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Factors Influencing Online Education during COVID-19 Pandemic: Sri Lankan Students' Perspective

M. A. K. Sriyalatha[1] and P. J. Kumarasinghe[2]
[1]Senior Lecturer, Department of Business Economics, University of Sri Jayewardenepura, SRI LANKA
[2]Professor, Department of Business Economics, University of Sri Jayewardenepura, SRI LANKA

[1]Corresponding Author: kumuduni@sjp.ac.lk

ABSTRACT

This study examines the factors influencing online education for selected Sri Lankan universities during the COVID-19 pandemic. It also analyses the moderate effect of gender and type of the university on online education. Primary data were collected using a questionnaire via google form from Management students in Sri Lankan selected universities. Data analysis was done through structural equations using analysis of moment structures (AMOS) version 22.0. Attitude, internet and related facilities, curriculum, and self-motivation were found to have a significant positive impact on online education, while workload & time have no significant effect on online education. Among four factors, the strongest influence was derived from self-motivation followed by the curriculum. We have not found significant differences among male and female students' views on online education, while the impact from the type of university is different among the two categories. This study effectively guides policy makers and university administrators across the educational institutes to decide on continuing online education. It reveals some insights to the teachers, students, and parents to understand the significance of the modern online learning environment and its positive impact on the new learning mode. There is no study related to the factors associated with the impact of online education during the Covid-19 pandemic in the Sri Lankan context.

Keywords-- COVID-19 Pandemic, Online Education, Self-Motivation, Curriculum, Sri Lankan Universities

I. INTRODUCTION

The COVID-19 virus was first identified in Wuhan, in Hubei province in China, in late 2019.It quickly spread across the world, reinforcing the World Health Organization (WHO) to announce it as a pandemic by mid-March 2020. It is a health crunch that has changed the human lives across the world[1].

To date, the COVID-19 pandemic has left an unprecedented trail of both humanitarian and economic damage in all countries. About 117 million people were infected, and more than 2.5 million deaths were reported by mid-March 2021, and the pandemic continues. The economic consequences of the ongoing 'Great Lockdown' are expected to be higher than the Global Financial Crisis of 2007-08. Policymakers worldwide are struggling to cope with this crisis episode amidst numerous uncertainties, and many countries have decided to announce travel restrictions, quarantines, stay-at-home orders, etc. Besides, governments have decided to temporarily close all the learning institutions to control the spread of the virus, allowing for the safety of students, teachers, and all related parties.

Sri Lanka has been relatively effective in fighting the outbreak of COVID-19so far due to early measures implemented to control the spread. Among them, the promptest reaction was the immediate decision of the Sri Lanka government to close the school and Universities island-wide from mid of March 2020. The schools and universities in Sri Lanka re-opened in a phased manner but not entirely across the country [2].

There is no argument that the closure of education institutes due to the COVID-19 pandemic has affected education worldwide. At its peak, these countrywide shutting down of educational institutes affected more than 1.5 billion, or over 90% of the world's student population, from pre-primary to higher education [3]. With the closure of higher education institutions worldwide, especially, the university system has the greater responsibility to continue delivering education smoothly with the lockdown restrictions. Most higher educational institutions attempted to retain the essential operations ongoing while establishing online teaching platforms to provide the required knowledge and skills to their students. Similarly, the world is opening a unique situation where education for all levels of study is offered through online classes using the internet.

In Sri Lanka, most educational institutions and state and non-state universities have introduced online teaching platforms, which help students and teachers temporarily cope with the shutdown of educational institutes. Now online learning is employed as the only source of delivering knowledge due to the social distancing and nationwide lockdown amidst the COVID-19 pandemic. This is a novel experience to all of us, and still, its limitations and benefits are not evident.

With the imposing of limited movement by corresponding authorities, students cannot attend classes face-to-face. Educational institutes made quick changes to the delivery mode from traditional teaching to e-learning or online learning. Either method has caused a considerable impact or satisfaction on the teaching, but the learning process is not appropriately examined. Several studies recommended that e-learning enhances students' engagement and analytical skills [4, 5, 6]revealed that the traditional learning method is better than online learning since students can communicate verbally with their peers and instructors, which improved their interpersonal skills. Besides, learners can get direct feedback from their teachers through traditional learning, thereby enhancing their learning motivation. Therefore, it is vital to know the attributes that affected online education during the COVID-19 pandemic. This paper uses the student online education model to examine the impact of COVID-19 on university students' online learning and it is designed to explain the framework for better understanding:

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

COVID-19 pandemic stimulated the quick evolution from physical to online mode of delivering knowledge via video conferencing, Zoom platform, Google classroom. and some other modes.Most Sri Lankan universities have implemented many of these modes for the first time by enabling a rapid transition from the traditional to the virtual platform with the prevailing situation.

Many researchers have shown the importance of shifting to an online delivery mode during crisis times. Similarly, some researchers have revealed thecomplicated issues that arose during the COVID-19 pandemic in delivering knowledge in universities [7, 8, 9]. The primary role of universities is to teach in education and transferring knowledge to improve student satisfaction. Some studies indicated that online learning negatively impacts student learning [10, 11, 12] while other studies disclosed that online learning has a positive impact on student learning [13, 14].In this study, we examine the impact of several factors on online education.

Attitude

[15] indicated that students had shown an initial positive attitude to an organized and well-resourced Information and Communications Technology (ICT) based learning process. They preferred step-by-step instructions rather than self-study using ICT. Further, the students enjoyed the blended learning environment and were optimistic about their knowledge and skill development. The findings showed that students more likely to have face-to-face instructions. [16] revealed that students involved in the traditional learning approach indicated a slightly more positive attitude toward using technology than their online counterparts.

[17] observed that the attitude construct has a positive impact on online education. Their results revealed that attitude had the least impact on online classes because some education-related activities (such as homework, assignments, and other activities related to their course of study on education) were performed even before the pandemic. [18] discussed predictive factors of student success in online education. Overall, the studies revealed that the of students havea negative attitude on online classes. Suchnegative attitudes lead to unfulfilled learning outcomes for the learners.

Therefore, the following hypothesis was formulated based on previous research findings to test the impact of attitude on online education.

H1. There is a significant impact of attitude on the online education

Internet and Other Facilities

[11] revealed that the e-learning platforms were challenging to most students due to the lack of the technical know-how of technological devices and the limited access to the internet. The results further showed that when students have appropriate devices, including smartphones, computers, laptops, and iPads, it motivates them to involve in online learning. Similarly, [19] found that network issues, lack of training, and lack of interaction due to connectivity issues are the major challenges faced during the COVID-19 period on virtual learning and teaching. [20] revealed that the main technology-related challenges faced during the pandemic on digital education arelack of good internet, connectivity issues, lack of laptops and microphones.[21] showed that the online education platform was a success with the latest configured laptops, microphones, cameras, and proper internet connections with high bandwidth.[22] revealed that in Saudi Arabia,many students do not have suitable gadgets to attend online classes.Many have stated the absence of internet services around theirresidential areas. [23] reported that to facilitate online learning in Saudi Arabia, many higher education institutions have provided laptops and tablets to students free of charge.

The following hypothesis was formulated based on the previous research findings to test the impact of the internet and other facilities on online education.

H2. There is a significant impact of the internet and other facilities on online education

Curriculum

Many researchers have perceived that during the COVID-19 pandemic, most educational institutes across the world delivered the curriculum content via an online platform that was initially designed to provide in physical classes. Since these curricula were not intended to provide

at least through a hybrid method, various issues arise. Besides, many topics included in the courses are not able to deliver through an online platform. Further, the researchers have pointed out that online delivery mode requires high-level students' commitment and engagement to learn. Thus, scholars have proposed that collaborative curriculum development by faculty members and students is essential to pass knowledge successfully [24, 25].

[17] found that a curriculum hasa negative impact on online classes during COVID- pandemic. The reason for this negative impact was explained as sudden movement from regular classes to the online mode during the COVID-19 pandemic. The unexpected transition from physical to virtual did not allow sufficient time for the students to familiarize themselves with the new mode of teaching. Thus, the following hypothesis was formulated to test the impact of curriculum on online education.

H3. There is a significant impact of curriculum on the online education

Self-Motivation

[17] reveals that motivation is a factor that has almost a 50% impact on online education performance during the COVID-19 pandemic. Zia further pointed out that motivating students to attend online classes is the primary challenge for the faculties and the teaching staff members. [26] showed that the success of online learning was influenced by the method of instructing and their level of clarity, by the accessibility and suitability of technological equipment,bytime, motivation,andsupport for participationin online learning. [19] suggested that a lack of training, awareness and motivation arethe main challenges for teachers in encounteing the onlineteaching-learning process. [27] found that blended learning students were more satisfied, motivated, and added more significant value to course activities and contents than traditional students. [28] suggested that online students are more intrinsically motivated acrossthe board than conventional students. [21]reported that teachers had revealed a low level of motivation towards interaction, student engagement, and student discipline via online teaching.

[29] examined the impact of COVID-19 on the students in highereducation institutions during pre- and Movement Control Order (MCO). This study focused on university students by analyzing the students' motivation, the community of inquiry, and learning performance. The results revealed that the students lost motivation and learning performance using online learning methods during the MCO period. Therefore, the following hypothesis was formulated to test the impact of motivation on online education.

H4. There is a significant impact of self-motivation on online education

Workload & Time

[30] examined that many students have agreed that they could save much time via the online learning platform. Students believed that the virtual platform had offered more flexibility of the class time. Moreover, the students believe that they could receivean improved learning experience and better explanations via online learning. Recorded lectures and lecture materials give them a chance to play repeatedly, and thus it provides an opportunity to increase the learning experience.Further, the results of the study show that the findings did not support a positive significant relationship between workload and student satisfaction with online learning during the pandemic.

Therefore, the following hypothesis was formulated to test the impact of workload & time on online education.

H5. There is a significant impact of workload & time on the online education

III. CONCEPTUAL MODEL

The following conceptual model was constructed based on the literature review. The model has been proposed with five factors expected to study the impacton online learning mode during the COVID-19 pandemic (Figure 1). In this model, attitude, internet and other facilities, curriculum, self-motivation and workload& time are identified as independent factors, whereas online educationis a dependent factor. In addition, the authors have incorporated two moderating variables, namely type of university and gender.

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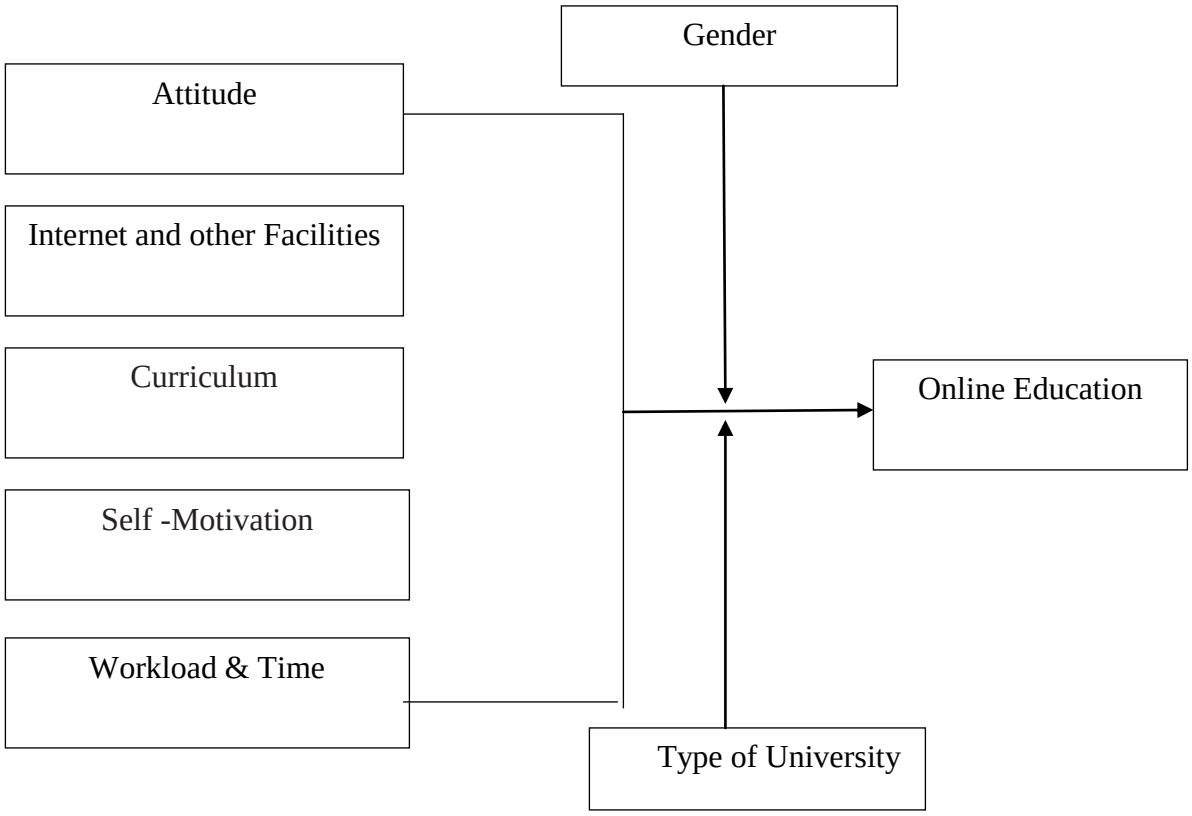

Figure 1: Conceptual Model for online education

IV. METHODOLOGY

Population and Sample

Factors that influence online education were examined in this study. University undergraduate students in the management stream were considered the population of this study to achievethis objective. Since a large number of students are entering the management stream, they are highly affected by this COVID-19 pandemic due to social distancing. Hence management faculties have decided to deliver lecturers via an online platform. Therefore, these students, from both state and non-state universities in Sri Lanka, are suitable to consider as the study population. The sample consists with students from state and non-state universities.

Data Collection

The primary data were collected through a self-administered questionnaire via Google form to measure theimpact of these factors on online education in Sri Lanka. For minimizing possible questionnaire errors, the first draft of the questionnaire was distributed among 30 students to ensure the appropriateness of wording, structure, and sequencing of questions. The pre-test results indicated that the questionnaire vocabulary, sequence, and structure were appropriate, and its filling-out time was approximately ten minutes.

The 27 items on the scale were grouped into six variables: attitude (A1 – A4); internet and otherfacilities (IOF1 – IOF5); curriculum (C1 – C4); self-motivation (SM1 – SM5); workload & time (WT1 – WT4), and online education (OE1 – OE5). The five-level Likert scale was used, ranging from (1 = strongly disagree; 5 = strongly agree). Data were collected from February 12, 2021,to March 12, 2021.The primary demographic data were collected for further analysis. All in all, 410 students submitted their responses for the research. Out of 410 questionnaires, the study used 359 questionnaires and excluded 51 from the original database because of data outliers and incomplete answers.

The final sample consists of 185 female students and 174 male students. Ofthe total, 207 students (57.7%) were from state universities and 152 students (42.3%) from non-state universities. Table Iprovides the respondents' profilethat includes gender, type of university,year of study, quality of the network, and the device they used. As per Table I, most students have a good and stable

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connection, while few students did not have network coverage to attend online lectures.Students further stated that they use more than one device for taking part online sessions. Majority of the students use smartphones, followed by laptops.

Table I: Respondents' Profile

Item	n	Item	n
Gender		Quality of Network	
Male	174	Excellent and stable	24
Female	185	Good and stable	230
Type of University		Poor	98
State	207	No network coverage	07
Non-state	152		
Year of Study		Device (Use more than one)	
First	24	Desktop Computer	34
Second	171	Laptop	266
Third	147	Tablet	15
Forth	17	Smart Phone	302

Source: Author Commplied

Reliability and Validity Test

Table II presents an overview of the reliability of the variables: attitude, internet and other facilities, curriculum, self-motivation, workload & time, and online education based on Cronbach's alpha value, which was used as a measure of internal consistency. [31] specified that the acceptable level of reliability coefficient in Cronbach's alpha should be about 0.70, where most of the alpha coefficients of these variables lie between 0.74 and 0.92, as shown in Table II. Correlation coefficient is used to check the validity as stated by [32]. Further, Table II presents the item-total correlations, which specify that most coefficients were significant at the 1% level.

Table II: Reliability and Validity Statistics

Variable	No. of items	Cronbach's Alpha	OE	Atti	IOF	Cu	SM	WT
Online Education (OE)	5	0.740	1					
Attitude (Atti)	4	0.922	.733**					
Internet and other Facilities (IOF)	5	0.818	.655**	.465**				
Curriculum(Cu)	4	0.904	.789**	.744**	.639**			
Self–Motivation (SM)	5	0.826	.826**	.680**	.594**	.732**		
Workload & Time (WT)	3	0.852	.215**	.030	.265**	.127*	.159**	1

Source: Author Commplied
Note: **Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

V. ANALYSIS AND FINDINGS

Analyzing and interpreting the study results are necessary to test the hypotheses established in the above section. Hence, data were analyzed by applying a structural equation model (SEM) using the analysis of moment structures (AMOS) Version 22.0 statistical software.

Before further analysis, we confirmed the results by using the goodness of fit index (GFI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), the incremental fit index (IFI), the Tucker-Lews index (TLI), and the minimum discrepancy measured by (CMIN\DF). For both CFI and GFI, values greater than 0.90 indicated a good fit, while values below 0.06 for RMSEA indicate an acceptable fit after modification of the SEM model. The minimum

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discrepancy measured by CMIN\DF, also reported in Table III, shows that the value is less than 3, which represents a good fit. Further analysis is possible since all values have satisfied the standard requirement. Thus, the model explains a relatively higher percentage of data variance, about 94 percent (GFI = 0.941),disclosing that its adequacy can be considered reasonably good.

Table III: The goodness of fit indices of Initial Model and Final Model

Achieved Fit Indices						
Fit Measures	CMIN\DF	RMSEA	GFI	IFI	TLI	CFI
Initial	4.924	0.105	0.923	0.929	0.907	0.919
Final	2.151	0.057	0.941	0.943	0.922	0.943
Acceptable Scale for adequate fit	≤ 3	≤ 0.06	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.9

Source: Author Commplied

After confirming the goodness of fit ofthe conceptual model, hypothesis testing was done employing SEM, seen in Table IV and Figure II. The figure indicates the standardized regression coefficient of the final model. The first four hypotheses,i.e., attitude, internet and other facilities, curriculum, and self-motivation, were accepted as having a positive impact on online education. These resulted in a positive and significant influence on online education. However, hypothesis 5 was rejected as there was no significant impact on online education from workload & time during the COVID-19 pandemic.

Table IV: Final Estimation of Measurement Model Parameters

			Estimate	S.E.	C.R.	p	Decision
OE	<---	Att	.369	.043	6.230	.000	Supported
OE	<---	IOF	.286	.056	4.882	.000	Supported
OE	<---	Cu	.546	.052	7.902	.000	Supported
OE	<---	SM	.696	.058	8.710	.000	Supported
OE	<---	WT	.016	.043	.326	.744	Not supported

Source: Author Commplied

Self-motivation had a strong and positive effect followed by curriculum on online education;(β=0.696, p<0.01), (β=0.546, p<0.01), and a moderate impact on online education from attitude (β=0.369, p<0.01). In contrast, workload & time were found to have a positive but insignificant effect on online education (β=-0.016, p>0.01).

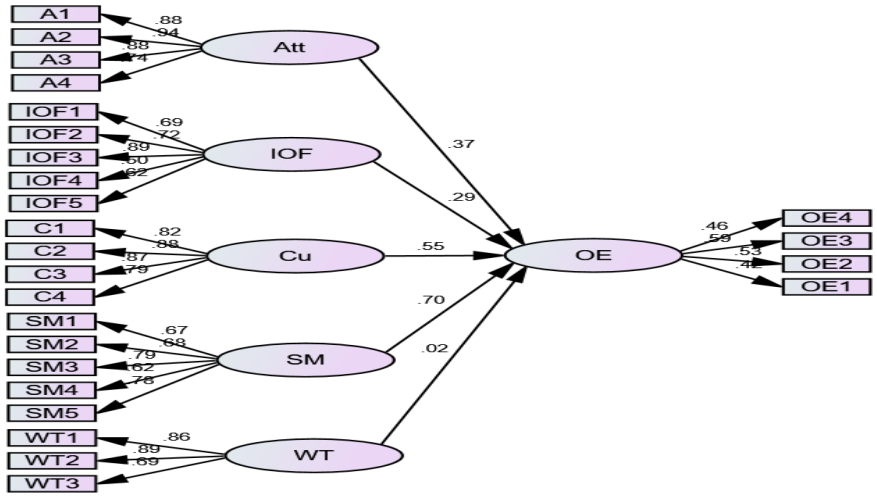

Figure II: Path coefficients values for factors of online education

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Next, Structural Equation Model was conducted to test the moderating impact on online education using gender and type of university. The analysis proved that gender has no moderating effect on online education while type of university has shown a moderating effect on online education according to the SEM. Table V presents a summary of the results

.

Table V: Final Estimation of Measurement Model Parameters for Male and Female Respondents

			Estimate Male	p	Estimate Female	p	Decision
OE	<---	Att	.318	.000	.452	.000	Supported
OE	<---	IOF	.153	.025	.365	.000	Supported
OE	<---	Cu	.574	.000	.556	.000	Supported
OE	<---	SM	.738	.000	.594	.000	Supported
OE	<---	WT	.032	.625	.002	.978	Not supported

Source: Author Commplied

Male and female students have reported the highest positive effect from self-motivation on online education. All three models revealed that workload & time have no impact on online education in selected Sri Lankan universities at the structural level of the model.

Table VI represents the results of gender (male; female) comparison on online education. For online education, no significant differences were observed between the male and female students. In contrast, based on the type of university, we found interesting results about online education. Non-state university students have not considered attitude as a significant factor concerning online education. The standard path coefficient was 0.072 and it was not significant at 5 % level of significance.The reason might be the cost of education, which is not reducing due to the pandemic. In the Sri Lankan context, state university students receive every benefit without paying money out of their pockets. In contrast, non-state university students must pay tuition fees for their undergraduate studies(see Table VII).

Table VI: Results of Gender Comparison

			Estimate (Male)	Estimate (Female)	t value	Decision
OE	<---	Att	.318	.452	0.879	Not Supported
OE	<---	IOF	.153	.365	1.771	Not supported
OE	<---	Cu	.574	.556	-.639	Not Supported
OE	<---	SM	.738	.594	-1.610	Not Supported
OE	<---	WT	.032	.002	-0.306	Not supported

Source: Author Commplied

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Table VII: Results of State and Non-State Universities

			Estimate State	p	Estimate Non-state	p
OE	<---	Att	.562	.000*	.072	.238**
OE	<---	IOF	.386	.000*	.135	.038*
OE	<---	Cu	.371	.000*	.637	.000*
OE	<---	SM	.630	.000*	.756	.000*
OE	<---	WT	.007	.924**	-.006	.920**

Source: Author Commplied
Hypotheses Accepted at 95% significant Level *
Hypotheses Rejected at 95% significant Level **

When we compared the state and non-state university student responses, it revealed another significant finding, presented in Table VIII. The results showed that in addition to workload & time, self-motivation hasdifferent effects on online education among state and non-state university students. Further, the results confirmed that the state university students have more positive attitude towards online education.

Table VIII: Results of University Comparison

			Estimate (State)	Estimate (Non- State)	t value	Decision
OE	<---	Att	.562	.072	-4.179	Supported
OE	<---	IOF	.386	.135	-2.246	supported
OE	<---	Cu	.371	.637	1.934	Supported
OE	<---	SM	.630	.756	1.887	Not Supported
OE	<---	WT	.007	-.006	-0.138	Not supported

Source: Author Commplied

VI. DISCUSSION AND CONCLUSION

This study contributes to identifying factors affecting online education during the COVID-19 pandemic. In this study, five factors were selected through reviewing literature and developed five hypotheses to test the conceptual model. Thereafter, variables were tested by applying SEM through AMOS software. The standardized path coefficients were used to identify the impact of allfive hypotheses. The results revealed that self-motivation (0. 696) has the highest positive impact on online education (see Table IV) during the pandemic. In contrast, the internet and other facilities (0. 286) have the least positive impact on online education. Understandably, motivationplays a vitalrole in any teaching and learning practice and all forms of services [33,34, 35, 36, 17,37].

Similarly, students should have appropriate devices and access to the internet facility to attend online education.Unlike developed countries, the developing countries have less infrastructure facilitates and low resources with inequality. This heterogeneityis applicable to the Sri Lankan context. Therefore, the results revealed the lowest positive impact from the internet and other facilities on online education. Moreover, path coefficient values for attitude show a 36.9%impact on online education. It was evident that during this pandemic, everyone needs to maintain social distancing while engaging day to day activates and other activities like education. Hence, students know that education is of utmost importance for their future success, and they want to complete their degree program within the stipulated time period. They also experience some benefits via online education such as saving time, e.g., traveling, and getting a chance to stay at home safely during the pandemic.Thus, the attitude construct shows a reasonable effect on online education among students.

The curriculum had a positive (0.546) significant impact on online education. Itrepresents the second-highest positive impact on online education. We realize that the move from physical classes to the virtual mode was sudden due to the COVID-19 pandemic, but shifting from regular mode to online mode has less impact on the curriculum,especially in Social sciences. Therefore, most students are more likely to have an online basis during this particular period, and the curriculum content delivered via online mode is not difficult to understand. Thus, curriculum indicates a positiveimpact on online education.

Another positive point is that management stream students follow subjects relating to information technology in their degree programs as a part and partial fulfillment. This nature of the management stream students positivelyimpacted to adopt the online mode. It was an advantage for university authorities to introduce the online learning mode with the Social science students.

The other construct, workload & time (0.016), shows an insignificant path coefficient among the five constructs. This is because online educationdoes not put much burden on students. The findings have not shown any differences when check with the moderating effect with sub samples. This result further confirms that workload & time are not an issue for students to join online education.

VII. CONCLUSION

The study resultsprovide vital information for university administration and theacademic staff who conduct seminars and lectures via online education during the COVID-19 pandemic and social distancing. The findings of the study will support them in understanding the students' responses regarding online education. Further, the results support identifying the factors associated with online education, and hence they can plan and schedule online education successfully.

Basedon the literature review, we identified five variables (attitude, internet and other facilities, curriculum, self-motivation and workload & time) for the analysis. Out of five, four constructs hada significant positive impact on online education. The highest level of impact from self-motivation was followed by curriculum among students during this pandemic. This finding is consistent with [17] and [21].

Similarly, we analyzed the same model based on gender to check whether the factors that affected online education are the same (or not). Interestingly, there were no differences between factors affecting online education and the gender of the students, as indicated in Tables V and VI. We found a significant positive effect from four variables: attitude, internet and other facilities, curriculum, and self-motivation. Like the overall model findings, self-motivation has the highest effect, followed by the curriculum. Therefore, we can conclude that there is no significant difference between the factors affecting online education for both male and female students. The results revealed that state and non-state university students have different views on online education with regards to motivation.

Significance and Implication

This study reveals some insights to the teachers, educators, university administrators, policymakers, students, and parents to understand the significance of the modern online learning environment and its positive impact on the new learning mode. The study outcome will provide some guidance to university administrators to adopt online teaching, at least as an alternative approach, to the physical classes.Once we return to the new normal condition, students, lecturers, and teachers could be trained to deal with these exceptional circumstances in the future.

Universities, especially, can divide the courses into conventional teaching and online teaching. Which will help inculcate the technology into the classrooms and efficient functioning of the university system. Further, this study reveals that providing technical infrastructure and proper internet connectivity without intermittent interruption is essential for online education. It might be the biggest challenge especially for developing countries, including Sri Lanka.

Limitations

Similar to other research, this study also has some limitations and practical implications. The data collection was limited only to selected state and non-state universities in the western province,in Sri Lanka. Thus, the researchers should use more universities, especially from other provinces, to enhance the robustness of the findings. Another suggestion is to use a seven-, nine-, or ten-pointLikert scale instead of a five-point Likert scale questionnaire for data collection.

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