



DESIGN AND DEVELOPMENT OF A SCALE TO MEASURE STUDENT'S PERCEPTIONS ON ONLINE LEARNING

T S Nanjundeswaraswamy¹
Swamy D R
Rashmi S
Vallipuram Kanagasigam

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Globally, the COVID-19 pandemic has disrupted the functioning of all sectors of the economy. With no exception, the education sector's functioning has also been significantly affected due to the rapid outbreak of COVID-19. It has resulted in a drastic surge to deliver pedagogy using online methods. In this uncertain worldwide environment, educational institutions have been forced to continue educating students through the remote teaching process due to the emergency lockdown declaration. With due consideration for the prevailing conditions, the government and policymakers of educational institutions had to promote online education. Even many Higher Educational Technical Institutions (HETIs) may be likely to continue teaching online once this pandemic has passed. It is essential to review and examine students' perceptions about the online learning process to improve online education's quality and standard to the next higher level. In this context, the present study aimed to develop and validate a measuring instrument to evaluate students' online learning perceptions. Data was collected from 1632 students using a structured questionnaire Using EFA, CFA, and SEM. The designed instrument is validated. The developed instrument addresses a total variance of 63.47% with Cronbach's alpha reliability coefficient value 0.942. The final validated instrument consisted of seven factors, Capability of Online Learning (COL), On-line Learning Difficulties (OLD), Course Faculty Capability in online learning (CFC), Online Learning System (OLS), On-line Learning Assessment (OLA), Online Platform and Communication for Learning (OPCL) and Conventional Learning and Communication (CLC).



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1. INTRODUCTION

The outbreak of corona virus disease has increased the world's entire population's tension and anxiety without any discrimination. At the same time, it also created a lot

of socio-economical problems across the globe, which is evident from the collapse of the international stock market, which lost about \$6 trillion in capital in a single week from February 24-26, 2020 (Nasim, 2020). Compared to other developed economies, India is one of

¹ T S Nanjundeswaraswamy
Email: nswamy.ts@gmail.com

the most populous and emerging economies globally. Like other economies, it too is facing a difficult situation during the COVID-19 spread. It has its difficulties in handling this pandemic since the outbreak in early 2020. Like other sectors, the education sector was also affected by COVID-19. If one looks at history, a similar situation during 1918-1919 due to the influenza epidemic, and Spanish flu in 1957-58. The United States had faced a similar effect, and decision-makers, at that time, had taken similar interventions, i.e., lockdown/closure of schools, and public gathering prohibitions, etc., apart from other restrictions (Markel et al., 2007). This may have been due to the closing of academic institutions, which may have helped break the further spread of this infectious disease.

The academic programs attending helps the learners to empower their knowledge, skill, attitude, and creative skill-sets, which allows them to reach an employable level. Apart from this, it has also benefited from social skills and social consciousness from an economic perspective. The wild spread of pandemics had posed several challenges to learners and educators in the learning environment. For educators, it is to make the educational process continuous by implementing alternative measures. The different countries had followed a wide range of measures to respond to this crisis, depending upon the stakeholder's resources and readiness. Few developed countries rapidly enhanced their e-learning resources to support the learners. In these countries, all stakeholders joined hands to build digital resources to help the learners (Azzi-huck and Shamis, 2020). For this socially and physically distanced education, the countries without adequate resources and infrastructure depended on the various traditional technology such as radio and TV to compensate for the loss. During the pandemic and beyond, education needs to be reconstructed as the community embedded practice for higher effectiveness. Finally, realizing the educational outcome eventually depends on the facilities, skill, and expertise of those involved in the learning environment (Saavedra, 2020).

In India, without much time, with the available resources, academic institutions had made their humble effort to make the ongoing academic process continuous through online mode, with the different stakeholder's help. It is a well-known fact that most of the higher educational institutions had embraced the available Information and Communication Technologies (ICT) tools to conduct online classes. The other part of the story is that the content delivered was not designed for online learning but traditional face-to-face learning. The sudden migration from the conventional platform to a new online platform created a lot of discomfort and stress among the stakeholders. The learning environment matters a lot in the teaching and learning process. The classroom climate has some advantages compared with other modes of learning, i.e., perceived connection, rapport, or affinity between teacher and learner (Cooper,

1995; Dwyer et al., 2004). The latter are significantly less in online learning, maybe because this happens mostly within a computer-mediated context, resulting in lower interaction and engagement (Allen, 2006).

Further, this lower interaction may result in confusion or frustration with the course content (Brown, 1996; Hara, 2000) if it is not adequately designed. Especially in the online context, course design and structure play a crucial role in student's perception (Kaufmann et al., 2016). The reason may be that course design reflects the teacher's direction and overall purpose. It has to be done carefully from the initial course design phase (Ko and Rossan, 2011), especially for online teaching, until it is implemented.

Evaluating migrated online mode and student perceptions of online learning of offline content helps educators design and implement the academic learning process in similar situations.

2. LITERATURE REVIEW

COVID -19 pandemic had affected and changed the dynamics of the entire teaching-learning process across the world. Because of its sudden impact and requirement, decision-makers migrated to online teaching systems to make academic activities continuous. In a developing economy like India, this adoption, without proper preparations, created many discomforts and anxiety among all the stakeholders. During the lockdown situation, teachers had played a dual role. The first one is to teach the students, and the second one is all about social responsibility, to keep the student engaged with the constructive work to avoid the spread of a pandemic.

Many studies have explored online learning issues, which covers both positive and negative aspects of it. Online learning provides an independent and nonjudgmental learning environment, which is very important for the learners' empowerment (Kongrith et al., 2005; Khaferi and Khaferri, 2022) as a. About the acquirement and sharing of knowledge through the electronic mode. This form of learning mostly depends on the network, computers, cell phones, and other electronic devices (Wentling et al., 2000). Obviously, in the online teaching-learning process, the critical requirement is a high bandwidth network is required (Zhang et al., 2004). All of the above factors indicate the importance of infrastructure in the online teaching-learning process.

It is necessary to evaluate the online teaching-learning process effectiveness by considering the different factors, especially from the student's perspectives. In this direction, Stewart et al. (2004) identified the seven predominant factors that affect online learning: Appearance of Web Pages, Class Procedures and Expectations, Content Delivery, Hyperlinks, and

Navigation, Instructor and Peer Interaction, Online Applications and Technical Issues Further to this study, Roberts et al. (2006) had used four factors to evaluate online learning effectiveness: Course Materials, Instructor Characteristics, Library Resources, and Technology Researcher Bangert (2006) had also identified four factors to determine the effectiveness of online learning: Active Learning, Cooperation among Students, Student-Faculty Interaction, and Time on Task To measure the online learning process's effectiveness, Fortune et al. (2011) had used six dimensions such as the Amount of time spend, Course content, Learning environment, preferences, collaboration, and Technical skills.

The study by Cole et al. (2014) had explored eight factors to measure student's satisfaction with online learning are; Clarity, Communication, Convenience, Instructor, Interaction, Learning style, Platform, Structure Similarly. Kaufmann et al. (2016) had used three factors to measure the students' online learning climate: course-specific structural issues, student characteristics and behaviors, and instructor behaviors. The factors are selected based on the research context in all the above studies.

From the literature, the researchers have used several factors to measure the student's perception about online learning, and many instruments were designed and validated to measure the perception of students about online learning in a normal situation; However; there are no studies available in the body of literature where the factors are identified to evaluate learners' perception when offline learning content is delivered online With this background, the present study proceeds to identify and develop a reliable and valid scale to measure online learning effectiveness and validate the same.

3. METHODOLOGY

An online survey was conducted using a designed questionnaire through Google form. The developed questionnaire contains the factors identified based on their frequency, the pilot study's inputs, and the expert's feedback. The data collected was validated, and the factors were subjected to Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The Structural Equation Modeling (SEM) was performed to verify the interrelationship between the items and factors using SPSS and AMOS software (version 2.1). Kline (2015) and Netemeyer et al. (2003) had suggested the Exploratory Factor analysis (EFA) and Confirmatory Factor Analysis (CFA) was used to reduce the number of items and to identify the critical factors for designing the instrument EFA was conducted to extract the new factor structure and examine the construct validity of the Online Learning Scale (OLS) The measurement model was undertaken to explore the relationship between the observed measure and latent variable of OLS Confirmatory Factor Analysis

According to Bagozzi and Phillip's (1982) suggestions, for the present study, the proposed instrument was validated by examining different statistical tests such as factor analysis, convergent validity, reliability, and discriminate validity using SPSS and AMOS software.

3.1 Components Selection

From the literature survey, sixteen important factors influencing online learning were considered for the present study, namely; Active Learning process; Amount of time spent; Assessment methods; Behavior Intent after and before the class; Communicativeness; Cooperation Among Students; Diverse Talents, and Ways of Learning; Face to Face communication possibilities; High Expectations of the instructor and the students; Instructor behaviors; Internet Availability; Learning Environment; Prompt Feedback facilities; Satisfaction of the students; Student-Faculty Contact and Time on Task The selection is based on their frequency in the literature, the importance of the component to the Indian context, and the expert's suggestions.

3.2 Design of Questionnaire and Data Collection

On a five-point Likert scale, all the questionnaire items were developed, strongly disagree as one and strongly agree as five The instrument comprises 61 items from 16 factors derived through the literature analysis and other reasons The developed instrument consists of two parts; the first part contains the Educational Institutions and student's demographical attributes The second part included 61 items that influence online learning Few questions were intentionally negatively framed to reduce the bias In total, 1828 responses were collected through the Google forms It is from two engineering colleges, one is located in Bangalore, Karnataka state, and in Noida, Uttar Pradesh, 196 responses were discarded for inappropriate responses The researcher Vinodkumar and Bhasi (2009) had suggested that two separate sets of data for EFA and CFA give more reliable and accurate results to validate the instrument For the present study, 1632 responses are considered for analysis, out of which 824 responses were considered for the components/factors identification and item reduction using EFA, and the remaining 808 responses were evaluated to confirm the extracted items and components using CFA.

Table 1 shows the demographic profile of the respondents. The heterogeneous data was collected by considering the students' different demographic characteristics such as Geographic Location, Departments, year of study, gender, place of residence, and Gadgets for online learning.

Table 1. Demographic profile of the respondents

Sl.No	Demo characteristics of respondents		Number of Respondents	Percentage
1	Geographic Location	Bangalore	944	57.84
		Noida	688	42.16
2	Departments	CSE	359	22.00
		CE	400	24.51
		ECE	254	15.56
		EEE	112	6.86
		E&IE	85	5.21
		IEM	143	8.76
		ISE	65	3.98
		ME	176	10.78
		MCA	8	0.49
		MBA	30	1.84
3	Year	I	632	38.73
		II	419	25.67
		III	270	16.54
		IV	311	19.06
4	Gender	Male	1120	68.63
		Female	512	31.37
5	Place of residence	Urban	1039	63.66
		Suburban	114	6.99
		Rural	479	29.35
6	Gadgets used for online learning	Desktop	15	0.92
		I Pad	6	0.37
		Laptop	339	20.77
		Smart Phone	1268	77.70
		Tablet	4	0.25

3.3 Identification of Critical Impact Factors

The Exploratory Factor Analysis (EFA) was conducted after the sample adequacy test to identify the critical impact factors of online learning. The results show that the Kaiser-Meyer-Olkin sampling adequacy coefficient is 0.954, which is more than the critical value of 0.6, as mentioned by Kaiser and Rice (1974). It indicates that the sample size is sufficient for performing the EFA using Principal Component Analysis. With Varimax

rotation EFA was conducted, the analysis resulted in eight critical factors and 49 items that explain 63.47 percentage of the total variance.

It indicated that the designed instrument is reliable and acceptable for further statistical calculations. The reliability coefficient Cronbach's alpha value for the present study is 0.942. Cronbach's alpha value should be more than 0.7 Nunnally (1978) for good reliability.

Table 2. Summary of Principle Component Analysis

Com	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.999	30.609	30.609	14.999	30.609	30.609	9.937	20.279	20.279
2	6.706	13.685	44.294	6.706	13.685	44.294	6.354	12.967	33.246
3	2.852	5.820	50.114	2.852	5.820	50.114	5.179	10.569	43.815
4	1.826	3.726	53.841	1.826	3.726	53.841	2.623	5.353	49.168
5	1.363	2.781	56.622	1.363	2.781	56.622	2.016	4.114	53.283
6	1.181	2.410	59.032	1.181	2.410	59.032	1.995	4.072	57.354
7	1.156	2.359	61.391	1.156	2.359	61.391	1.740	3.551	60.905
8	1.020	2.082	63.473	1.020	2.082	63.473	1.258	2.568	63.473
9	.909	1.854	65.327						
10	.813	1.659	66.986						
11	.746	1.523	68.510						
12	.724	1.478	69.987						
13	.683	1.395	71.382						
14	.645	1.315	72.697						
15	.624	1.274	73.971						
16	.599	1.223	75.194						
17	.585	1.194	76.388						

Table 2. Summary of Principle Component Analysis (continued)

18	.539	1.099	77.487						
19	.535	1.092	78.579						
20	.523	1.068	79.647						
21	.515	1.050	80.697						
22	.491	1.002	81.699						
23	.485	.990	82.689						
24	.467	.953	83.642						
25	.450	.918	84.560						
26	.446	.911	85.471						
27	.430	.877	86.348						
28	.423	.863	87.211						
29	.402	.821	88.032						
30	.392	.801	88.833						
31	.379	.773	89.606						
32	.372	.758	90.364						
33	.365	.745	91.109						
34	.359	.732	91.842						
35	.352	.718	92.559						
36	.329	.671	93.230						
37	.321	.656	93.886						
38	.310	.632	94.518						
39	.298	.609	95.127						
40	.289	.590	95.717						
41	.272	.555	96.272						
42	.264	.539	96.810						
43	.256	.522	97.332						
44	.251	.512	97.844						
45	.236	.482	98.326						
46	.233	.475	98.801						
47	.205	.419	99.220						
48	.201	.409	99.629						
49	.182	.371	100.000						

Extraction Method: Principal Component Analysis.

The extracted eight critical factors structure were reframed by considering the relevance of the items. The factors were named as Capability of Online Learning (COL), On-line Learning Difficulties (OLD), Course Faculty Capability in online teaching (CFT), Online Learning System (OLS), On-line Learning Assessment

(OLA), Online Platform and Communication for Learning (OPCL), Conventional Learning and Communication (CLC) and Online Learning Inconvenience (OLI) The items, item loading, name of the critical factors, and variance explained are shown in table 3.

Table 3. Summary of factor analysis

Q No.	Factor loading	Items	Component name	Variance explained
COL1	.832	I would prefer this mode of learning in the future for all the courses	The capability of Online Learning (COL),	20.279
COL2	.787	If asked, I would probably recommend the online learning system as an ideal learning platform		
COL3	.779	I believe my interest will increase in the future by the usage of these online tools.		
COL4	.770	This mode of learning could be used for all type of courses		
COL5	.766	I would recommend online teaching and learning to other people		
COL6	.684	Online teaching and learning helps to enhance my Knowledge and Innovative capability		
COL7	.671	I find myself to be more productive while having online learning		
COL8	.669	As a student, I enjoy working independently and learning with various online tools		
COL9	.657	I can present my technical seminar and project progress effectively using online tools to my reviewers		
COL10	.653	I am comfortable with Lab courses in online mode		
COL11	.649	Learning is the same in the class and at home		
COL12	.627	I am willing to actively communicate with my classmates and faculty electronically in the future		

Q No.	Factor loading	Items	Component name	Variance explained
COL13	.613	I am comfortable communicating electronically.		
COL14	.597	I feel comfortable composing text on a computer in an online learning environment.		
COL15	.552	An online environment makes it easier for me to communicate with my faculty.		
COL16	.550	I am happy with the scheme of online evaluation		
OLD1	.813	I may be keeping abreast of the technological developments, but I am losing out on people skills	Online Learning Difficulties (OLD)	33.246
OLD2	.800	I can't feel what I am doing as I do in the laboratory or workshop.		
OLD3	.799	There is absolutely no scope for building team skills as I sit in my location and learn.		
OLD4	.790	There is a disconnect between my tutor and myself, and I seldom experience the bondage in the actual classroom.		
OLD5	.759	I don't believe that online learning offers the same joy of learning that we have in the classroom		
OLD6	.758	Online teaching does not permit any social interaction and has its limitations in developing social skills.		
OLD7	.745	I miss the fun of learning together with my friends.		
OLD8	.721	I prefer to have face to face interaction for teaching-learning rather than online teaching		
OLD9	.713	Though practicals can be conducted through virtual labs, it does not give the same experience as a laboratory.		
OLD10	.679	Development of soft skills is impossible in the online teaching and learning process		
CFC1	.741	Course faculty are well-versed with the online teaching platforms	Course Faculty Capability in online teaching (CFT)	43.815
CFC2	.740	Feedback was taken after each session.		
CFC3	.733	Course faculty are responding to our queries and giving instantaneous feedback quickly and efficiently		
CFC4	.733	Course faculty are knowledgeable in their field		
CFC5	.719	Course faculty are well prepared and organized for the sessions		
CFC6	.719	Quality of Content and delivery was good		
CFC7	.718	Course faculty create an environment for interactive participation		
CFC8	.715	Interaction with faculty was good		
OLS1	.809	Internet facility at my location was sufficient for attending the virtual classes.	Online Learning System (OLS)	49.168
OLS2	.772	I am comfortable with the speed of the Internet while accessing online classes.		
OLS3	.674	I Am comfortable with the reliability of an Internet service provider.		
OLS4	.524	I am comfortable attending virtual classes from different locations.		
OLA1	.624	The online assessment provides me enough time to elaborate on my answers	Online Learning Assessment (OLA)	53.283
OLA2	.618	The online assessment is aesthetically appealing		
OLA3	.586	The Assessment criteria for online learning gives me a positivity towards fair results		
OPCL1	.691	The online platforms make it easier to interact with other students	Online Platform and Communication for Learning (OPCL)	57.354
OPCL2	.679	The online platforms make it easier to share knowledge with other users		
OPCL3	.644	The online platforms make discussions easier with faculty		
CLC1	.769	A classroom environment makes it easier for me to communicate with my classmates.	Conventional Learning and Communication (CLC)	60.905
CLC2	.680	A classroom environment makes it easier for me to communicate with my faculty		
CLC3	.566	The learning environment helps me to learn course material better		
OLI1	.878	I faced security/privacy issues with tools and techniques used in online teaching	Online Learning Inconvenience (OLI)	63.473

4. VALIDATION OF THE MEASURING INSTRUMENT

4.1 Confirmatory Factor Analysis(CFA)

Exploratory Factor Analysis revealed an eight factors structure, and this eight-factor model is empirically examined through Confirmatory Factor Analysis(CFA) using Analysis of Moment Structure (AMOS) and Structural Equation Modelling (SEM) CFA explored seven factors with 39 items Figure 1 represents the measurement model for Online Learning The confirmed factors were Capability of Online Learning (COL), On-line Learning Difficulties (OLD), Course Faculty

Capability in online teaching (CFT), Online Learning System (OLS), Online Learning Assessment (OLA), Online Platform and Communication for Learning (OPCL) and Conventional Learning and Communication (CLC) One-factor, along with ten items, is deleted because of the poor factor loading According to De Vellis (2003) and Streiner (2003), items can be deleted during CFA when item loading is less than 0.4 if it contributes more than one factor explaining the complexity and not significant when the p-value is more than 0.05 The resulted seven-factor measurement model was evaluated for its goodness of fit indices and statistically acceptable model.

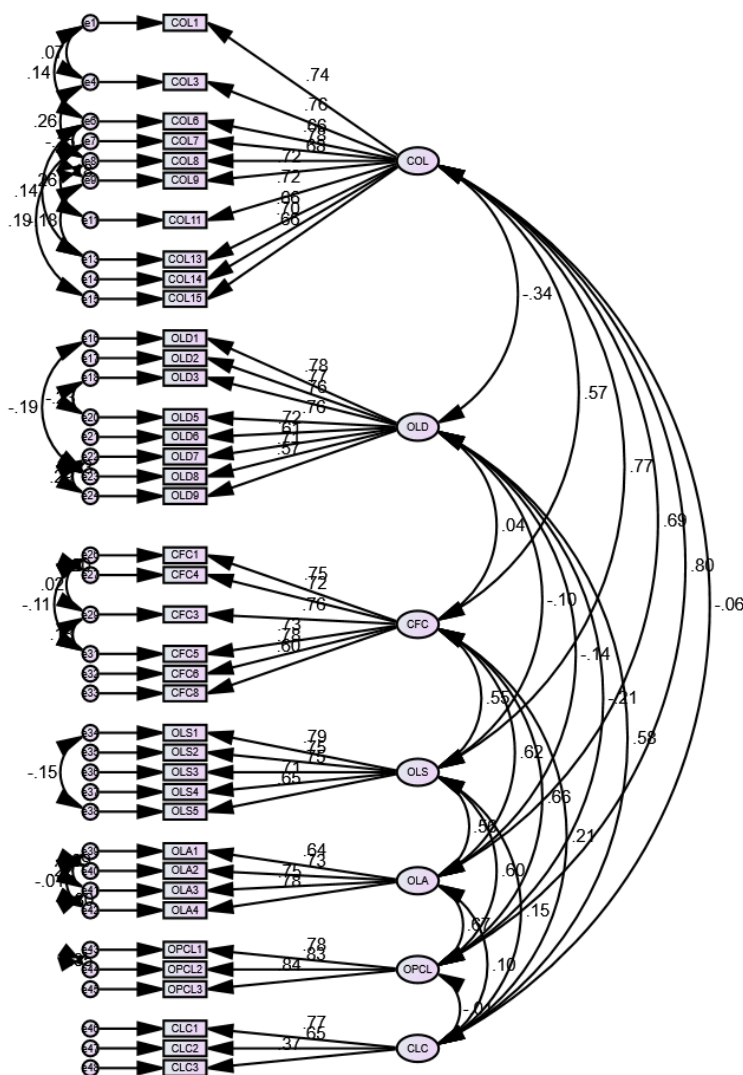


Figure 1. Measurement Model

The Seven-factor measurement model and 39 items indicated a factor with loading ranging between 0.57 to 0.84, indicating that the proposed instrument fulfills the convergent validity criteria CFA statistics such as CMIN/DF = 2.167, which is less than 3 (Bentler 1992) Model fit indices such as GFI= 0.916, AGFI = 0.900, NFI = 0.917, RFI = 0.907, IFI=

0.954, TLI=0.948, CFI=0.954 are more than 0.9. For the good measuring instrument, the model fit indices should be more than 0.9, Daire et al. (2008) Finally, the RMSEA=0.038, for the better measurement model, the error approximation should be less than 0.08 (Hair et al.2006). Most of the model fit indices in the proposed

measurement model to measure online learning indicated that it fulfills construct validity criteria.

4.2 Convergent validity

To examine the nature of differences among the extracted constructs, convergent validity analysis need to be conducted. According to Mark & Sockel (2001), Normed Fit Index (NFI) is also one of the measures of convergent validity of the instrument. If NFI is more than 0.9 indicates that the construct is a good

convergent. According to Van Saane et at. (2003), if Average Variance Extracted (AVE), Reliability coefficient like Cronbach's alpha value and Composite Reliability (CR) of the individual construct is more than 0.4 indicates that the scale is convergent. Table 4 represents the convergent validity statistics For the proposed measurement model, NFI= 0.917, and the individual construct's reliability is more than 0.6. The Average Variance Extracted Composite reliability is more than 0.4. It is an indication of strong and acceptable convergent validity.

Table 4. Convergent Validity Statistics

Sl.No	Dimensions	Mean	Standard deviation	Reliability Cronbach's alpha value	(AVE)	(CR)
1	The capability of Online Learning (COL),	2.60	0.746	0.911	0.423	0.879
2	Online Learning Difficulties (OLD),	3.82	0.714	0.890	0.537	0.902
3	Course Faculty Capability in online teaching (CFT)	3.39	0.704	0.871	0.506	0.821
4	Online Learning System (OLS),	3.03	0.716	0.842	0.455	0.799
5	Online Learning Assessment (OLA),	2.68	0.822	0.834	0.496	0.793
6	Online Platform and Communication for Learning (OPCL),	2.67	0.921	0.877	0.431	0.693
7	Conventional Learning and Communication (CLC)	3.63	0.740	0.617	0.452	0.712

4.3 Discriminate Validity

According to Bryman and Bell (2015), discriminate validity measures the construct that was specifically and autonomously different from one another. For the present research, the square root of the AVE of each component is more than the correlation coefficient of the individual construct. It indicates that the proposed construct is different from each other, and they measure the various entities, which is shown in Table 5.

Table 5. Discriminate Validity

	COL	OLD	CFC	OLS	OLA	OPCL	CLC
COL	0.650						
OLD	-0.316	0.732					
CFC	0.502	0.028	0.711				
OLS	0.682	-0.085	0.474	0.674			
OLA	0.581	-0.121	0.495	0.474	0.704		
OPCL	0.698	-0.190	0.539	0.513	0.524	0.656	
CLC	0.049	0.420	0.209	0.183	0.133	0.062	0.672

5. CONCLUSION

With the growing popularity and adoption of online education globally, an academic community needs to emphasize and reassess student's online learning capabilities, intentions, difficulties, and other characteristics in the online delivery of pedagogy. The present study proposes a conceptual framework for understanding the effectiveness of online teaching from

the student perspective. The conceptual model examines the reliability and validity of the scale developed. The study has assessed the factors, internal consistency, and validity. It confirms the 1632 student's responses From EFA. Eight constructs were extracted, namely Capability of Online Teaching (COL), On-line Learning Difficulties (OLD), Course Faculty Capability in online teaching (CFT), Online Learning System (OLS), On-line Learning Assessment (OLA), Online Platform and Communication for Learning (OPCL), Conventional Learning and Communication (CLC) and Online Learning Inconvenience (OLI).

Further, the CFA confirmed seven factors, namely Capability of Online Learning (COL), On-line Learning Difficulties (OLD), Course Faculty Capability in on-line Teaching (CFT), Online Learning System (OLS), On-line Learning Assessment (OLA), Online Platform and Communication for Learning (OPCL) and Conventional Learning and Communication (CLC) The seven-factor model satisfied the reliability, AVE, and discriminant validity criteria Further, the composite reliability for all the seven factors model was above 0.7 The cut-off value and all the factor loadings were significant, with each item describing the factors Hence, the seven-factor online learning model from the student's perspective was valid to test the effectiveness of the students' online learning behavior and attitude.

The above findings also indicate that the online learning model from the student's perspective is a multidimensional scale composed of seven more significant factors. Comparing the currently developed scale with that of the earlier study by Hung et al. (2010) reveals that student's capability, different learning platforms, and communication are significant factors in the online learning environment. Yet another recent study in Ghana by Forson & Vuopala (2019) had reported that attitude, self-regulated learning skills, and collaborative and interactive skills of students are also the significant factors that influence online learning effectiveness. It is important to note that previous studies have reported factors related to technology usage, online learning ability, readiness, motivation, attitude, and others, but the faculty element is missing in most of the studies. However, this study analysis confirmed the factors related to technology, online tools, assessment methods, student ability and difficulties, faculty ability, communication, and online learning inconveniences. Thus, the scale developed in this study consists of human behavior and attitude related factors (students capability and difficulties of online learning, faculty capability in online teaching), specific technology-related factors (online learning system, assessment of online learning, online platform and communication for learning and conventional learning and communication). As a result, the scale developed in this study has a significant contribution to the body of the literature on an online learning environment.

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6. IMPLICATIONS

The delivery of pedagogy online has its dynamics, as large - the scale of student's fraternity is completely naïve to online education. It is essential to pay attention to the various parameters like quantum, length of content delivered, online learning behavior, and preparedness or readiness of students and teachers. By paying attention to the influencing factors, online teaching's effectiveness could be enhanced, and the quality of e-teaching can be improved increasing learner satisfaction. The instant shift from classroom learning to online learning led to anxiety among the students who need to be comforted; to actively engage themselves in online teaching and learning processes. It needs to be addressed immediately by policymakers with appropriate measures.

The study also reveals seven factors to measure online learning's effectiveness from the student's perspective. The study results indicate two significant dimensions, namely difficulties in online learning and even faculty capability in online teaching, need to be addressed immediately with the concerned stakeholder's utmost care and attention. The faculty may help the students to overcome the difficulties in online learning by designing the course appropriately and delivering more effectively in a simple way, using appropriate tools. It encourages the student's participation and interaction during class sessions. Further, it is also essential for the faculty to empower themselves in online teaching capabilities by undergoing suitable training.

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T S Nanjundeswaraswamy

Department of Mechanical Engineering
JSS Academy of Technical Education,
Bangalore, India
nswamy.ts@gmail.com

Swamy D R

Department of Industrial Engineering
and Management
JSS Academy of Technical Education,
Bangalore, India
drswamydr@gmail.com

Rashmi S

Department of Industrial Engineering
and Management
JSS Academy of Technical Education,
Bangalore, India
rachel.s.81@gmail.com

Vallipuram Kanagasigam

Eastern University, Sri Lanka
kanagasigamv@esn.ac.lk
