Measuring Students' Perceptions Of Online Learning In Higher Education

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Abstract: Online learning has become a global platform for collaboration. In search of better economical ways to train and educate people, universities and enterprises have expanded their use of online learning. The purpose of this paper is to measure students' perceptions of online learning in higher education. Data was collected by distributing a questionnaire among 300 students from different universities in the UAE to measure the critical factors. This paper attempted to measure critical aspects such as, instructor characteristics (IC), social presence (SP), instructional design (ID), and trust (TR). The results indicated that the critical factors influence students' perceptions. This work will benefit designers, teachers, and universities to create a more effective online curriculum.

Index Terms— Online Learning, Instructor Characteristics, Social Presence, Instructional Design, Trust.

1. INTRODUCTION

Online learning or E-learning is learning whose implementation is supported by electronic services such as telephone, audio, videotape, satellite transmission or computer. [1] stated that e-learning is learning that uses online (internet-based) as an intermediary medium between instructors and students. Learning through online will make it easier for both parties because the delivery of teaching materials is faster, easier, and more efficient compared to other ways. E-learning facilitates interaction among students and subjects. Similarly, the interaction among students and instructors along with other students can share information or opinions on a variety of learning issues and students' personal development needs [1]. The instructor may place learning materials and assignments to be made by students in certain areas of the website and accessible to students. If necessary, the instructor can also give students the opportunity to access certain learning materials and exam questions that are only available to students once for a period of time [2]. The online learning market has been surpassed 165 billion USD in 2015 and is likely to increase by 5% between 2016 to 2023, exceeding 240 billion USD [3]. In the ever-changing world of Information and Communication Technology (ICT), the Internet is critical when it comes to receiving instructions from other locations [4, 5, 6]. The usage of the Internet in higher education has increased exponentially [7]. [8] stated that the Internet offers access to substantial learning content, which additionally offers ways for people to contact each other and pool their ideas, as well as talk on forums with users from all around the world. The usage of the Internet in face-to-face learning contexts has an impact on the learning process in terms of developing the skills acquired by students [9]. A meta-analysis comparing academic results from online courses and face-to-face courses generally shows that there is no common difference between the two formats, but there are big differences in effect, with several online courses give better results than face-to-face courses [9]. A recent meta-analysis of the highest high-quality study [10] suggested that e-learning leads to similar or better outcomes than face-to-face learning, although the author noted that the optimistic effect of e-learning outcomes was stronger than in face-to-face courses.

2. THEORETICAL FRAMEWORK

[11] defined online learning as "an innovative approach for delivering a well-designed, learner-centered, interactive, and facilitated learning environment to anyone, at any place, and at any time by utilizing the attributes and resources of various digital technologies along with other forms of learning materials suited for open, flexible, and distributed learning environments.". The implementation of e-learning as a learning media for students has many benefits including; a) flexible, b) saving learning time, c) reducing travel charges, d) reduction of overall costs of education, e) access to a broader geographical area, and f) training learners are more independent in gaining knowledge [2]. Many articles have shown positive results from online learning environments. [12] compared problematic online and face-to-face learning settings in the context of mathematics. It was found that students from a problem-oriented e-learning group work better than face-to-face students. Research by [13] mentioned the fact that online courses support students and they can comprehend the course content with greater ease and efficiency. [14] stated that synchronous and asynchronous learning can encourage students when it comes to self-paced learning. Learners had greater autonomy and were in charge of their online course participation [15]. Besides, the results showed that students had satisfactory feelings about the introduction to ICT in classrooms and that they had a positive attitude toward the adoption of online courses. [16]. [17] felt that online courses offer flexibility when it comes to time and location and additionally presents cost-effectiveness. Newly, many papers have created scales to ascertain student outlooks regarding online learning. [18] undertook a study to look into the tools created by [19]. They felt that "comfort with e-learning" and "self-management of learning" were the two key factors shown following their factor analysis. [20] conducted another test of [19] instrument through 314 Australian university students. The paper showed that this instrument can be used throughout the research and practice when it comes to student preferences to online learning. On the other hand, [21] felt that the online preparation of learners had to include technical computer skills, Internet skills and learner control throughout the sequence and choice of course material [19]. [21] created the Online Learning Readiness Scale (OLRS), which involves several key elements, including self-directed learning, learning drive, computer /

Internet self-efficacy, learner control, self-efficacy, instructional design, and confidence. Using the previously described aspects to look into student ideologies regarding online learning, this paper attempts to create a scale which would be able to be used effectively to show modern online learning circumstances. described instructor properties of them being empathetic, helpful, and sensitive to student needs. [23] stated that students did not take an active role in the e-learning system without guidance, and this was brought on through instructors who were additionally active throughout e-learning systems. When students and instructors communicate, greater social presence allows students to be more encouraged, have stronger feelings, cognitive function and learning outcomes [24]. [14] put forward the notion that the instructor offers feedback consistently, and becomes involved in discussions. [25] felt that the online trainer was the mediator, the planner, the trainer, and communicator all together. [26] examined the quality of online instruction, learning motivation, and learning engagement as key elements that affect course results of the online learning program. As a result, the instructor is critical when it comes to online learning environments. A person's mental activity to interact with a specific piece of information is called cognitive load. This cognitive load must be examined in-depth when planning instructional resources, particularly for the eLearning setting. The cognitive load theory focuses on the restrictions that a human's working memory presents when it comes to establishing the effectiveness of instruction, and has been seen as a structure with which researches on the process cognitive and pedagogical design can be built on [27]. The theory puts forward the notion that instruction should be planned under the scope of working memory to reach the optimal learning outcomes [28]. Working memory (WM) is seen as a collection of small pieces of information that a learner is can hold for a short period in their mind, while at the same time providing rapid access to newer, or extra information gathering [29]. Once the data on offer surpasses the level of mental effort that a learner can show, WM is exceeded, and learning is restricted. Conversely, in cases where the data provided is too limited, the mental effort taken on by the learners is also less, and then learning efficiency drops [30]. There is a limited amount of data that users engage within such a way that their current memory is changed to involve new data and save it for the future [31]. Internal, external, and relevant cognitive loads are different categories used to measure mental effort. Specifically, Internal load is directly tied to the nature of the level of complication in the content that learners receive and their expertise [27]. External load is related to the external elements set out throughout the instruction, which can establish deeper efforts in WM and can have an indirect negative effect on learning [32]. Lastly, relevant cognitive load describes the additional effort that learners put in, to bring about learning [27]. [33] underlined the fact that an instructional design of a course is not always effective once learners have cognitive overload (which is the collection of the extraneous, intrinsic, and germane load when it surpasses the learners' cognitive ability). [34] put forward the notion of student-centered course design, able to limit anxiety levels as they are tied to online courses. As a result, a well-designed online course can show the course designer's elaborate design process in addition to teaching experiences that are absorbed on the cognitive loads described in particular above. [35] stated that trust was the solid reliance of an entity to take action in a reliable, safe, and consistent way, in a specific situation (p. 4). Wang (2014) highlighted that creating and upholding trust is critical when it comes to online courses being beneficial, as they can limit the dropout rate. [36]. Additionally, underlined that when students feel that an online course offers advantages, they will have greater enjoyment in it. The studies described above show that trust towards online learning is a critical element in a student's view of online learning. To conclude, there are key aspects to online learning which were not examined earlier. This paper attempts to use these critical aspects, namely instructor characteristics (IC), social presence (SP), instructional design (ID), and trust (TR), and to create and confirm the validity of our scale.

3. METHODOLOGY

3.1 Participants and Data Collection

A collection of 300 participants from various universities in the United Arab Emirates was conducted, including a Google survey of students with various academic backgrounds (BA, MSc or Ph.D.) and an online learning experience. The demographic data covering gender, age, and educational history. Figure 1 shows that roughly 67.3% were female students and 32.7% were male participants, with 60% being BA, 37.3% MSc students, and 2.7% Ph.D. students. The key element seen is that roughly 96% of students own a smartphone, and 99.3% have Facebook accounts. When looking at Internet use every day, about 73.3% of students use it other than five hours a day, this shows that students have an experience of using the Internet.

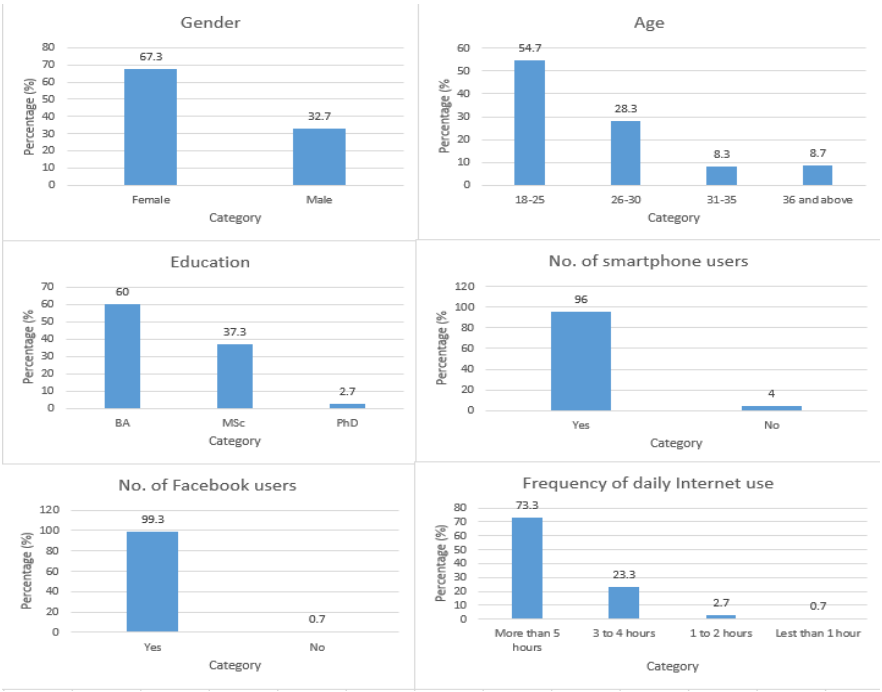

Figure 1: Demographic Statistics

Table 1: Survey Items

Construct	Item no.	Item
Instructor Characteristics (IC)	IC 1	Instructors should be friendly and approachable.
	IC 2	Instructors should encourage student interactions.
	IC 3	Instructors should provide sufficient learning resources online.
	IC 4	Instructors should solve emerging problems efficiently.
	IC 5	Instructors should provide fast feedbacks to queries in the discussion forum.
Social Presence (SP)	SP 1	This course would help me to use the Internet sources more efficiently.
	SP 2	I think sharing knowledge through online discussions is a good idea.
	SP 3	Online discussion enables students to exchange ideas and comments.
	SP 4	I would benefit from using interactive applications.
	SP 5	Browsing classmates' works would help to improve the quality of my own work.
Instructional Design (ID)	ID 1	I differentiate between difficult and easier types of course content and study them differently.
	ID 2	I like to involve myself actively in group discussions.
	ID 3	Understanding the subject matter of this course is very important to me.
Trust (TR)	TR 1	Online courses should provide a better learning experience than traditional courses.
	TR 2	I believe that I can earn better grade in an online course than in a traditional course.
	TR 3	Students learn more in online courses than they learn in traditional courses.

3.2 Item Generation

The survey tool employed in this paper included six items of personal data, with a further 16 items split across four categories, namely (IC), (SP), (ID), and (TR) (see Table 1 for descriptions of every aspect). To preserve the validity of the content of the instrument, a group of four experts examined the elements contained in these aspects. The IC category was made up of five items found through [23]. The SP dimension is made up of five items using the work of [23, 36]. The ID dimension was made up of three items using the work of [37]. The TR dimension consisted of three items from [38] and [39]. In addition to the demographic information presented, the survey elements were considered using a five-point Likert scale, with 1 representing strong disagreement and 5 representing that they strongly agree.

3.3 Data Analysis

To establish the factor structure, exploratory factor analysis (EFA) with principal component analysis (PCA) through varimax rotation was used. The data was without values missing, and the normality of data was investigated using skewness and kurtosis values. The results show that skewness (IC = 1.331; SP = 0.940; ID = 0.723; TR = –0.113) and kurtosis (IC = 2.039; SP = 1.316; ID = 0.416; TR = 0.420) values fell amid the recommended varieties of |3| and |10| for skewness and kurtosis correspondingly. As a result, the data is considered normal. The outcomes from the Kaiser–Meyer–Olkin (KMO = 0.824) and Bartlett's test of sphericity ($\chi 2$ (120) = 2122.324, $p < .001$) indicated that the data was sufficiently suitable to continue factor analysis.

4. RESULTS

4.1 (PCA) and (CFA)

(PCA) with varimax rotation was used to find out the factor structure stemming from the gathered data. The primary analysis was completed to gather the eigenvalues for the data's different factors. [40] states that the elements which have an eigenvalue (EV) over 1 are thought to be representative. The four factors made up 62.809% of the overall variance. The first factor, which was IC, had an (EV) of 7.052, covered five items (α= .934). The second factor, "SP," had an (EV) of 2.343, covered five items (α = 0.89). The third factor, "ID," had an (EV) of 1.304, covered three items (α = 0. 0.727). The fourth factor, "TR," had an (EV) of 1.211, covered three items (α = 0.732). Table 2 describes the factor loadings following rotation.

Table 2: Factor Analysis and Cronbach's Alpha

Item	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1: (IC)				
IC 1	0.843			
IC 2	0.856			
IC 3	0.912			
IC 4	0.811			
IC 5	0.798			
Factor 2: (SP)				
SP 1		0.911		
SP 2		0.823		
SP 3		0.812		
SP 4		0.811		
SP 5		0.712		
Factor 3: (ID)				
ID 1			0.745	
ID 2			0.653	
ID 3			0.612	
Factor 4: (TR)				
TR 1				0.684
TR 2				0.663
TR 3				0.645
EV	7.052	2.343	1.304	1.211
% of variance	42.342	12.112	4.432	3.923
(α)	0.934	0.89	0.727	0.732

(CFA) was performed to find the structural validity of the scale. As given in Table 3, the CFA produced an acceptable index ($\chi 2$ (96) = 166.834, $p < 0.001$) representing that the four-factor model, attained in EFA, was the optimum of the corresponding.

Table 3: Factor Analysis and Cronbach's Alpha

Fit Index	POSTOL	Recommended Value
Chi-square($\chi 2$)	166.834	-
Degree of freedom(DF)	96	-
$\chi 2$ / DF	1.737	≤ 5

4.2 Convergent and Discriminant Validity

Together with the model fit indices, the validity of the scale is looked into, and it is required that Composite Reliability (CR) is examined, along with average variance extracted (AVE), gathered from CFA [40]. [40] stated that when it comes to convergent validity, the factor loadings of the items must be more than 0.7, with CR a minimum of 0.7 and AVE more than 0.5. The factor loadings gathered from (CFA) were more than 0.7, offering proof that there is convergent validity. Table 4 shows that CR values for IC, SP, ID, and TR were 0.823, 0.764, 0.921, and 0.744, respectively, meeting the minimum value requirement of 0.7. The AVE for IC, SP, ID, and TR were over 0.5. [40] stated that, when it comes to discriminant validity, the square root of the AVE of the constructs must be over the correlation of the construct and other constructs in the model, with a minimum value of 0.5. From Table 5, it is revealed that the square root of the AVE of all constructs is substantially greater than the result of inter-construction correlation. This supports convergent and discriminatory scale validity.

Table 4: (CR) and (AVE) of (CFA)

Measures	Items	(CR)	(AVE)
IC	5	0.823	0.545
SP	5	0.764	0.633
ID	3	0.921	0.643
TR	3	0.744	0.567

Table 5: Correlations among constructs				
Measures	IC	SP	ID	TR
IC	**0.689**			
SP	0.134	**0.831**		
ID	0.478	0.687	**0.811**	
TR	0.293	0.645	0.687	**0.712**

5 DISCUSSION AND CONCLUSION

This paper effort to build a scale with which to measure students' perception of online learning in higher education. The survey was shared with 300 students from various universities in the UAE, to try to maximize reliability and validity. The exploratory factor analysis was able to show a four-factor structure solution, covering 62.809% of the overall variance. Following this, the CFA was behind the four-factor structure involving IC, SP, ID, and TR. The structures met the requirements of reliability and discriminant validity. statistical analyzes have shown that scale is a powerful and useful tool. However, this differs from earlier scales created by [18] and [21], as the current scale showed a greater number of contemporary factors critical to the student's feelings towards online learning. Instructors take on numerous responsibilities stemming from the provision of beneficial learning to support the active engagement of the students. This result is echoed in the work of [23]. SP can assist instructional designers to keep the quality of their online learning experience high, in line with the work of [41]. The ID aspects cover individual differences and student-centered course design, able to encourage students to take part in online learning, in line with the earlier study completed by [34]. Learners' trust in online courses was considered to be the most important aspect when it comes to successful employment of e-learning. This finding is matched with the outcomes shown that, when learners are fulfilled with an online course, they have a greater level of enjoyment [36]. It is suggested that any future research should examine the link between demographic variables and students' feelings regarding online learning, which can also allow for different planning of course design in online learning, to offer new benefits to students. The current scale attempted to surpass the downsides of the earlier studies when it comes to the planning of modern online courses, such as IC, SP, ID, and TR. This paper encourages educational designers, educators and institutions to improve the quality of online courses existing currently and in the future.

6 REFERENCES

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