learning principles and provide a collection of reflections and experiences to be transmitted from a generation of mobile learning researchers, developers and teachers to, hopefully, the next generation. It seems that this is an era, due to the COVID-19 pandemic, where their expectation and efforts effectively adapted to the education process.

Zaharah et al. (2020) stated that eLearning brings change and creativity to Indonesian education because during the COVID-19 epidemic, nearly 75 per cent of students engaged in online learning simultaneously. However, there are many barriers to the introduction of learning tools, such as internet networks are not met, students are not used to them, teachers and even parents work or research by online learning at home. According to them, this is a natural occurrence, because using the MLE has not become a routine for students and teachers. However, it is a method to be familiar with in the future as that could yield better results in learning.

The findings of a study conducted in India (Joshi et al., 2020) show that significant challenges were barriers faced by students in home environments, a lack of necessary facilities, external distraction and family disturbance during teaching and performing tests. Institutional support barriers, such as the budget for the procurement of advanced technologies, a lack of planning, a lack of technical support and a lack of clarity and guidance, also affected the method. Teachers were also faced with technical issues. Those problems were categorized as a lack of technological support, including a lack of technical infrastructure, low awareness of online teaching platforms and security issues. Problems such as negative attitudes and lack of motivation are described as variables that

hinder their participation inonline teaching and assessments.

The need to train students for a world in which digital literacy plays a significant role has also been recognized in Germany. König et al. (2020) suggested that digitalization has recently gained popularity in schools, and is used to close the gap between traditional learning by students and school progress towards the knowledge economy. Therefore, the school curriculum needs to be increasingly interconnected with ICT, and opportunities to use modern technology tools and digital resources shouldbe provided to students.

Oyinloye (2020) stresses that new teaching and learning methods are currently being implemented by many educational institutions worldwide as different digital online platforms are being adopted to replace the traditional classroom as schools are closed due to COVID-19. The findings of her study suggest that COVID-19 would have a negative effect on Nigeria's education system. Most schools in Nigeria lack eLearning facilities to enable teachers to connect with their students at such a time that even the few schools and children have issues with power supply, which makes most students are unable to access the eLearning facilities.

Despite high expectations, as Sahlberg (2020) said, there is only a slight possibility that schools can improve as a result of this pandemic without bold and courageous changes in attitude about how that change occurs. The COVID-19 pandemic has exacerbated the consequences of prior social and educational inequality, and a significant outcome of the pandemic will be to address these. Learning at home has always been focused on the old logic of absorbing information and knowledge during school closures, rather than generating or co-creating new ideas and solutions to real-life issues.

According to Iivari et al. (2020), teachers in a Finnish public school reported that they used Google Classroom, an online learning environment, often for five years before the lockdown. Luckily, therefore the case was not a giant leap either for the kids or for the teacher. The teachers say that for all of the pupils, technology was not a concern or an obstacle. For those who did not have them at home, the school borrowed equipment, such as laptops. In the beginning, though, skills may have been a bit of anobstacle for them.

Theoretical Framework

Framework for the Rational Analysis of Mobile Education (FRAME) by Marguerite L. Koole (2009) is used as the theoretical framework of this

research. As shown in **Figure 1**, the Device Aspect (D) refersto the physical, technical, and functional characteristics of a mobile device such as size, weight, keyboard type, screen size. At the same time, the Learner Aspect (L) takes into account an individual's cognitive abilities, memory, prior knowledge, emotions, and possible motivations such as cognitive structure, active knowledge, self-questioning where the Social Aspect (S) takes into account the processes of social interaction and cooperation such as social constraints, quality of the relationship between peers and teacher. While the device usability intersection (DL) in the model describes the relationship between one learner and a device, the Social Technologies intersection (DS) describes how mobile devices enable communication and collaboration amongst multiple individuals and systems. The Interaction Learning intersection (LS) represents a synthesis of learning and instructional theories but relies very heavily upon the philosophy of social constructivism.

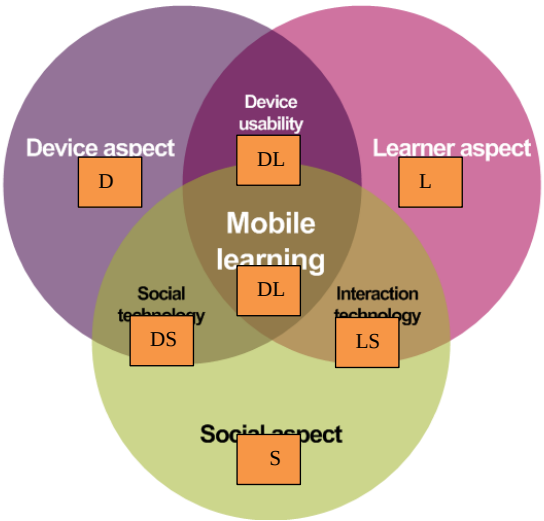

Figure 1: The FRAME model

Effective mobile learning (DLS) is the primary intersection results from the integration of the device (D),learner (L), and social (S) aspects. According to Koole (2009), effective mobile learning provides enhanced collaboration among learners, access to information, and a deeper contextualization of learning. Theoretically, effective mobile learning can empower learners by enabling them to assess better and select relevant information, redefine their goals, and reconsider their understanding of concepts within a shifting and growing frame of reference (the

information context). Effective mobile learning provides an enhanced cognitive environment in which distance learners can interact with their instructors, their course materials, their physical and virtual environments, and each other.

Methodology

This study was conducted as a case study during the lockdown period of the first wave of COVID-19 in Sri Lanka. Due to the condition of the country during the lockdown, the only possible way of contact was phone calls, social networking apps (SNA) and other communication apps such as Zoom and Teams. Therefore, this study was conducted entirely using the communication tools mentioned above. Anonymity was guaranteed to make the sample more comfortable, by not requestion any of their contact information which was yield positive aspects concerning the analysis of their comments which will be discussed in results.

Research Design and Sample

This research was conducted in an exploratory research approach due to the lack of research conducted in the Sri Lankan context in the area. A convenience sample with the participation of 105 secondary school students representing Western, Central and Sabaragamuwa districts according to the availability of access. Communications with the teachers were done through short interviews via phone calls and WhatsApp due to the prevailing lockdown measures throughout the country at the time of conducting the survey.

Data Collection and Analysis

This study adopts both qualitative and quantitative data gathered via an online survey to determine the extent to which technology is used in the learning process by the selected students during the lockdown. Also, the motivational and restrictive factors towards the mobile learning process were considered too. The survey consists of 14 closed-ended questions which include, multiple-choice questions and Likert scales and a comment section, which prompt for a long answer. However, the comments section was not compulsory. Besides, interviews were conducted amongst teachers to understand the behaviour and the attendance of the students during the synchronous online sessions and SNA-based teaching environments. In addition to the automated analyzer provided with Google forms, analytical software was used to generate tabulated data.

Results and Discussion

Availability of mobile devices, tools, and software are to be used for the implementation of the infrastructure for the mobile learning environment.

According to a survey of mobile usage in Sri Lanka by LIRNEasia, only 34 per cent of households in Sri Lanka with children under the age of 18 had an Internet connection in 2018, as stated in the Sri Lanka Education Forum (Gamage & De Mel, 2020). More than 90 per cent of these links are accessed via a smartphone over mobile networks, mainly due to the economic factors. Subsequently, the most feasible option for the majority of students was to access the mobile learning sessions using the existing devices and tools as the lockdown state in the country mostly discouraged the purchase of new devices mostly due to the economic factors as well as there was a shortage of devices due to the halt of imports during the lockdown period. According to the survey, majority of the students use their home computer (41%) for online education. Among others, 11.4 per cent use parents' computer, 32.4 per cent use the mobile phone of their parents while the rest uses other forms of devices such as tabs where the median falls into the category of using parents' computer (**Figure 2**). Concerning the type of internet connection they used for the online educational purpose, there are 44 students (41.9 %) with a postpaid home broadband connection which has the highest value for prepaid home broadband connection (25.7 %), prepaid mobile internet (20 %), and postpaid mobile internet (17.1 %) connections as shown in **Figure 2.**

According to that information, 43.8 per cent of students depend on their parents' digital device as the infrastructure of the MLE where there are inconveniences of participation synchronous online session in case their parents are in essential service such as health services and forced to work outside home during the pandemic. Though the percentage of those cases are not high, that is a factor that needs to be considered too. Also, further communication with the students and teachers revealed that there are problems with the availability of infrastructure when there is two or more student in the same house, sharing the only available digital device. As one student emphasizes, "If there are two three children do they cannot go online through one phone/computer", and another raised the issue as "Any problem with the hardware makes it difficult during the COVID time to repair".

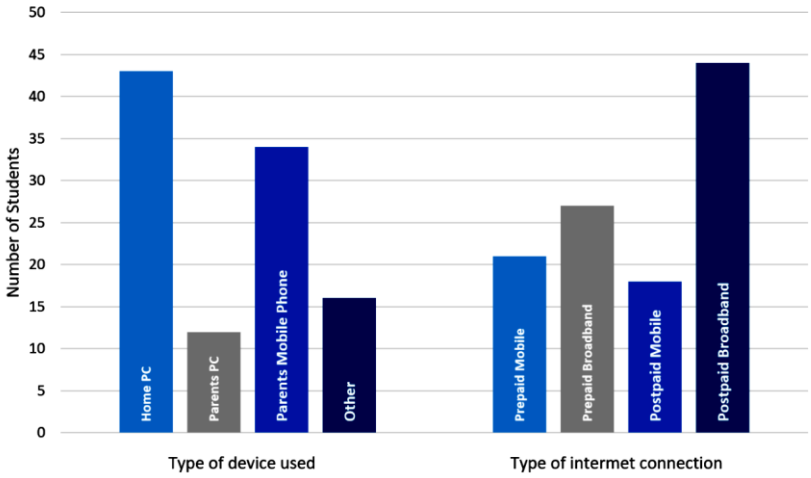

Figure 2: Usage of mobile devices and internet connection

Software for the mobile learning were mostly free software and mobile apps, WhatsApp and Viber mostly, or the basic free versions of applications such as Zoom. Some school has the aces to Google Classroom or Microsoft Teams where they offered that privileges for their students. Survey and interviews with the teachers confirmed that there were no issues related to software unless the denial of support of particular software due to the lack of hardware requirements of the digital devices of some students which were settled through accommodating a previous version of the software or app. Therefore, concerning the information from the sample, it is evident that they have sufficient digital tools and software to be used as the infrastructure for their MLE. Hence, as depicted by the FRAME model of Koole (2009), there is a positive sign on the device aspect where the available digital devices can be utilized for the infrastructure of the MLE.

Level of existing mobile literacy to manipulate with the mobile learning environment.

According to the information from Department of Census and Statistics Sri Lanka (Computer Literacy Statistics, 2019), the computer and digital literacy of the school student in the secondary level is 42.2 per cent and 54.7 per cent respectively. Responses of the sample also revealed a correlation towards those data where the gap between computer and mobile literacy is the same though the literacy rated are higher than those statics. Reason for higher literacy rates might be due to the sample size.

There are 79.1 per cent of students with computer literacy higher than average, and the value of that for mobile literacy is 88.5 per cent. **Figure 3** shows a comparison of those data. According to the information from the sample, the median of both computer and mobile literacy falls in 'Very Good' out of five Likert scalevalues from 'Excellent' to 'Poor'.

Moreover, there was no comment from the students or teachers on the lack of literacy on mobile learning. It shows that even the ones with 'Fair' or 'Poor' literacy on technology have managed to manipulate with the MLE. Therefore, it is agreeable with the recent comment of De Mel (2020) that, "Our students are bright and yes, we boast of a high literacy. But never do we use that foundation to make our kids world-class."

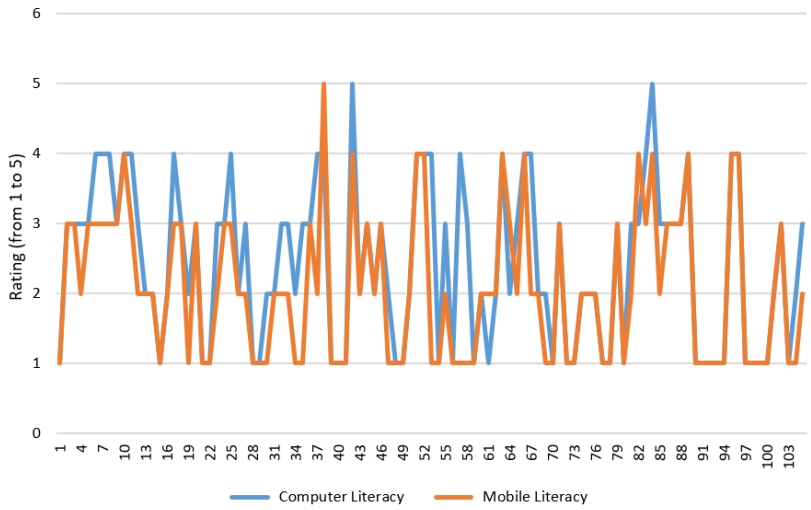

Figure 3: Computer and mobile literacy of the sample

Restrictive and encouraging factors for the students to engage with learning activities in a mobile learning environment.

The sudden shift to MLE for the continuation of the learning process created numerous opportunities as well as challenges towards the learners. For most of the learners, the most common issues were the time slots and the duration of the lessons. With the responses from the sample, **Figure 4** shows the preference of the students on the study time and durations. It shows that the students prefer to adhere to their default learning slot which falls in the morning session as majority prefer the time slot from 8 am to 12 pm (47.4 %) and the least preferred time slots are between 12 pm to 4 pm and 4 pm to 8 pm (7.6 % each) while there is an

equal but low preference over early morning and late evening time slots with 19 % and 18.1 % respectively. Concerning the duration of lessons, most preferred were 2 and 4 hours which had the same preference rate of 30.5 per cent. For 5 hours and 6 hours, the rating decreased to 4.8 % and 16 %. Therefore, it is a positive factor to assign classes in the morning sessions and make sure the durations of those lessons are not falling beyond four hours.

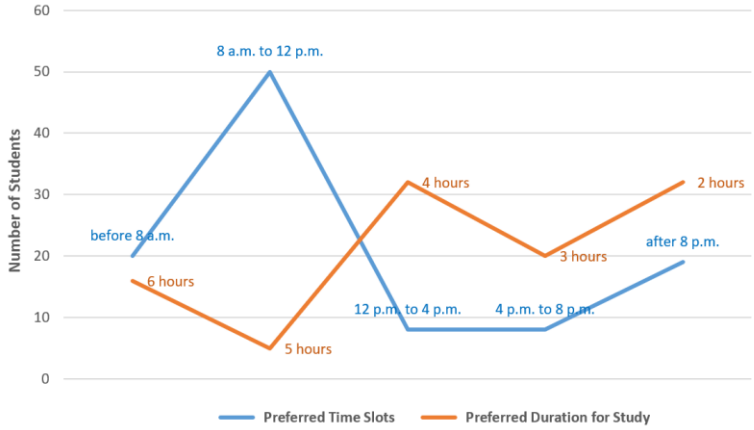

Figure 4: Preference over the study slots and duration

Moreover, there is a need to consider the students' preference over the MLE. As shown in **Figure 5**, students' preference over the mode of delivery and overall preference in mobile learning, it seems that the majority prefer to have live sessions (80 %). However, due to the network-related issues in both delivering and receiving ends, it was not always a possibility. According to the comments of the teachers, participations for synchronous online lessons were relatively low. Therefore, though the students have preference over live classes, with the prevailing condition, it was not a success most of the time where the teachers shifted to SNA-based asynchronous methods. In addition to that, around 24 per cent from the sample are either not much preferred or dislike the MLE. Discussions with those students show that it was due to the monotonous nature of the delivery of lessons as well as the high screen time where some students complained about eye strain and weariness. According to the comments of the students. one stated that "…and I got eyes very weak, just because of staring at the phone for hours."

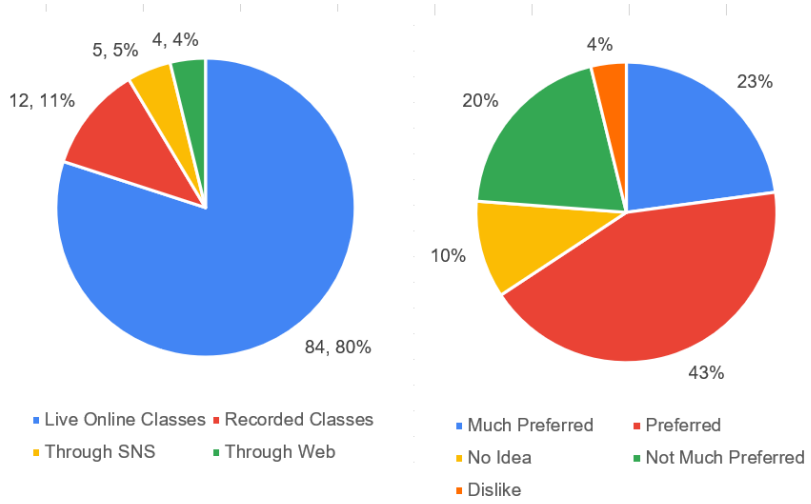

Figure 5: Preference over the mode of delivery and working with the mobile learning environment

Another major drawback was the internet speed and charges. As depicted in **Figure 6**, the majority of the students encountered issues with slow internet. Technically, with the increase of the usage of the mobile internet, respective service providing terminals starts to be overflowed with requests which made it impossible to cater to a new request to use those terminals. According to the sample, around 59 per cent of the students experienced slow internet, and the situation was worse when the teachers also experience at the delivering end. Also, high internet charges as the free quota of data quickly exceeded make the teachers shift the approach from online to SNA-based instructions to minimize the data usage. However, at the time of composing this article, most of the leading telecommunication providers has introduced low-cost alternatives for Zoom or Teams based teaching-learning environments. Unavailability of reloads or reload cards during the lockdown was another major drawback. At the time where the second wave has locked down several areas of the country, that issue is still there but not as much experienced in the first wave because the telecommunication providers have introduced additional ways to top-up mobile connections.

Moreover, there was the issue of the inability of finding resources such as mobile phones or computers to access MLEs where a student commented that when there are two-three children, they cannot go online through one phone/computer as most of the time online classes are scheduled to suit the school time, from 8 am to 2 pm. As students

emphasized, abrupt changes in the schedules, as well as the clashes in the timetable, makes the student stress. Therefore, special consideration should be drawn on that aspect too.

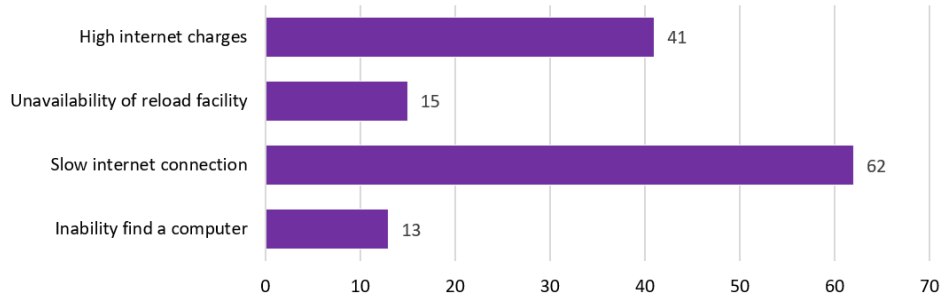

Figure 6: Drawbacks and restrictionsfaced bystudents**.**

Limitations and Implication for Further Studies

As the study was conducted with the use of a convenience sample with a small sample size from a population close to 4,037,157 students of 10,012 public schools all around the island, there is a necessity of working with sufficient sample size with at least district or province base study to generalize the findings. Hence, the assistance of the respective authorities is sought after to expand this study further. Furthermore, there is a necessity to survey the form of printed forms where the students have no access to equipment or internet to have a broad and a clear view of the actual state of the feasibility of implementing nationwide mobile learning environment. Finding the feasibility of LMS based learning platform would be useful as the students can work with it without time constraint using uploaded content. Furthermore, there is a necessity to research about the appropriate pedagogy that can be synchronizedwith the eLearning as most students have suggested that they expect the way of delivery to be changed to engage them more in the mobile learning process.

Conclusion and Recommendations

Though there are complexities created by the economic stability, shortage of stocks due to lockdown inpurchasing devices, according to the information from the sample, it is evident that available digital devices, tools, software and apps with the students can be used to set up the infrastructure for the MLE. However, there is a problem with 24X7 availability of the devices as 43.8 per cent from the sample use parents' computer or mobile phone while there are instances of sharing the only

available device with several siblings. The suggestion of Kadirgamar & Thiruvarangan (2020) to take steps to eliminate the cost for both students and teachers by providing the equipment and connectivity at a nominal rate would be a perfect move. As Owusu-Fordjour et al. (2020) suggested concerning the Ghanaian context, thereis a need for the students to expose more towards the tools used to manipulate with the eLearning platforms and how to use them effectively for educational practice in Sri Lankan context too to improvethe mobile literacy and narrow the gap of the digital divide. While agreeing with statement of Zaharah et al. (2020) that eLearning learning brings change and creativity to education during the COVID-19 epidemic, Sri Lankan students also expect innovative ways to make the students attached to the lessons. As one student suggests, "teachers should find a way to make the online class a bit more interesting so that children must not fall asleep during these classes children should feel involved otherwise they are more likely to be bored." This statement urges the need to concern more about thelearner aspect illustrated in the FRAME model by Koole (2009) such as motivation. However, the social aspect needs to study more extensively as the lockdown state lead the students to be in a digital environment.

Besides, there must be a concern about the finding the most effective time for the students to participate and avoid abrupt changes on the schedule which could have clashed with either the students' or their siblings' learning schedules. It is evident as Toquero (2020) emphasize majority of educational institutes has faced increasing challenges in their planning, implementation and evaluation systems, mainly dueto the lack of knowledge about the pedagogy and digital literacy. Furthermore, it is necessary to educate both the administrators and the teachers on how to use the MLE effectively to make the students moreengaged and interested. The global pandemic, however, has given the opportunities for the policymakers in the country to upgrade its delivery mode of education and switch their focus to available emerging technology which can scaffold the learning process. Finally, adhering to the statement of De Mel (2020), provided our students are smart and have a high degree of literacy compared to the other students in the region, it is evident that the proper time has come to welcome the opportunity offered by eLearning platform, eliminate challenges and embrace to the opportunities to produce more knowledgeable and skilled intellectuals.

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