

**BARRIERS TO ONLINE LEARNING IN HIGHER EDUCATION DURING THE CORONA PANDEMIC  
PERIOD SPECIAL REFERENCE TO EASTERN UNIVERSITY, SRI LANKA- CONFIRMATORY FACTOR  
ANALYSIS (CFA) MODEL**

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**Abstract**

This paper aims to analyze students who face challenges of online learning during the COVID-19 pandemic period. This paper collected data from 200 students from the faculty of Arts and culture, Eastern University, Sri Lanka, as samples in this study. This study used a quantitative approach. This paper has used as analysis part descriptive and inferential analysis. Especially Confirmatory factor analysis (CFA) has been used for this study. Students have been facing technical, family, Individual, and institutional barriers from online learning. The majority of the students met stress through this online learning. According to the research findings, as per the rank analysis and mean analysis, students have been facing firstly technical challenges followed by individual challenges, family challenges lastly institutional challenges, respectively. Stress is the significant and major challenge; absolute fit indices fit the sample data and reflect that the suggested model has a good fit by satisfying the necessary values. The results will help policymakers, including the government as well as the educational community, in conducting and providing smooth online learning across the nation during the pandemic.

**Keywords:** - Online learning, challenges, Pandemic period, Confirmatory factor analysis (CFA)

**1. Introduction**

The worldwide education landscape has abruptly changed in favour of distance learning due to the temporary shutdown of educational institutions during the coronavirus illness (COVID-19) epidemic. Various digital platforms and applications, including digital learning management systems, collaboration platforms for live-video communication, and enormous open online communities, saw a spike in use due to this drastic transition. During the epidemic, certain platforms provided free access to essential services, which higher education institutions took advantage of heavily, particularly among academic staff and students with digital experience.

In the online learning process, students use various communications where participants interact simultaneously as many software. Those are video conferencing, zoom, google meet, WebEx, or asynchronous such as time-separated communication such as e-mail, Google Forms, streaming video content, posting lecture notes, and social media platforms. Higher education is already difficult to come by in Sri Lanka. The government mandated that all educational institutions be closed. Institutions, including universities, closed on March 12, 2020. public universities 15, private universities make up the higher education sector roughly 40 other public and private tertiary institutions. Disruptions to tertiary education caused by COVID-19 have the potential to postpone the formation of the leaders. Higher education institutions used existing Moodle-based learning management systems hosted on university web servers to offset the effects of disrupted learning.

The research problem is that, the pandemic has altered the entire educational environment (Baticulon et al., 2021). The impact has been enormous, affecting university learning today and possibly more in the future. Several universities Face-to-face teaching has been destroyed by universities, resulting in a paradigm shift, and most institutions have been obligated to shift from campus-based learning to day-to-day online teaching overnight (Abbasi et al., 2020). The COVID-19 pandemic has hampered students' lives and, unfortunately, is likely to have

a long-term impact on their future academic lives, causing educational disruption everywhere (Abuhammad, 2020). In this crisis, most university administrators see online education as a panacea for problem solving (Dhawan, 2020).

The following are the study's objectives:

1. To study the demographics of characters of the Online learners.
2. To examine the online learning challenges (measuring only performance) model (CFA) for assessing learners' perceptions of online learning.

## **2. Literature review**

Many authors have been searched and researched various ways and methods to relevant to online education in the pandemic periods. Such that ways, Howlett et al., (2009) defined Online learning as "the use of electronic technology and media to deliver, support, and enhance both learning and teaching, and involves contact between learners and teachers using online content." Improved information accessibility, simplicity of standardizing and updating content, and cost-effectiveness are advantages of employing online learning in medical education. Ahmed et al., (2020) explained that in low- and middle-income countries, online learning could address faculty shortages by expanding the reach of medical educators and increasing their efficiency. Improve access to healthcare training by increasing the number of healthcare workers, encouraging their retention in regional units, and enhancing interaction with institutions with more resources.

\*Simamora, (2020) clearly has shown various responses to the challenges students face while studying online, including the positive and negative effects of online learning, economic conditions, anxiety during online learning. The need for the government to think and plan, the risk of user data security, the transition from face-to-face classes to online learning, ability, finding effective online learning media, and expectations. Sarwar et al., (2020) concluded that the current study revealed that Pakistani dentistry students were unified in their unhappiness with various online training sessions. This study will assist academic institutions in developing effective learning platforms aimed at improving students' learning experiences. Gibbons, (2007) concluded that as a result, online learning is a vital space for exploring, criticizing, problematizing, and creating spaces in which the caring and educating subject can be produced online.

The current study was meant by assessing Arts students' perceptions of the challenges of online teaching in Sri Lanka and highlighting the obstacles they have in adopting this new learning style. No one do this study based on this respondent or this University for finding the online challenges. Moreover no one has used CFA model for analysing the data and obtaining the result in this particular study. This is the gap of the study.

## **3. Methodology**

This research study used both primary and secondary data. Secondary data has been collected from Annual reports, websites, and various research papers. Primary data was collected based upon the undergraduate Arts and culture students in Eastern University from the first year to final (4th) year, who attended online classes, were included in this study. Quota sampling was used in this study, as data collection technique. Quota sampling is a non-probability sampling method that involves the non-random selection of a set number or proportion of units. This is known as a quota. Researcher divided the population into mutually exclusive subgroups (called strata) as first year to final year, and then recruit sample units until the quota is fulfilled. From June 1 to 15, 2021, the author distributed an electronic survey as Google forms questions to the students through the WhatsApp group and Viber groups. The following information has been gathered using a combination of five-point Likert scale questions and demographics, information about Arts students.

Furthermore, Online learning challenges are divided into four types: technical barriers, Institutional barriers, Family barriers, and personal barriers. Each factor has contained three statements. These are measured by using Likert scale type of data. The data were analysed using the SPSS software package-26 and the Analysis of the moment structure (AMOS) 16 program analysis. The online learning challenges assessed using statistical approaches such as descriptive analysis, provided as mean and standard deviation, whereas other categorical parameters were reported as frequencies and percentages. Reliability analysis and confirmatory factor analysis-Structural equation model (SEM) also derived using AMOS software.

## 4. Results and Discussions

### Demographic profile of the respondents

Table one shows the demographic profile of the Eastern University students involved in this study. As per table 1, out of 200 students, 162(81%) are female, and 38(19%) are male. The majority of the students responded from 1<sup>st</sup> year, around 66%. Most of the students (61%) age is 20-22 category. Out of 200, 82% of the students living in a rural area, and 18% of the students residing in urban areas. Out of 200students, 20% of students come from female-headed families. Most of the students, 162 (61%) students, their parents work as day workers who come from low-income families. Concerning the level of education of their head of the families, 91% of there was up to school level. 67% of their family receive below the 15000 Rs per month. Furthermore, 69 % of their family have only one learning device as their own. But 120 (60%) students said that more than one member learns from online learning in their home. Then this difficult to understand at the same time of the day to the students. 78% of the students using the data as prepaid, and only 6% have no data type for learning activities. They are using friends and relative Wi-Fi facilities for learning. Another interesting finding is that in the demographic profile, the majority of the students, 72% are dialog customers. Lastly, most of the students, 45%, learn per week for 6-10 hours.

**Table 01- Demographic profile of the University students. (sample-200)**

S/N	Characteristics	Catergorize	No of Respondents	Percentages (%)
1	Year	1st year	132	66
		2nd year	29	14
		3rd year	24	12
		4th year	15	8
2	Gender	Male	38	19
		Female	162	81
3	Age	20-22	122	61
		23-25	78	39
4	Location	Rural	164	82
		Urban	36	18
5	Family Head	Male head	161	80
		Female head	39	20
6	Job	Government	24	12
		Privat	15	8
		Self-employed	23	12
		Day worker	122	61
		Unemployee	16	8

7	Monthly Income	below15000	133	67
		15001-30000	48	24
		30001-45000	16	8
		over 45000	3	2
8	Education of Family Head	School level	181	91
		Undergrauate	13	7
		Postgraduate	6	3
9	Number of learning devices	None	33	17
		1 device	138	69
		2 device	20	10
		More than 2 devices	9	5
10	Number of online learners	One	81	40
		Two	73	36
		Three	35	18
		More than three	11	6
11	Internet package	No internet	12	6
		Prepaid	156	78
		post paid	32	16
12	Browsing company	dialog	144	72.0
		Airtel	31	15.5
		Mobital	18	9.0
		SLT	2	1.0
		More than one other	4	2.0
13	Hours spent online per week	below 5 hours	41	20.5
		6-10 hours	90	45.0
		11-15 hours	26	13.0
		More than 15 hours	43	21.5

### Construct reliability analysis for Online learning challenges

When applying the Likert scale type of questions, we check the Cronbach's alpha value for reliability and consistency. (Joseph et al.,2003) Table 2 shows the components and total reliabilities of the Likert scale of online challenges scores. Considering to Table 02, overall score of all the 12 statements is 0.775. Which is indicates a higher level of internal consistency. The combined scale's substantial alpha value suggests that the scale's reliability and convergent validity were both met (Parasuraman et al., 1991). But individually check the alpha value for technical challenges, institutional challenges, family challenges, and individual challenges are 0.863, 0.736,0.793, and 0.732, respectively.

**Table 02: The result of the reliability analysis for Likert scale questions**

Questionnaire	No of attributes	Cronbach's Alpha	Reliability type
Technical challenges	03	0.863	Good
Institutional Challenges	03	0.736	Accept
Family challenges	03	0.793	Accept
Individual challenges	03	0.732	Accept
Overall reliability analysis	<b>12</b>	<b>0.775</b>	Accept

**Online Learning challenges-**

The following challenges have been facing Online learners. The mean value and standard deviation of each statement are given as follows.

**Table- 03 Results of Descriptive analysis of online learning challenges**

S.NO	Statements	Mean	Standard deviation	Rank
01	Technical challenges			
01	Devices are not comfortable	3.99	.985	3
02	Limited signal facilities	4.03	.942	2
03	Lack of technical access	3.28	1.090	8
<b>02</b>	<b>Individual challenges</b>			
04	Health problems	3.91	.666	4
05	Stress	4.04	.633	1
06	Online learning is not motivating to me	3.75	.742	6
<b>03</b>	<b>Family challenges</b>			
07	Lack of family supports	3.20	1.243	9
08	Conflicts within the family	3.64	1.323	7
09	Financial issues	3.80	1.178	5
<b>04</b>	<b>Institutional challenges</b>			
10	Lecturers are not trained to teach	1.91	.970	12
11	Lack of discussion facilities	2.27	1.211	10
12	Lower level of satisfaction about teaching and learning materials	1.97	1.075	11

\* Source-Survey data

\* Frequency and Percent

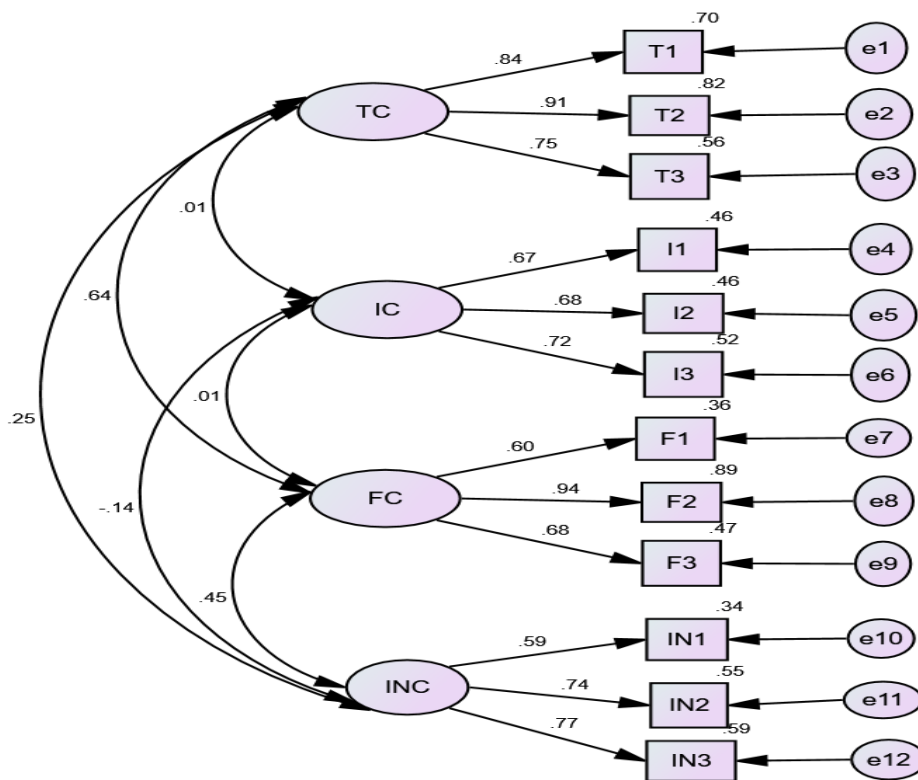
The above table shows that twelve statements, and each consists of a five-point scale value of its. Twelve statements include four main categories of challenges: technical challenges, Family challenges, Institutional challenges, and Individual challenges. Each one consists of three statements.

**Confirmatory factor analysis model (CFA) measurement**

Confirmatory factor analysis has been performed to assess the model's appropriateness based on the data collected. Anderson and Gerbing (1988) advised that the Confirmatory model was studied first, followed by the measurement model to verify the survey instrument's reliability and validity. The Confirmatory model was studied using AMOS version 23 after the measurement model has been analyzed to test the survey instrument's reliability and validity. The data is analyzed using Confirmatory factor analysis to see if it fits a theoretical model. Chi-square/degrees of freedom ( $\chi^2/df$ ), CFI, GFI, AGFI, TLI, IFI, RMSEA, and PGFI were all used to evaluate the model (Table 5)

**Table 04 Model fit summary of CFA model for Online learning challenges**

Indices	Value	Suggested value
Chi-square value	52.282	
DF	48	
P value	0.311	> 0.05 ( Hair et al., 1998)
Chi-square value/DF	1.089	< 5.00 ( Hair et al., 1998)
GFI	0.96	> 0.90 (Hu and Bentler, 1999)
AGFI	0.935	> 0.90 ( Hair et al. 2006)
NFI	0.943	> 0.90 (Hu and Bentler, 1999)
CFI	0.995	> 0.90 (Daire et al., 2008)
RMR	0.047	< 0.08 ( Hair et al. 2006)
RMSEA	0.021	< 0.08 ( Hair et al. 2006)



**Figure-1 Confirmatory Factor Analysis model on Online learning challenges**

The above table shows that the calculated P-value is 0.311, which is greater than 0.05, indicating a perfect fit. Here Goodness of Fit Index (GFI) value (0.96) and Adjusted Goodness of Fit Index (AGFI) value (0.935) is more significant than 0.9, which represents it is a good fit. The calculated Normed Fit Index (NFI) value (0.948) and Comparative Fit Index (CFI) value (0.995) indicates that it is a perfect fit. Also, it has been found that the Root Mean square Residuals (RMR) and Root Mean Square Error of Approximation (RMSEA) values are 0.021, which is less than 0.08, indicating it is perfectly fit.

**CFA model with standardized factor loading**

As per Figure 1, Based on the CFA model, it is possible to conclude that technical challenges, institutional challenges, family challenges, and individual challenges are statistically significant. This means that all factors are mutually inter-covariates with each of them. Factor loading values of all indicators in the measurement model are above 0.6, which is higher than the acceptable range of above 0.5.

**Table 05 Reliability and validity check of the CFA Model**

			Factor loading (FL)	Item reliability(IR)	Delta	AVE	Sum of FL	sum of delta	Construct reliability
T1	<-- -	TC	0.836	0.698896	0.301104				
T2	<-- -	TC	0.906	0.820836	0.179164				
T3	<-- -	TC	0.749	0.561001	0.438999	0.693578	2.491	0.919267	0.870968
I1	<-- -	IC	0.715	0.511225	0.488775				
I2	<-- -	IC	0.698	0.487204	0.512796				
I3	<-- -	IC	0.721	0.519841	0.480159	0.50609	2.134	1.48173	0.754505
F1	<-- -	FC	0.597	0.356409	0.643591				
F2	<-- -	FC	0.942	0.887364	0.112636				
F3	<-- -	FC	0.683	0.466489	0.533511	0.570087	2.222	1.289738	0.79288
IN 1	<-- -	INC	0.612	0.374544	0.625456				
IN 2	<-- -	INC	0.741	0.549081	0.450919				
IN 3	<-- -	INC	0.767	0.588289	0.411711	0.503971	2.12	1.488086	0.75126

The model's validity was found to be satisfactory in the measurement model, such as all the challenges based on the results of the average variance extracted. A good rule of thumb is an AVE of 0.5, or higher indicates adequate

convergent validity. An AVE is less than 0.5 suggests that, on average, there is more error remaining in the items than there is variance explained by the latent factor structure have imposed on the measure.

The rule of thumb construct reliability estimate is 0.7 or higher suggest good reliability. Reliability between 0.6 and 0.7 may be acceptable, provided that other indicators of a model's construct validity are good. High construct reliability indicates that internal consistency exists. This means the measures all are consistently representing something. Such as technical challenges, institutional challenges, family challenges, and individual challenges based on composite reliabilities exist solid internal reliability.

**Table-06 Discriminant validity of Online learning challenges**

Factors	Squared inner construct correlation (SIC)				
	AVE	TC	IC	FC	INC
TC	0.69358	nil	0.0001	0.4122	0.0635
IC	0.50609	0.0001	nil	0.0002	0.0182
FC	0.57009	0.4122	0.0002	nil	0.2034
INC	0.50397	0.0635	0.0182	0.2034	nil

All Average Variance Extracted (AVE) estimates in the above table are more significant than the corresponding Squared Interconstruct Correlation (SIC) estimates. This means the indicators have more in common with the construct they are associated with than other constructs. Therefore CFA model demonstrates Discriminant Validity.

## 5. Conclusion

This study aimed to demographic characters firstly found—demographic profile of the Eastern University students involved in this study. Out of 200 students, the majority are 82% female Majority of the students responded from 1<sup>st</sup> year around. 82% of the students living in rural areas. 20% of the students come from female-headed families. Most of the students, 61% students, their parents work as day workers from low-income families. Concerning the level of education of their head of the respondent's families. 91% of their families educated up to the school level. 67% of their family received below the 15000 Rs per month. Furthermore, 69 % of their family have only one learning device as their own. But 60% of students said that more than one member learns from online learning in their home. 78% of the students using the data as prepaid, and only 6% have no data type for learning activities. Another interesting finding is that in the demographic profile, the majority of the students, 72% are dialog customers. Lastly, most of the students, 45%, learn per week for 6-10 hours. Next, Considering the thornback alpha value, the overall score of all the 12 statements is 0.775. Which is indicates a higher level of internal consistency. The results of the Likert scale analysis are significantly important. Four main challenges, each consists of three statements. Those are Technical challenges, Family challenges, Institutional challenges, and Individual challenges. Based on the rank analysis and mean analysis, students have been facing firstly technical challenges followed by individual challenges, family challenges lastly institutional challenges, respectively. Stress is the significant and first challenge; this has a high mean value and lower standard deviation based on the student's response.

Use Confirmatory factor modeling to investigate the elements determining online learners' perception of the four factors relevant to the online challenges CFA model. This study confirms and solves the online learning challenges. The proposed model is then using data acquired from Eastern University, Sri Lanka. It has been found that the calculated P-value is significant, perfectly fit. Here Goodness of Fit Index (GFI) value and Adjusted Goodness of Fit Index (AGFI) are more important than 0.9, representing it as a good fit. The calculated Normed Fit Index



(NFI) value and comparative Fit Index (CFI) value indicates a perfect fit. Also, it has been found that the Root Mean square Residuals (RMR) and Root Mean Square Error of Approximation (RMSEA) values are less than 0.08, indicating it perfectly fits. The above four challenges were recognized as four key factors of Online learning challenges. Factor loading values of all indicators in the measured model are above 0.6, which is higher than the acceptable range of above 0.5. A good rule of thumb is an AVE of 0.5, or higher indicates adequate convergent validity. The power of thumb construct reliability estimate is 0.7 or higher suggest good reliability. Further CFA model demonstrates discriminant validity.

### **Implications**

Indeed, this research will assist higher education in determining the priority that students backward or rural place on many critical aspects of Online learning students. Government should change the educational policies or way of teaching and learning systems in today's competitive world. Then considering these challenges government re-arranging the Online classes to the Higher education sector, especially for University students.

### **limitations and the future perspectives**

This research has its own set of limitations. The conclusions of this study may not apply to all higher educations in Sri Lanka because it was limited to one University in Sri Lanka. Furthermore, because the research is limited to one University's generalizations may not apply to other Universities. Without any discrimination, students' opinions are presented in a non-discriminatory manner, which was treated as such without prejudice. Further research in higher education, particularly in the globalized context, can be conducted from various perspectives and various countries.

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