



Self-reported Effectiveness of Undergraduates' E-learning Practices Used During the Covid-19 Pandemic: With Reference to Sri Lanka

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Abstract

The study presented in this paper evaluates the self-reported effectiveness of online classes followed by Sri Lankan undergraduates during the COVID-19 pandemic, to identify difficulties/conveniences of virtual learning as experienced by the learner, using the survey method as the strategy of inquiry. 342 responses were collected from the undergraduate population in Sri Lanka using a pre-tested and structured questionnaire, the analysis of which, suggested that undergraduates have a general dissatisfaction with various components of online teaching, even though they are introduced to combat the pandemic situation. The Kruskal - Wallis test is used in this study to investigate the differences in the measures of the effectiveness of virtual education through the year of Undergraduates. The study could aid in obtaining an analytical perspective from the point of view of the learner in strategizing remedial actions and also in improving the overall involvement of technology and the internet in the education industry of the country.

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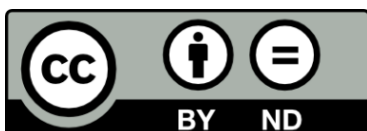
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INTRODUCTION

The severe acute respiratory syndrome: coronavirus, popularly known as COVID-19, was first identified in late December 2019 from Wuhan, China which then spread to more than 200 countries. The World Health Organization (WHO) declared COVID-19 as a global public emergency of international concern on 30th January 2020 and as a pandemic on 11th March 2020. The first case of the virus was confirmed in Sri Lanka on 27th January 2020. As of 5th October 2020, the total number of cases of COVID-19 in the country was 3471 with 13 deaths. In reaction to COVID-19, Sri Lankan authorities closed all higher educational institutions around the country on 5th October 2020.

The coronavirus (COVID-19) pandemic has influenced the world in different ways. To avoid the spread of this pandemic, all countries in the world have introduced several health guidelines. These practices restrict the usual human behavior, which has a high impact on their daily routines and incorporate work-from-anywhere strategies for all employees of most industries. The COVID-19 pandemic has significantly challenged the operations of higher education institutes across the world as well. All higher educational institutes in the world are obliged to rapidly transfer from traditional modes of delivering academic activities to virtual learning methods (Hasan & Bao, 2020).

The Covid-19 pandemic has subjected to close schools and higher education institutions in every country. Approximately, over 1.7 billion learning partners are produced by schools (Adnan, 2020). Therefore, universities have to move faster and engage as soon as possible with a vast imagine of virtual learning, with teaching being delivered virtually. Subsequently, it will lead to an impact on the teacher's traditional strategy of delivering the service package because they have been adopted with digital strategies (Dietrich et al., 2020). Due to the unexpected difficulties posed by the Covid-19 pandemic, the education industry is subjected to change (Crawford et al., 2020). As the first respondent, China has conducted virtual training for 180 million students; including those in primary, secondary, and tertiary stages, for foreign students,—and for universities that purely depend on international student exchange programs (Perrotta, 2020).

It is observed that several higher education institutions initially aimed on the change of academic delivering methods to the imagined situation and not highly focused on virtual learning and delivery platforms, due to the lack of technical resources in higher education institutes, low technical awareness of students since they are highly accustomed to traditional modes and lack of updated technological facilities.



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One of the major concerns expressed about virtual learning is its limitation on face-to-face interaction between learning partners and service facilitator because all the content related to the course are discussed using electronic and online platforms with the relevant course module delivered (Hasan & Bao, 2020). Sometimes, students who are tactile learners are found to have less interest to get involved in online learning and online classes. Face-to-face interaction and two-way communication are other major challenges faced by instructors when they are delivering academic services virtually because the instructors' learning patterns are communicated only digitally with the instructor and they are unable to see learning partners physically (Hasan & Bao, 2020).

The current challenges faced by every higher education institute are unique; unlike usual online education platforms, according to one perspective, it is more closely associated with crisis learning. There is a highest requirement for higher education institutes to modify their curricula, and the adoption of the latest technologies and tactics should be important (Adnan, 2020). Universities are the hub of social activities and collaboration as well. If the roles of universities are ignored, thousands of learning partners and upcoming scholars will lose social interaction-based tasks that are crucial for development. Learning partners should continue to be studied,

especially students who have less facilities are influenced by school suspension. Therefore, this can be considered as an important issue to be tackled. Considering the concise period of stopping universities due to the pandemic situation will lead to create specific issues in the education sector and tend to increase the human stress level (Adnan, 2020). Furthermore, within the study context of Sri Lanka, no attempt has been taken to examine the effectiveness of e-learning practices. It will be discussed in the next section further.

Problem Statement

Recently, a limited number of scholars have revealed the difficulties and advantages which occur due to the online learning during the Covid-19 pandemic (Mailizar et al., 2020). Scholars are engaging to identify the benefits and difficulties of virtual learning practices newly introduced due to the COVID-19 pandemic, from the perspective of students. According to Mailizar et al., (2020) and Sarwar et al., (2020) the learners' voice is significant in this challenge.

With the unexpected influence of the Covid-19 pandemic, all universities in Sri Lanka were closed by early March 2020. Because of the inability to go back to normal routines within a month, a major issue faced by the higher education sector was finding a better way to deliver services and complete academic programs on time. The only viable option, as identified in the study,



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was delivering services by using new technological devices. At the time, it was observed that some difficulties had emerged. The major challenge has been in measuring the effectiveness of the practices introduced for e-learning during the COVID-19 pandemic. This is found to be related to the unavailability of an accepted measurement scale and the low involvement of the Sri Lankan higher education sector in virtual learning. Within the Sri Lankan context, no immediate attempt has been taken to investigate the effectiveness and challenges of e-learning during the Covid-19 situation. Therefore, the main objective of this study is to evaluate the effectiveness of virtual learning during the COVID-19 pandemic.

LITERATURE REVIEW

E-learning

Virtual learning has been in practice for at least four decades. During the COVID-19 pandemic, the service delivering channel has transferred from traditional means to modern technological media. Distance education or virtual learning methods were initially implemented to engage learners who did not have ready access to physical classrooms, had limited time for participating in the typical classroom sessions, or normally unlike to engage the traditional university environment (Dietrich et al., 2020). E-Learning could be defined as internet-based learning where educational

actions and functions delivered through the internet are organized systematically as part of an educational program. The "distance" element of an e-learning environment takes a different nature when compared to "distance" in a traditional learning environment. Traditional learning methods represent distance as a physical metric. Though the physical distance is immaterial in e-learning environments, its definition of "distance" has to be considered for the successful adoption of an e-learning system. The level of interaction allowed seems to be a critical factor of learning as observed in the traditional system and relates to the element of "distance" in an e-learning environment. Moallem, (2003) categorizes computer-mediated interactions as

- (a) Cognitive or individual interaction (learner's interaction with content)
- (b) Social or interpersonal interaction (learners' interactions with each other and the facilitator)

Figure 1 (Chen, 2001), shows the transactional distance and typology interaction in e-learning platforms, where the transactional distance can be stated as psychological space of potential misunderstandings between the behaviors of instructors and those of the learners.

Therefore, the importance of creating communication strategies that reduce the psychological distance between



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students, between lecturers and students is crucial.

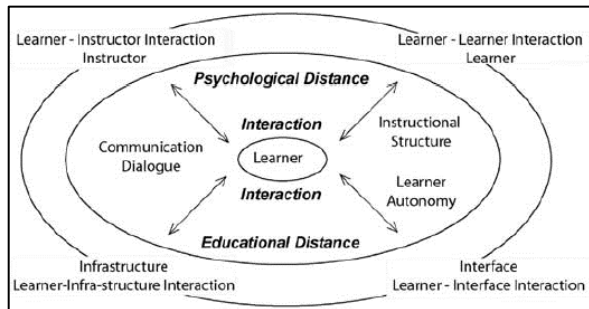


Figure 1- Interactions and Distance of e-learning platforms

Most of the literature reviewed suggested the fact that the parameters used in e-learning environments have their meanings and applications that could be different from those in the traditional context, though the same phrases and parameters are used with the traditional system as well. Many studies have applied the Kirkpatrick Model, identified as an effective tool for analyzing and evaluating the results of training and educational programs, to evaluate the effectiveness of e-learning activities. It takes into account, any style of training, both informal and formal, to determine aptitude based on four levels of criteria (Wu et al., 2016).

Level 1 - Reaction - measures how participants react to the training.

Level 2 - Learning - analyzes the new level of understanding reached.

Level 3 - Behavior – level of application of learning

Level 4 - Results - the impact of learning (positive or negative)

Many e-learning approaches were found to have re-defined the concept of

learning and teaching, as applicable in its context. Especially, the role of the teacher in an e-learning environment shifts to that of a "facilitator". However, Noesgaard & Ørngreen, (2015) have identified three strategies used by teachers to avoid substantial changes to their traditional work practice: firstly, finding statements to reject the content, secondly, modifying content to work similar to their current practices, and thirdly, pinpointing content that can be easily implemented in the new approach.

The adoption of the internet for education overcomes the time and space limitations of traditional education systems, broadening the scope of accessibility of education where the place of the learner or the time are not limitations for learning to take place; interactions between (a) lecturer and student, (b) student and student, (c) individuals and groups, and (d) groups and individuals occur without being limited by time and place. This approach to education, therefore, seems viable in conditions where time and place of learning are hampered, such as during the global Covid-19 pandemic. The using of symbols, language, cultural objects, and writing with peers, e-Teachers, learning objects, and contents change into the cognition of the learners, suggesting the fact that cultural accommodation is important in an e-learning context. A major argument of virtual learning is the theory of self-study which suggests that effective



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learning can happen even though service delivery and students are not present in the face-to-face mode; it is enough to participate two parties via any mode. Within this structure, the roles of learner and service delivery are deviating from those they have done in a typical face-to-face service delivery model. Further, the service delivery is no longer the monopoly power in terms of knowledge, and become the only guider to guide learners in the learning process, while learners have to take steps to enhance their participation (Dietrich et al., 2020).

Therefore, it could be mentioned that emphasizing the usability and usefulness of the learning mechanism occurring online is needed. Concerning this, exploring main point of e-learning possibly engage with university students, the study in (Perrotta, 2020) has explored four independent practices should implement for obtaining different aspects of the learning experience, considering associations between the approaches to learning and student experience of e-learning. The 4 aspects are interactivity, (Dietrich et al., 2020) approaches to e-moderating, (Crawford et al., 2020) issues related to course design (Perrotta, 2020) and workload awareness (Hasan & Bao, 2020).

Effectiveness of E-learning platforms during the COVID-19 Pandemic

All State and private universities and higher education institutions were

faced with issues related to finding a suitable channel for delivering their services, obtaining technical fluency; know-how related to technical devices and software at the face of self-quarantine guidelines and healthcare practices imposed by government and transportation constraints (Crawford et al., 2020). Several scholars within their studies questioned the preparedness of the education industry for the forthcoming digital era given the new conditions of its operating environment (Houlden, S., & Veletsianos, 2020).

It is observed that higher education institutes of Australia have run effectively, even during the COVID-19 pandemic. Macquarie University, Monash University, and Victoria University, in particular, have designed online learning platforms and responded relatively quickly. On the other hand, institutes such as the University of Queensland and the University of Technology, Sydney are found to be continuously conducting their academic and research activities with the use of online methods such as recordings (Crawford et al., 2020).

Even though China is the very first country that reported COVID-19 cases, their higher education sector had taken little time to respond to this matter. Reports identify some conflicts regarding how higher education institutes adapted to this situation immediately (Crawford et al., 2020). Some institutes of China directly changed to virtual platforms rapidly. With the transformation from



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traditional methods to virtual, educational institutes have faced the challenge of delivering a quality bundle of service package (Qu, 2020).

Furthermore, social isolation rules imposed by the government influence the academic and academic supporting members that are traditionally up in the front of the classroom (Cappelletti, 2020). New York University- Shanghai, Duke Kunshan University, Zhejiang University, Peking University, Tsinghua University, Shanghai and Jiao Tong University were found to have adopted virtual methods by the end of March 2020. However, all universities haven't sufficient academic capabilities and necessary resources to deliver their service online yet (Leung & Sharma, 2020).

In India, the Maharashtra government cancelled all university examinations by following the guidelines of the University Grants Commission. The University of Hyderabad cancelled all academic activities and at the same time, took steps to close their hostels. The SRM Institute of Science and Technology and VIT, Vellore provided the summer vacation for all learning partners. 20 public universities in Malaysia came up with virtual solutions immediately by introducing virtual learning (Lim, 2020). They used several social media and other software such as live streaming on Facebook or YouTube, Lightboard Video Technology, Zoom, or in-house e-learning platforms (Crawford et al., 2020). This transformation can be

considered a fragmented approach to fulfilling higher education learning and delivering services with high quality. Within this, including assessment methods such as lab research are continuously allowed at the University Kebangsaan Malaysia and the University Malaysia Terengganu, whereas the University Utara Malaysia and the International Islamic University Malaysia or the University Malaysia Perlis conduct traditional lectures but bans their learners to go outside without permission (Lim, 2020).

With the island wide closure of all State and private universities, Malaysia's Ministry of Higher Education took an abnormal step to ban all virtual learning activities on 17 March 2020. Both State universities and private institutes of higher education are prohibited to deliver all online lectures, examinations, viva voce, student development programmer's research, and innovation within the banned period (Crawford et al., 2020).

Considering the context of Singapore, some higher education institutions conduct their lectures and other academic activities online - fully or up to a high extent. Conducting learning or academic activities using other means than traditional channels is not a new step. However, some events and activities such as the annual convocation ceremonies, large-scale events, foreign student exchange programs, and foreign internship programmes have been canceled. The



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students affected by the COVID 19 pandemic have been provided with several benefits such as credit-bearing learning arrangements. The Ministry of Education of Singapore has asked about 2,300 students in the local Autonomous Universities and Polytechnics to return from their official overseas placements quickly (Ang, 2020). Traditional face-to-face delivery methods at local universities have been converted into virtual platforms, galvanizing a sudden EdTech boom. Universities use web-conferencing platforms such as Zoom, Webinar, and Panopto, partially as contingency measures, and partially collaborated into their learning management systems. Examples of universities that have implemented the above practices are James Cook University, the National Technological University, the National University of Singapore and the Singapore University of Social Sciences (Crawford et al., 2020). Certainly, not like day today life activities, the COVID-19 pandemic has greatly influenced the path of learning partners, academics, and educational institutes around the world. Due to the pandemic, universities across the world are being closed temporarily. Any institute would not be able to run their service delivering processes smoothly, using virtual platforms, social distance, and healthcare guidelines, overnight (Crawford et al., 2020). These radical changes that happened due to the COVID-19 pandemic will create several difficulties and challenges to higher

educational institutes, particularly as a clear day for safe operations on-premises, which is still unknown. Therefore, creating a proper virtual platform using available resources by the particular institute seems to be a reasonable option (Crawford et al., 2020).

However, the Covid-19 pandemic has given opportunities to academic experts to build innovative and effective methods which can replace the traditional face-to-face lecture delivering techniques. They have started to consider virtual learning as the only method to maintain the usual activities within that three to four month. It will lead to stop the unnecessary delay that happens before starting the activities usually. (Crawford et al., 2020).

Even though several online courses are already being offered by several higher education institutions, two issues related to them are identified. First, from a macro perspective, very little is established regarding the effects and productivity of virtual learning. Second, the ability to conduct teaching online could differ based on the wide range of learning goals that guide instructional and educational priorities (Crawford et al., 2020).

METHODOLOGY

According to the philosophical stance, this study follows the positivism philosophy. This study follows a



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deductive research approach. At the same time, the study has been carried out as a cross-sectional study. This study aims to identify the effectiveness of e-learning classes during the COVID-19 pandemic, from the perspective of the learner. Therefore, students in State and private universities of Sri Lanka are the study population of this study. There is no sample framework because of the inability to find an exact list of all the students who are studying in State and private universities in Sri Lanka. Therefore, convenience sampling, which is a non-probability sampling technique, was adopted.

The strategy of inquiry used in this study is the survey method. A survey was conducted to evaluate the self-reported effectiveness of virtual learning followed by undergraduates during the COVID-19 pandemic, to identify difficulties/conveniences of virtual learning, as experienced by the learner. The data collecting instrument is a structured questionnaire. The questionnaire was distributed through online methods to identify students who are studying in universities of Sri Lanka. The medium of questionnaire is English. The questionnaire is divided into three sections: individual (subject), contextual (object), and e-learning solution (artifact). These categories are inspired by the concept of activity theory as shown in table 1. The items were evaluated on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree". The units of analysis

of this study are undergraduate students. Using Sarwar et al (2020) have identified the operationalization of the variables of the study (Please the appendix for the operationalization table)

Table 1- Sectioning of Questionnaire

Individual (subject)	Contextual (object)	E-learning solution (artifact)
Age	Interaction	Technological Access Infrastructure facilities
Gender (etc.)	Active learning(etc.)	Assistance (etc.)

RESULTS AND DISCUSSION

Frequencies and percentages were reported for all categorical characteristics using table 2, 3. The Kruskal - Wallis test was used to examine the differences in the parameters of the effectiveness of virtual learning practices through the year of the undergraduates.

The online survey was conducted using Google facilities and a reasonably large sample size of 342 respondents from all around Sri Lanka were the participants. Table 2 represents the basic demographics of the study population.

Table 2-Basic demographics of study participants (n=342)

Characteristics - n (%)			
Age			
Under 19	0 (0)	25-27	61 (17.8)
19-21	51 (14.9)	Over 27	5 (1.5)



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22-24	225 (65.8)		
Gender			
Female	218 (63.7)	Male	124 (36.3)
Institution/University			
State University	311 (90.9)	Private University	31 (9.1)
Province of University			
Northern	23 (6.7)	Western	141 (41.2)
North Central	9 (2.6)	Southern	17 (5)
North Western	52 (15.2)	Sabaraga muwa	46 (13.5)
Eastern	35 (10.2)	Central Uva	46 (13.5)
			10 (2.9)
Year of Study			
1 st year	79 (23.1)	3 rd year	65 (18.8)
2 nd year	119 (34.8)	4 th year	79 (23.2)

More students from State-sector universities have been incorporated in the survey when compared to private universities. According to the year of study, there were 79 (23.1%) first-year, 119 (34.8%) second-year, 65 (18.8%) third-year, and 79 (23.2%) fourth-year students.

Table 3-Technology-readiness of the study participants (n=342)

Characteristics – n (%)			
Do you have easy access to the internet?			
Yes	287 (83.9)	No	55 (16.1)
If yes, how would you rate your internet connectivity?			
Very weak internet	13 (3.8)	Stable	128 (37.4)
Weak internet	38 (11.1)	Very stable	28 (8.2)
Average	135 (39.5)		
Do you have an unimpeded electrical supply?			
Yes	229 (67)	No	113 (33)

Which of the following device(s) do you use for online classes

Smartphone	259 (75.7)	Tablet	11 (3.2)
Laptop	210 (61.4)	Desktop	13 (3.8)

How are you notified of class schedules?

Via email	176 (51.5)	Through institutional Web site	127 (37.1)
Via individual text	20 (5.8)	Other	1 (0.3)
Through social media	194 (56.7)		

Technology-Readiness of Study Participants

Most of the learners reported the availability of some form of access to the internet (n= 283, 83.9%). However, more than half (54.4%) rated their internet connection as very weak to the average quality. Less than half (45.6%) rated the quality of their connection to be stable or very stable as described in Table 3. 67% of participants reported uninterrupted electrical supply. Smartphones (n=259, 75.7%) and laptops (n=210, 61.4%) were the most used equipment of the learners for engaging virtual classes. Social media was the most used mode of notification of class schedules.

Effectiveness of Online Classes

A five-point Likert scale was used for assessing the overall effectiveness of



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virtual platform, as presented in Table 4. The worst rating was reported for questions: demonstration of practical/laboratory work by the instructor during online classes is sufficient (average rating = 49.9%), online learning fits better with my schedules than normal day-to-day classes do (average rating = 43.4%).

Responses of Students by Year of Study

This important comparison revealed interesting details (Table 4). Due to this, the comparison hopes to present the study results in an in-depth manner. The students of the first year reported

poor assistance in avoiding the difficulties to engage with the class or materials as compared to the students of other years (mean rating: 2.6202 ± 0.7215 , $p < 0.0916$). At the same time, students of all the years and significantly the new entrants, agree that online classes are less informative compared to active learning on campus. In addition, the students of the first year also strongly disagreed with the effectiveness of online classes (mean rating: 3.5443 ± 1.0597 , $p = 0.0099$) as compared with students of other years, while students of all the years seem to find it difficult in giving un-hampered attention when attending classes from home.

Table 4 - Technology readiness of the study participants (n=342)

		1 st Year n = 79	2 nd Year n = 119	3 rd Year n = 65	4 th Year n = 79	p-Value Chi-squared
1). My institution has an online learning management system (LMS) or website, from where I could get all the information related to online classes	Mean	2.0379	1.8487	2.1718	2	< 0.3193
	SD	0.6876	0.7987	0.8272	0.8473	4.7021
2). All key information about the course(s) is/are available on the LMS or institution website.	Mean	2.1265	1.9411	2.2812	2.1012	< 0.3577
	SD	0.8528	0.8160	0.8445	0.7611	4.3748
3). All course material, reading, assignments, and lectures material are available online.	Mean	2.3797	2.0672	2.3750	2.2151	< 0.9011
	SD	0.9240	0.8994	0.9345	0.9291	1.0567
4). Students are assisted in overcoming obstacles in accessing the class or materials.	Mean	2.6202	2.4873	2.4687	2.3417	< 0.0916
	SD	0.7215	0.7463	0.6164	0.7318	7.9981



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5). Time allocated for online classes is sufficient.	Mean	2.4810	2.4033	2.4531	2.3037	< 0.0346
	SD	0.9852	0.8955	0.6649	0.7399	10.37
6). I can interact with teachers during online classes.	Mean	2.3291	2.3781	2.3750	2.3291	< 0.0875
	SD	1.0466	0.9204	0.6299	0.9159	8.1123
7). I can interact with teachers after the online class in the Q & A session.	Mean	2.4430	2.4957	2.5468	2.3037	< 0.1144
	SD	1.0948	0.9818	0.7752	0.8675	7.4404
8). Every individual is given a chance to participate in and express their ideas during online classes.	Mean	2.4050	2.5042	2.3437	2.3037	< 0.5176
	SD	0.9938	1.0485	0.8207	0.8822	3.2455
9). The teacher is well trained for online classes and can use Videoconferencing App(s) with ease.	Mean	2.4050	2.857	2.3281	2.3544	< 0.2562
	SD	0.9270	0.9126	0.7139	0.8326	5.3182
10). Attending classes from home hampers my attention and focus.	Mean	2.6582	2.8571	2.7803	2.7974	< 0.06613
	SD	1.0728	1.0108	0.7904	0.9790	8.8062
11). Online classes are equally or more informative compared to active learning on campus.	Mean	3.5443	2.8319	3.2031	3.1772	< 0.0099
	SD	1.0597	1.0994	0.9288	0.9708	13.298
12). Online learning fits better with my schedules than normal day-to-day classes do	Mean	3.1265	2.5294	2.6718	2.6329	< 0.0129
	SD	0.9522	0.9985	0.8175	0.9893	10.789
13). Demonstration of practical/laboratory work by the instructor during online classes is sufficient.	Mean	3.2025	3.1680	3.3750	3.2658	< 0.3539
	SD	0.8530	0.8266	0.7453	0.9296	3.2556
14). I would like to have online sessions continued even after on-premise classes start on campus.	Mean	3.2025	2.6638	2.9843	2.9493	< 0.5857
	SD	0.9388	1.0191	0.9342	0.9987	1.9365



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Reliability and Validity

The Cronbach’s alpha of the question items was all above lower limits of acceptability that are greater than 0.6 (Sekaran, 2014). Consequently, all measures were above 0.6. It confirmed that measures were highly reliable. Table 5 summarizes the reliability test of all question items of the study. Furthermore, the Pearson Correlation was used for ensuring the validity of question items. If the Pearson Correlation value is lesser than 0.5, it confirmed a higher level of validity within the questions items. Subsequently, all question items were lesser than 0.05, which confirmed the validity (Field, 2005).

Table 5 - Cronbach’s Alpha Values for Questions items

Question Items	Cronbach’s alpha
1). My institution has an online learning management system (LMS) or website, from where I could get all the information related to online classes	0.785
2). All key information about the course(s) is/are available on the LMS or institution website.	0.645
3). All course material, reading, assignments, and lectures material are available online.	0.725
4). Students are assisted in overcoming obstacles in accessing the class or materials.	0.789
5). Time allocated for online classes is sufficient.	0.892
6). I can interact with teachers during online classes.	0.763
7). I can interact with teachers after the online class in the Q & A session.	0.653

8). Every individual is given a chance to participate in and express their ideas during online classes.	0.759
9). The teacher is well trained for online classes and can use Videoconferencing App(s) with ease.	0.823
10). Attending classes from home hampers my attention and focus.	0.747
11). Online classes are equally or more informative compared to active learning on campus.	0.705
12). Online learning fits better with my schedules than normal day-to-day classes do	0.689
13). Demonstration of practical/laboratory work by the instructor during online classes is sufficient.	0.845
14). I would like to have online sessions continued even after on-premise classes start on campus.	0.736

MANAGERIAL IMPLICATIONS

Several implications could be drawn from the survey results and the study of literature conducted through this research. E-learning approaches adopted as a solution to problems caused in the educational sector due to Covid-19 are found to have created several opportunities for students to explore and adapt to, their acquisition of knowledge through higher education programs. Through the survey responses, it was identified that students are comfortable with using the Learning Management Systems provided by the institutions though they seem to struggle in adapting to the online delivery of content. It was also



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seen that a majority of students had internet facilities and equipment needed to learn online, while access to electricity was a greater problem, compared to connectivity.

It is therefore concluded that complementary infrastructure provision should be a concern when introducing e-learning to the student community. A significant majority uses smartphones in online learning. The delivery of learning material must, therefore, considering the size, resolution, and limitations of smartphones. The consideration of aspects such as text size, involvement of animations, using video and camera facilities at the same time, etc. could make the overall experience effective for learners that use smartphones to engage in learning, which, in this case, is the majority. Assisting students that face difficulties with technology and tools could also improve overall effectiveness, therefore, traditional student support structures of educational systems must also adopt online platforms and assist with problems in the online environment, that take a different appearance than those of traditional learning systems. In an environment where students are expected to be present during the delivery of lectures, the level of interaction must be reasonable from a student's perspective.

Requiring all the students to attend the class online was found to be ineffective unless students could engage in interactive discussions and learning

with each other and the facilitator, etc. In such situations, it is found to be necessary to promote individual expression and cultural accommodation. However, through the overall results obtained, it is clear that getting students to participate in online classes during lecture delivery is important and it gives space for student interaction and increases effectiveness in terms of the student experience than independent-study online courses do. This observation is similar to those mentioned in previous studies of Jiang, Parent & Eastmond, (2006). Instructor-led online courses provided better success rates to students than independent-study online courses did.

It was also observed that information provided to students on online platforms is less, compared to that provided in physical lectures, even though there are more opportunities to share more information, increase professional practice, and get exposed to new perspectives and experiences otherwise unavailable from students' perspective as seen through the survey.

CONCLUSION

The study presented in this paper evaluates the self-reported effectiveness of online classes followed by undergraduates during the COVID-19 pandemic, to identify difficulties/conveniences of virtual learning, as experienced by the learners. Findings of the study indicate that undergraduates from all over Sri



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Lanka have a general dissatisfaction regarding various components of online teaching, even though they are introduced to combat the pandemic situation.

Findings from the survey will deliver a superior explanation for difficulties which faced by learners, aiding in remedial actions, or provide assistance in improving the online presence of education of the country.

LIMITATIONS AND FUTURE RESEARCH

The proposed framework of this study is only focused on the self-reported effectiveness of online classes followed by undergraduates during the COVID-19 pandemic. Future research should investigate learners' opinions regarding the virtual service delivery to examine the difficulties faced by them. Further research could be extended to establish a measurement scale for measuring the quality of online learning. Furthermore, the proposed framework of this study only considers students who are studying in State and private universities in Sri Lanka and measure self-effectiveness using their perspective. More research is needed to conduct academic staff member perspectives to explore their opinion.

References

- Adnan, M. (2020). Online learning amid the COVID-19 pandemic: Students perspectives. *Journal of Pedagogical Sociology and Psychology*, 1(2), 45–51. <https://doi.org/10.33902/jpsp.2020261309>
- Ang, H. M. (2020). 2,300 polytechnic and university students asked to return from overseas placements amid COVID-19 pandemic. <https://www.channelnewsasia.com/news/singapore/2-300-polytechnicand-university-students-asked-to-return-from-12588588>
- Cappelletti, A. (2020). *China's coronavirus lockdown: In this situation, it is important to just keep going*. Times Higher Education.
- Chen, Y. J. (2001). Dimensions of transactional distance in the world wide web learning environment: A factor analysis. *British Journal of Educational Technology*, 32(4), 459–470. <https://doi.org/10.1111/1467-8535.00213>
- Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., Magni, P. A., & Lam, S. (2020). Journal of Applied Learning & Teaching COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching*, 3(1).
- Dietrich, N., Kentheswaran, K., Ahmadi, A., Teychene, J., Bessiere, Y., Alfenore, S., Laborie, S., Bastoul, D., Loubiere, K., Guigui, C., Sperandio, M., Barna, L., Paul, E., Cabassud, C., Line, A., & Hebrard, G. (2020). Attempts, successes, and failures of distance learning in the time of covid-19. *Journal of Chemical Education*, 97(9), 2448–2457. <https://doi.org/10.1021/acs.jchemed.0c00717>
- Field, A (2005). *Discovering statistics using SPSS*. (3rd ed.).
- Hasan, N., & Bao, Y. (2020). Impact of “e-Learning crack-up” perception on psychological distress among college students during COVID-19 pandemic: A mediating role of “fear of academic year loss.” *Children and Youth Services Review*, 118(July), 105355. <https://doi.org/10.1016/j.childyouth.2020.105355>
- Houlden, S., & Veletsianos, G. (2020). *Coronavirus pushes universities to switch to*



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- online classes - but are they ready?
<https://theconversation.com/coronavirus-pushes-universities-to-switch-to-online-classes-but-arethey-ready-132728>
- Jiang, M., Parent, S., & Eastmond, D. (2006). Effectiveness of web-based learning opportunities in a competency-based program. *International Journal on E-Learning*, 5(3).
- Leung, M., & Sharma, Y. (2020). *Online classes try to fill education gap during epidemic*.
- Lim, I. (2020). *COVID-19: What are Malaysia's public universities doing? Online classes and more*.
<https://www.malaymail.com/news/malaysia/2020/03/16/COVID-19-what-are-malaysias-public-universities-doingonline-classes-and-mo/1847071>
- Mailizar, Almanthari, A., Maulina, S., & Bruce, S. (2020). Secondary school mathematics teachers' views on e-learning implementation barriers during the COVID-19 pandemic: The case of Indonesia. *Eurasia Journal of Mathematics, Science and Technology Education*, 16(7).
<https://doi.org/10.29333/EJMSTE/8240>
- Moallem, M. (2003). An interactive online course: A collaborative design model. *Educational Technology Research and Development*, 51(4), 85-103.
- Noesgaard, S. S., & Ørngreen, R. (2015). The effectiveness of e-learning: An explorative and integrative review of the definitions, methodologies and factors that promote e-Learning effectiveness. *Electronic Journal of E-Learning*, 13(4), 278-290.
- Perrotta, C. (2020). *Coronavirus quarantine could spark an online learning boom*. *The Conversation*.
<https://theconversation.com/coronavirus-quarantine-could-sparkan-online-learning-boom-132180>
- Qu, L. (2020). *Online learning: When class is just a click away*, Duke Kunshan University.
<https://www.scmp.com/tech/enterprises/article/3048891/chinas-traditional-schoolsembrace-online-learning-coronavirus>
- Sarwar, H., Akhtar, H., Naeem, M. M., Khan, J. A., Waraich, K., Shabbir, S., Hasan, A., & Khurshid, Z. (2020). Self-Reported Effectiveness of e-Learning Classes during COVID-19 Pandemic: A Nation-Wide Survey of Pakistani Undergraduate Dentistry Students. *European Journal of Dentistry*, 14, S34-S43.
<https://doi.org/10.1055/s-0040-1717000>
- Sekaran, U., & Bougie, R. (2014), *Research methods for business: A skill building approach*. (5th ed.). India: Wiley India Pvt Ltd.
- Wu, B., Hu, Y., Gu, X., & Lim, C. P. (2016). Professional Development of New Higher Education Teachers with Information and Communication Technology in Shanghai. *Journal of Educational Computing Research*, 54(4), 531-562.
<https://doi.org/10.1177/0735633115621922>

Appendix

Operationalization

Questions items were adapted and modified from Sarwar et al., (2020). The below-mentioned table presented questions items.

Question Items
1). My institution has an online learning management system (LMS) or website, from where I could get all the information related to online classes
2). All key information about the course(s) is/are available on the LMS or institution website.
3). All course material, reading, assignments, and lectures material are available online.
4). Students are assisted in overcoming obstacles in accessing the class or materials.
5). Time allocated for online classes is sufficient.
6). I can interact with teachers during online classes.



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- 7). I can interact with teachers after the online class in the Q & A session.
 - 8). Every individual is given a chance to participate in and express their ideas during online classes.
 - 9). The teacher is well trained for online classes and can use Videoconferencing App(s) with ease.
 - 10). Attending classes from home hampers my attention and focus.
 - 11). Online classes are equally or more informative compared to active learning on campus.
 - 12). Online learning fits better with my schedules than normal day-to-day classes do
 - 13). Demonstration of practical/laboratory work by the instructor during online classes is sufficient.
 - 14). I would like to have online sessions continued even after on-premise classes start on campus.
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