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# Modelling the acceptance of e-learning during the pandemic of COVID-19-A study of South Korea

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## ABSTRACT

The pandemic of COVID-19 has disrupted normal life and working in almost all parts of the world. Among other industries, the education sector has been hit hard. The learning process should continue and e-learning is the best alternative to replace the conventional classroom setting. E-learning programs and courses were already available for people who were mentally and economically ready for such learning. The severity of the pandemic has forced students to learn through this mode and their acceptance of this system is the point of exploration. The study was conducted on the 375 students studying management program at the undergraduate and graduate level in universities of South Korea. The study examined the instructor characteristics (instructor attitude, competency & interaction), student characteristics (student motivation, mindset & collaboration), and technology acceptance model (perceived ease of use & perceived usefulness) on the behavioural intention of students to accept and use e-learning in the future. The moderating influence of the external factor 'perceived severity of pandemic COVID-19' was examined. The results suggested that all factors were positively influencing the behavioural intention to use and accept the e-learning system by the learners during this pandemic. The data were analysed using the partial least square structural equation modelling (PLS-SEM) approach. The findings of this study will be helpful for all the stakeholders of the education arrangement which are moving or already shifted towards e-learning during the current crisis. The study emphasizes the various factors that are critical to the student and instructor characteristics to accept and use this system in this inevitable situation.

## 1. Introduction

The recent development in technology and web-based services has provided support to online education and real-time interactions (Lee, 2010). E-learning has all that it takes to replace the traditional classroom setting expanding the reach of learning beyond the boundaries, time, and space (Baylari & Montazer, 2009). E-learning has the potential to be an alternative to take teaching to another level (Ozkan & Koseler, 2009). Online learning has shown rapid growth over the past few decades. To ensure good quality of online education and to gain colossal success in the usage of these technical resources in e-learning, some factors, especially from the instructors' side need to be considered like instructor attitude, competency, and interaction. Incompatibility in any one of the factors will disproportionate the entire teaching process (Soong et al., 2001). Attitude towards technology is defined as an "individual's positive or negative feelings (evaluative effect) about using a specific technology" (Venkatesh et al., 2012). Instructors' attitude towards e-learning plays a major role in its success. Online instructors use e-learning as a tool to educate students in online classrooms

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(Bahhouth et al., 2011). Using e-learning tools will help the instructor to make the learning effective and eventually will help to provide the best possible results. In online teaching, the main task of the instructor is not only uploading material, posting explanations or summaries on the given topic, and receiving emails but the Instructor has to provide an environment to the learners where they can interact with the instructor to discuss a problem that arises during the class (Ascough, 2002). Instructors' attitude towards e-learning is important to implement e-learning which will eventually, influences the learning process.

Online teaching is a challenging task that is why an instructor has to be skilful and competent enough to play different roles other than teaching. Online instructors should possess vast knowledge to implement e-learning successfully in the classroom (Bawane & Spector, 2009). Along with the knowledge of the subject, it is equally important for the instructor to possess the knowledge of technology and expertise to use it. A competent instructor is one who no doubt has a good hold on the subject, knowledge of ICT (Information and Communications Technology), implements its usage in the classroom, and has a positive attitude towards e-learning. Spector and De la Teja (2001) defined the instructors' competency as, "... state of being well qualified to perform an activity, task or job function" and "the way that a state of competence can be demonstrated to the relevant community". Akarasriworn and Ku (2013) stated that in order to create more learning opportunities interaction between instructors and learners is crucial. Interaction can take many forms in e-learning like interaction with content, e-learning system interface, and instructor (Baber, 2020). Kang and Im (2013) stated that interaction consists of 'guidance and facilitating learning', 'social intimacy', 'instructional communication (Q & A)', 'presence of instructor' and 'instructional support (support and management of learning materials)'.

The quality, usage, gains, and shortcomings of the technology in e-learning determine the attitude of students towards it (Aixia & Wang, 2011). Seifert (2004) defined student motivation as "as attempts to maintain or enhance self-worth". The motivation of students towards technology will determine the success of e-learning. Their involvement in the class, their experience with ICT and their attitude towards it determine their motivation to accept e-learning (Hamzah et al., 2015). It is quite important to make certain implementation in the usage of technology or to make it more user-friendly, which ensures the involvement of students in order to keep them engaged and motivated (Keller & Suzuki, 2004). Lack of students' motivation can be a factor to fade the success of e-learning. Similarly, the mindset has a distinctive reasoning alignment that influences the thought process as well as behaviour (Taylor & Gollwitzer, 1995). Alpay and Ireson (2006) stated that college-level students with a growth mindset are optimistic and open to opportunities. Mindset influences the overall success and failure of a student (Hong et al., 1999). Soong et al. (2001) suggested that the mindset about learning is an important latent causal effect of the students' and instructors' epistemology. Since learning is a two-way process, students learn mainly through debates and discussions. Students get more opportunities to learn when they are exposed to frequent interactions (Weiser et al., 2018).

Technology-based learning has played a significant role in every field and it has deeply influenced academics. Davis (1989) suggested a technology acceptance model (TAM) explicates a potential individual's behavioural intentions of using a technological method. In existing e-learning technology studies, TAM is the most common theory being used to understand the intention to accept e-learning (Sumak et al., 2011). It mainly focuses on the analysis of how learners' or instructors' attitudes towards ICT influence the acceptance of it (Elkaseh et al., 2016). Many researchers used TAM to assess the acceptance of e-learning in different contexts (Al-Fraihat et al., 2020; Baby & Kannammal, 2020; Eraslan Yalcin & Kutlu, 2019). There are two factors, which predict the users' perception about the technology acceptance in TAM-perceived ease of use and perceived usefulness (Abdullah et al., 2016). In some studies, external factors were tested with these two factors to examine the acceptance model in different contexts (Liang, 2019).

There are debates about the use of TAM to explain teachers' and students' acceptance of information systems within the educational context (Goh et al., 2020). Bunz, Seibert, & Hendrickse, 2020 recently transformed the TAM into Virtual Reality Technology Scale (AVRTS) to develop the scales measuring attitudes toward virtual reality technology. Thus, this signifies the robustness of the model to test the acceptance of information system in different contexts and environment like the current crisis. Glahn and Gruber (2020) raised an important issue of contextual education design and found that interactive environments and learning resources lead to contextualization passively by permitting learners to enlarge their learning ambit into new settings.

Although there are enough studies that emphasize the importance of student and instructor characteristics to enhance learning acceptance, however, e-learning during the pandemic is more of forced learning than planned one (Bao, 2020). Therefore, further research is required to investigate the factors which be positively influencing the acceptance of this forceful shift towards e-learning. The situation during this COVID-19 outbreak is an exceptional and negative impact of lockdown and long quarantine period on the learners' psychological condition is the point of concern (Brooks et al., 2020). Particularly students of management courses require experiential learning, which was affected and whilst classes have adopted new pedagogy and method (Ratten & Jones, 2020). There is a lack of research on the forceful shift towards online learning particular in management education, which may be helpful during this time (Tesar, 2020). The study will assess the characteristics of instructor and students which are relevant during this time for accepting the e-learning. The relevance of the technology acceptance model (TAM) will be also tested during the current crisis. Although the TAM evaluates the behavioural intention, however, behavioural intention to use can be interchangeably assessed as the acceptance of the e-learning (Blut & Wang, 2019). The moderating role of the external variable 'the severity of COVID-19' on each formative variable is to be investigated to understand the acceptance of learning by students during the pandemic of COVID-19.

## 2. Literature review

### 2.1. Instructor attitude

The importance of technology in the education system, be it online or offline cannot be undermined, but at the same moment, we cannot ignore the fact that the usage of e-learning tools in online education largely depends on the instructor and student

characteristics. [Chyung et al. \(2009\)](#) found that the major enabling or disabling factor in the approval of technology is the instructor's attitude. [Kersaint \(2003\)](#) while advocating the positive attitude of instructors towards e-learning, stated that an instructor with a positive attitude feels comfortable in the usage of e-learning tools and implementing them into their classroom to make the teaching experience better. [Xhaferi et al. \(2018\)](#) surveyed to analyze the attitude of instructors towards the usage of technologies in online education, in which the target population consisted of 49-university faculty members and found that subject of study and gender does not correlate with the attitude towards e-learning. To maintain success in the online educational system, the positive attitude of instructors is very crucial ([Woodrow, 1992](#)). However, it has not always been easy for instructors to maintain a positive attitude toward online learning. [Watson et al. \(1998\)](#) while asserting the importance of a positive attitude of the instructor, stated that attitude towards e-learning is a key factor not only in the development of technology but also overcome their resistance to use the application of ICT in the teaching process. One of the major factors is the peculiarity of the technology itself that is responsible for affecting the instructors' attitude towards ICT ([Rogers, 1995](#)). [Liaw et al. \(2008\)](#) has categorized the instructor attitude towards ICT in three different areas; affective, cognitive, and behavioural measurement. Affective (perceived enjoyment) and cognitive (perceived usefulness) measurement have a positive effect on behavioural intention ([Liaw and Huang, 2002](#)). An instructor with a positive attitude towards e-learning tools maintains the quality of learning and forms an important part of instructor characteristics ([Al-Fraihat et al., 2020](#)). Therefore, the following hypothesis is proposed:

**H1a.** *Attitude of an instructor towards e-learning will have a positive influence on the instructors' characteristics.*

## 2.2. Instructor competency

[Davis and Fill \(2007\)](#) mentioned the role of instructors in e-learning, that online instructor should possess more skills especially in the implementation of technology in the classroom than a traditional one. They should have a positive attitude towards the usage of ICT, as these skills help them to develop e-competencies, which will have a positive effect on their entire teaching experience. [Hiltz et al. \(2000\)](#) suggested that, with the introduction of e-learning, the role of an instructor has undergone a major shift from a subject expert to a facilitator. [Salmon \(2012\)](#) identified the competencies of online instructors into different categories, which are; knowledge of the online system, technical competency, communication skills, content proficiency, and personal features. Instructors' competency in e-learning is a major component of the instructors' role ([Selim, 2007](#); [Li et al., 2017](#)).

**H1b.** *Instructor competency in e-learning will have a positive influence on the instructors' characteristics.*

## 2.3. Instructor interaction

Students achieve the highest levels of learning when there is an organized interaction in e-learning ([Garrison & Cleveland-Innes, 2005](#)). Interaction between the instructor and learners is important, as it can influence student motivation and inspire learning ([Lee, 2018](#)). Facilitating students through interaction on the learning management system (LMS) is an important function of instructor characteristics, and recognized as an anticipated practice in e-learning ([Alamri & Tyler-Wood, 2017](#); [Estis-Sumerel, 2020](#)). [Jin \(2005\)](#) suggested that instructor and learner interaction can positively change the frustration of students arising due to technical glitch or inexperience of using technology, which may be prominent during the pandemic crisis.

**H1c.** *Interaction between student and instructor in e-learning will have a positive influence on the instructors' characteristics.*

**H4.** *The instructors' characteristics in e-learning will have a positive influence on the intention to accept e-learning by the students during the pandemic of COVID-19.*

## 2.4. Student motivation

To determine the success of e-learning, students' motivation to learn in the online environment plays a pivotal role ([Rhema and Miliszewska, 2014](#)). [Rovai et al. \(2007\)](#) compared the level of student motivation in traditional Learning and e-learning, suggested that e-learners have to be highly motivated than traditional classroom learners ones. [Harandi \(2015\)](#) suggested the same findings and stated that students are highly motivated when they seek to join an online course, which is required in this type of learning. Students will be motivated in online learning when they perceive that their goal of learning is meeting and they have the competency to use technology and e-learning tools ([Kim & Frick, 2011](#)). The same study suggested that accessibility and flexibility features of e-learning influence the student motivation to enrol in e-learning courses. During the pandemic of COVID-19 universities and students were forced to shift to online learning, when students have paid for offline mode of learning and were not ready to study through technological platforms, motivation to learn online becomes an important factor ([Baber, 2020](#)). A forceful shift towards online learning when students are not ready to learn online can have a negative perception of e-learning and will carry the same biases for e-learning activities in the future ([Guglielmino & Guglielmino, 2003](#)). [Piskurich \(2003, pp. 1–10\)](#) stated that one of the reasons online education does not prove fruitful in past is that learners are not ready and motivated for it. Student motivation in the online learning environment has been studied and established relationship has been found with student performance ([Saadé et al., 2007](#)), the success of e-learning ([Bilgiç et al., 2011](#)), perceived quality learning ([Grolnick & Ryan, 1987](#)) and retention rate ([Vallerand & Blssonnette, 1992](#)). Thus, student motivation is an important part of student characteristics when it comes to online learning. Therefore, the following hypothesis needs to be tested:

**H2a.** *Student motivation in e-learning will have a positive influence on student characteristics.*

### 2.5. Student mind-set

Mind-set refers to one's belief about his/her ability (Dweck, 2006). Usually, we find students with different mind-sets, but mainly with two mindsets, one is a growth mindset and the other is fixed. A student who believes that he/she can change his/her ability with hard work and persistence is called a growth mindset and if a student believes that he/she cannot change his/her ability no matter how hard they work is called fixed or unchangeable mindset (Gutshall, 2016). A growth mindset is open to challenges and more resistant in hard times while a fixed mindset avoids challenges and neglect negative but useful feedback (Mansouri & Mhunpiew, 2016). Students may learn things by simply absorbing instructions or participating in constructive discussions. Knowledge construction by contribution and participation yields better results of learning than mere knowledge absorption (Soong et al., 2001).

**H2b.** *Student mindset in e-learning will have a positive influence on student characteristics.*

### 2.6. Student collaboration

Online education helps students to interact and provide a space where they can collaborate among themselves through discussion and debates. If students are given an opportunity to collaborate, they can comprehend topics in a better possible way unlike following the traditional method of teaching. Bellamy (1996) stated that learning would be successful and fruitful only when collaboration involves students acquiring more useful and comprehensible knowledge. Kearns and Frey (2010) stated that using e-learning tools like a discussion board, emails, instant messaging, assignment, and polls support learning activities and enhance student collaboration in an online environment. Student collaboration in an e-learning setting is an important part of student characteristics. However, course content should be designed in such a way that it encourages collaboration (Soong et al., 2001).

**H2c.** *Student collaboration in e-learning will have a positive influence on student characteristics.*

**H5.** *Student characteristics in e-learning will have a positive influence on the intention to accept e-learning by the students during the pandemic of COVID-19.*

### 2.7. Perceived ease of use

Perceived ease of use (PEOU) is defined as, "the degree to which a person believes that using a particular system would be free of effort" (Davis et al., 1989). Chen and Tseng (2012) proposed that perceived ease of use has a positive impact on e-learning acceptance and adoption. Some studies suggested that perceived ease of use has an influence over perceived usefulness and both have a positive influence on behavioural intention to accept the technological system (Abdullah et al., 2016; Huang et al., 2020) which is in contradicting the study of Park (2009). In the context of e-learning, perceived ease of use has been found to significantly influence the intention to adopt e-learning in Iranian students (Mohammadi, 2015) similar results were found in Lebanon (Tarhini et al., 2013a). Al-hawari and Mouakket (2010) found perceived ease of use insignificant in determining the student satisfaction in e-learning in UAE.

**H3a.** *Perceived ease of use of the learning management system will have a positive influence on the TAM.*

### 2.8. Perceived usefulness

Perceived usefulness (PU) is defined as, "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). The perceived usefulness of the e-learning system is a strong predictor of a technology-oriented learning system (Chen et al., 2011). Arbaugh (2000) stated that the perceived usefulness of the e-learning system has a positive relation with delivering quality education and developing a positive attitude of students towards course. Several studies have validated this construct to measure the success of e-learning systems (Limayem & Cheung, 2008; Revythi & Tselios, 2019). Perceived usefulness of e-learning system has been found an important and critical predictor of e-learning intentions (Kimathi & Zhang, 2019; Salloum et al., 2019; Tarhini et al., 2013b). However, contradicting results have been confirmed by Koç et al. (2016).

**H3b.** *Perceived usefulness of the learning management system will have a positive influence on e-learning technology acceptance.*

The legacy of TAM is still relevant and useful to determine technology acceptance in the educational context. Lazar et al. (2020) conducted a study in Romania and South Africa and developed a digital technology adoption scale in the blended learning context. This study extended TAM that considers the influence of two related predictors—familiarity with traditional and modern tools on the intention to use them, in a blended learning context. Baby and Kannammal (2020) recently modified the TAM to develop a user-centric e-learning model. The model includes external factors like perceived trust and security of the system. Šumak et al. (2011) conducted a systematic literature review of e-learning acceptance and found that TAM is the most-used theory in e-learning acceptance research.

**H6.** *TAM of e-learning will have a positive influence on the intention to accept e-learning by the students during the pandemic of COVID-19.*

### 2.9. Perceived severity of COVID 19 pandemic

The outbreak of COVID-19 has confirmed in Wuhan, China at the beginning of 2020 has spread to almost every corner of the world and has created vast havoc around the globe. World Health Organization declared it a pandemic on March 11, 2020. The outcome of

the pandemic influences behaviour of an individual (Kok et al., 2010). Some studies were conducted in different places to analyze the influence of age and gender over the behavioural response and showed that older people and women take more preventive measures to fight against the pandemic than others (Quah & Hin-Peng, 2004). While, in contrast to the previous study, the other study conducted in the Netherlands showed no association between age and taking preventive measures (Brug et al., 2004). Basilaia and Kavadze (2020) stated that the transition from traditional to online setup during the COVID-19 pandemic was successful though, to ensure the quality of learning further research is required. Saxena et al. (2021) found that the perceived benefits of maintaining social distance during the COVID-19 pandemic partially moderate the relationship between e-learning quality and student satisfaction. During the previous researches, e-learning was planned and accepted by the learners before the enrollment. However, the current pandemic has forced the students to move to e-learning (Hodges et al., 2020) and hence, the factors which will contribute towards characteristics of students and instructors may change. The gap between planned online learning and forced online learning has not made a good impression on the large general public about online education (Gacs et al., 2020). The perceived severity of this pandemic may influence the instructor and student characteristics while using the e-learning system. Technology acceptance will also be influenced by the perception of the severity of this infection. PEOU and PU are both affected by external variables in the past research (Abdullah et al., 2016). The study will examine moderating influence of the external variable ‘perceived severity of the COVID-19 pandemic’ on the formative constructs of instructor characteristics, student characteristics, and technology acceptance model.

**H7a.** *Perceived severity of COVID-19 will have a moderating influence on the interaction between instructors’ characteristics and behavioural intention.*

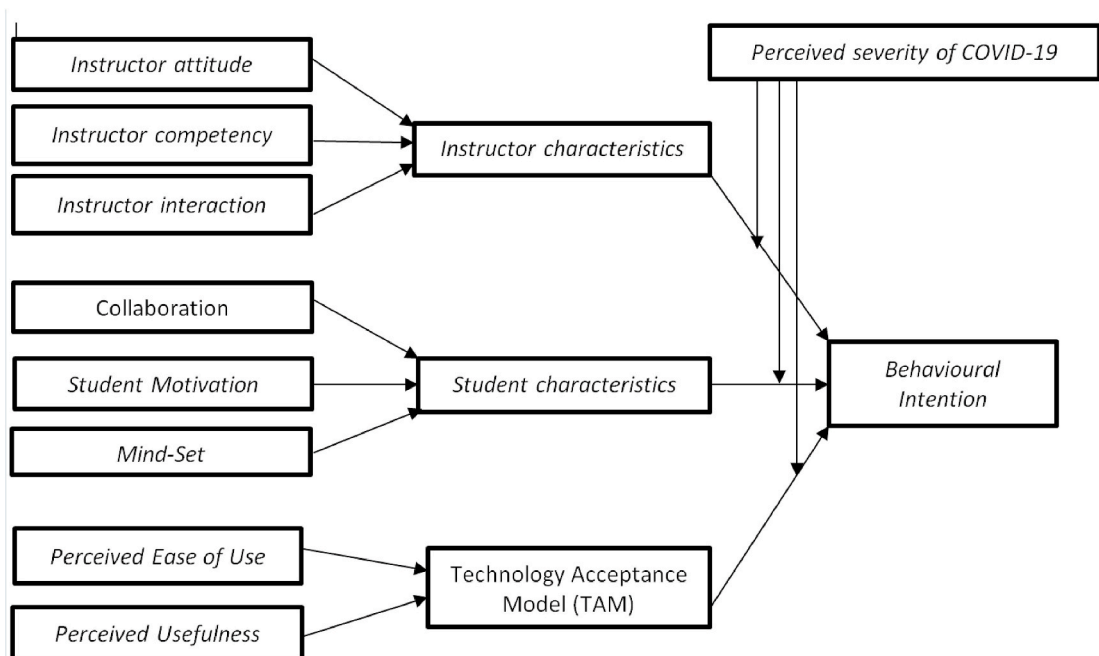
**H7b.** *Perceived severity of COVID-19 will have a moderating influence on the interaction between student characteristics and behavioural intention.*

**H7c.** *Perceived severity of COVID-19 will have a moderating influence on the interaction between TAM and behavioural intention.*

**3. Method**

The participants in this study were graduate and undergraduate management students enrolled in South Korean universities. The data was collected through a web-based questionnaire survey by the convenience sampling technique. It was made sure that only management students participate in the survey. The students were from eleven different countries across the world. Data were gathered using a survey questionnaire comprising questions on demographics and multiple items for each variable in the research model. The response of students was taken anonymously so that they can answer the questions related to instructor attitude, competency, and interaction unbiased and without any fear. The questionnaire was administered in the English language as all participants were studying in an international setting.

This study employs the partial least square (PLS) structural equation modelling (SEM) approach. Partial least squares (PLS), a form of structural equation modelling (SEM), is a helpful approach in predicting behaviour in behavioural research fields. Models which are



**Fig. 1.** Research model.

complex and comprising formative (causal) and reflective (consequent) constructs, the PLS approach provide theoretical insights and its strength lies in modelling (Lowry & Gaskin, 2014). This technique was preferred for its ability to simultaneously examine a series of dependence relationships, especially when there are first-order and second-order latent variables within the model (Hair et al., 1998). The first-order latent variables (instructor attitude, instructor competency, instructor interaction, student motivation, student mindset, student collaboration, perceived usefulness and perceived ease of use) acted as predictors for second-order latent variables (Instructor characteristics, Student characteristics and Technology acceptance model), represented as a formative construct. The decision of modelling a latent variable as a formative construct is based on the conditions followed by Chen (2011). The moderating influence of perceived severity of COVID-19 has been examined on 3 s-order latent variables as shown in Fig. 1.

The survey instrument consisted of 38 questions measured with ordinal scales using a 5-point Likert-type scale. The items of the ten variables were taken from the previous studies-instructor attitude, competency and interaction (Selim, 2007), student motivation (Eom & Ashill, 2016), mindset & collaboration (Soong et al., 2001), perceived ease of use & perceived usefulness (Lee, 2010), perceived severity of COVID-19 (Cho & Lee, 2015) and behavioural intention (Chen, 2011) as shown in Appendix A.

## 4. Measurements

### 4.1. Sample descriptive analysis

Most of the students were in the age group of 18–22 (69%) followed by the age group of 22–26 (29) and the rest (2%) were in the age group of 26–30. Most of the students were male (66%) and followed by females (34%). The sample had several nationalities as data was collected from international management schools. Most of the students were from Uzbekistan (38%) and Korea (30%), followed by China (17%), Bangladesh (4%), and Nepal (3%). Most students were undergraduate (92%) followed by graduates (8%) with majors in global management, business, marketing, entrepreneurship, hospitality, etc. The sample was a mix of students who had bit experience (49%) in online education, while 24% had no experience at all and some with enough (27%) experience of it (see Table 1).

## 5. Model testing

### 5.1. Construct reliability and validity

In exploratory factor analysis, ten factors were extracted for the setting equamax rotation since assuming factors are not correlated (Field, 2007). Kaiser–Meyer–Olkin measure of sampling adequacy (value of 0.951) in Bartlett’s test of sphericity (Approx. Chi-Square = 1635.06, df = 634, Sig. 0.000) assures the minimal requirement for confirmatory factor analysis (CFA) (Field, 2007). The values of factor loadings for each item were above the threshold level of 0.7 (Hair, Risher, Sarstedt, & Ringle, 2019) and all items were retained for further analysis. The measurement model analysis results suggested a positive indication of the robustness of the constructs’ measures represented by their internal consistency reliabilities as established by their composite reliabilities presented in Table 2. The values of Cronbach’s alpha and composite reliability of all the items exceeding the standard level of 0.70 (Hair et al., 2019). The average variance extracted (AVE) for all the constructs exceeds the lower acceptable limit of 0.50 (Hair et al., 2019). The average variance extracted determines the extent of variance in the items that are accounted for the latent constructs and is a more conformist estimation of the validity of a measurement model (Fornell & Larcker, 1981).

**Table 1**  
Demographic statistics.

Item	Options	Frequency	Per cent
Age	18–22	258	68.8
	22–26	110	29.3
	26–30	7	1.9
Gender	Female	128	34.1
	Male	247	65.9
Nationality	Bangladesh	16	4.3
	China	65	17.3
	India	2	.5
	Kazakhstan	5	1.3
	Korea	2	.5
	Nepal	11	2.9
	Nigeria	4	1.1
	Pakistan	6	1.6
	South Korea	115	30.7
	Uzbekistan	146	38.9
Level of study	Vietnam	3	.8
	Graduate	30	8.0
Experience of online learning	Undergraduate	345	92.0
	Enough	100	26.7
	None	91	24.3
	Not Much	184	49.1

An analogous set of fit indices from the studies of (Cheng et al., 2012; Hair et al., 2010) was used to appraise the structural model as shown in Table 3. Comparison of all fit indices with their corresponding recommended values suggested evidence of an acceptable model fit. Therefore, it is established that the goodness of fit indices fulfilled the recommended levels, signifying that the research model provided a good fit to the data.

The second step in the data analysis was to extract the path coefficients to examine the significance of hypothesized relationships in the research model. The results of the hypotheses testing, including standardized path coefficients, path significances, and t-value for each dependent variable are presented in Table 4. The results of path analysis are also depicted in Fig. 2 with path coefficients and R-square values. Starting from instructor attitude ( $\beta = 0.354, p < .01$ ), instructor competency ( $\beta = 0.367, p < .01$ ), and instructor interaction ( $\beta = 0.356, p < .01$ ) had significant relationship with instructor characteristics. Thus accepting hypotheses H1a, H1b, and H1c. With respect to student characteristics, all the constructs had a positively significant relationship to this endogenous variable. As student motivation ( $\beta = .518, p < .001$ ), student mind-set ( $\beta = 0.220, p < .01$ ), and student collaboration ( $\beta = 0.470, p < .001$ ) had positive associations with student characteristics, hypotheses H2a, H2b, and H2c were supported. With regard to technology acceptance model (TAM) of an e-learning system, both PEOU ( $\beta = 0.536, p < .001$ ), and PU ( $\beta = 0.549, p < .001$ ) has positive effect. Hence, Hypothesis H3a, and H3b are accepted.

All second-order latent variables were positively related to the dependent variable behavioural intention. Behavioural intention was influenced by instructor characteristics ( $\beta = 0.377, p < .01$ ), student characteristics ( $\beta = 0.340, p < .01$ ), and technology acceptance model (TAM) ( $\beta = 0.165, p < .01$ ). Thus, hypothesis H4, H5, and H6 are accepted. These variables explain about 76.5% of the variance in the dependent variable behavioural intention. The moderating role of perceived severity of COVID-19 has insignificant interaction between instructor characteristics and behavioural intention and the same influence on the relationship between student characteristics and behavioural intention. The perceived severity of COVID-19 does moderate the relation between TAM and behavioural intention, however, very mildly as shown in Table 5. Hence, H7a and H7b hypotheses are rejected and H7c is accepted. This means that the perceived severity of COVID-19 does not affect the student and instructor characteristics and it remains somewhat the same during the pandemic of COVID-19. Only the perceived severity of the pandemic has encouraged the acceptance of technology for e-learning, which may not have happened in the normal situation.

**Table 2**  
Measurement model.

Construct	Item	Factor Loadings	Mean	SD	Cronbach's Alpha	CR	AVE
<b>Instructor attitude</b>	INATT1	0.952	2.73	1.123	.967	.976	.910
	INATT2	0.958					
	INATT3	0.955					
	INATT4	0.951					
<b>Instructor competency</b>	INCOMP1	0.980	2.69	1.130	.976	.982	.932
	INCOMP2	0.959					
	INCOMP3	0.959					
	INCOMP4	0.964					
<b>Instructor interaction</b>	ININTER1	0.960	2.82	1.296	.979	.985	.942
	ININTER2	0.984					
	ININTER3	0.979					
	ININTER4	0.958					
<b>Student Motivation</b>	STUMOT1	0.943	2.80	.980	.952	.965	.873
	STUMOT2	0.932					
	STUMOT3	0.935					
	STUMOT4	0.928					
<b>Mind-Set</b>	STUMIND1	0.925	3.46	.942	.943	.964	.898
	STUMIND2	0.962					
	STUMIND3	0.956					
<b>Collaboration</b>	STUCOLL1	0.891	3.25	1.059	.959	.970	.890
	STUCOLL2	0.957					
	STUCOLL3	0.963					
	STUCOLL4	0.961					
<b>Perceived Ease of Use</b>	PEOU1	0.871	3.20	.862	.925	.947	.816
	PEOU2	0.926					
	PEOU3	0.897					
	PEOU4	0.918					
<b>Perceived Usefulness</b>	PU1	0.918	3.34	.837	.923	.946	.814
	PU2	0.931					
	PU3	0.933					
	PU4	0.823					
<b>Perceived severity of COVID-19</b>	PSC191	0.964	3.64	.883	.964	.977	.933
	PSC192	0.971					
	PSC193	0.963					
<b>Behavioural Intention</b>	BI1	0.943	3.09	1.09	.958	.969	.888
	BI2	0.934					
	BI3	0.946					
	BI4	0.946					



**Table 3**  
Model fit summary for the final measurement and structural model.

Model	$\lambda^2/df$ P-value	RMSEA	TLI	NNFI	CFI	GFI	PNFI
Recommended value (Cheng et al., 2012)	<2.0	<0.10	>0.90	>0.90	>0.90	>0.80	>0.60
Actual Value	2.58 .000	.065	.946	.923	.951	.822	.840

$\lambda^2$ : Chi-square; df: Degree of freedom; RMSEA: Root Mean Square Error of Approximation; TLI: Tucker Lewis index; NNFI: Non-Normed Fit Index; CFI: Comparative Fit Index; GFI: Goodness of Fit; PNFI: parsimony Normed Fit Index.

**Table 4**  
The summary of direct hypothesized results.

H#	Proposed relationship	Path coefficient	T-value	Remarks
H1a	Instructor attitude (+) instructor characteristics	0.354*	80.356	Accepted
H1b	Instructor competency (+) instructor characteristics	0.367*	88.258	Accepted
H1c	Instructor interaction (+) instructor characteristics	0.356*	87.626	Accepted
H2a	Student motivation (+) Student characteristics	0.518*	33.857	Accepted
H2b	Student mind-set (+) Student characteristics	0.220*	12.794	Accepted
H2c	Student collaboration (+) Student characteristics	0.470*	36.340	Accepted
H3a	PEOU (+) TAM	0.536*	52.339	Accepted
H3b	PU (+) TAM	0.549*	50.143	Accepted
H4	Instructor characteristics (+) intention	0.377*	9.389	Accepted
H5	Student characteristics (+) intention	0.340*	6.432	Accepted
H6	TAM (+) intention	0.165*	3.967	Accepted

\*Significant at  $P < .01$ .

## 6. Discussion

The role of an instructor in an online platform is mixed between the one who delivers lectures and also the one who facilitates the learning systems. The instructor characteristics are an important part of e-learning and must inspire student interaction to use this system. Instructor characteristics play an important role in the behavioural intention of students to use the e-learning system. Instructor attitude does influence the characteristics of instructors which are supported by past studies (Govindasamy, 2002; Selim, 2007; Soong et al., 2001) which considered a critical factor. The attitude of the instructor towards students bears much on the instructor characteristics as it signifies the preference and style of an instructor. Friendly and enthusiastic instructors are preferred by students as they make learning easy and interesting. During the pandemic of COVID-19, when learners were under a lockdown or staying at home following social distancing norms, an instructor who has positive energy and attitude may help to relieve some stress.

There is a lot dependent on the instructors' competency of e-learning and handling various tools that aid this learning. Students may intend to use e-learning when the instructor is making it easy for them to use it and encourages them to do the same. High competency will make it easy for students to understand the nature of learning and adjust to the technology side of the system. Williams (2003) categorized the competencies of an instructor in an e-learning environment as communication and interaction, instruction and learning, management and administration, and use of technology. The main aim of Instructors' competency in e-learning is to find new ways to make this learning easier and interesting for both instructors and learners. Instructors' competency plays an important role in the instructors' characteristics to adopt the e-learning system as also suggested in previous studies (Liaw et al., 2007).

The role of interaction between a learner and instructor in the success of learning in both online and traditional learning is well recognized (Jung et al., 2002; Woo & Reeves, 2007). High interaction will lead to an increased perceived value of learning and satisfaction in students. Various methods of increasing the quality of interaction in various learning environments have been proposed by past studies (Saba, 2000; Shin, 2004). The interaction should be productive and useful which will help learners to open up and feel comfortable. The interaction should be balanced between too formal and too personal. The results of this study suggest interaction with learners is an important aspect of instructor characteristics in online learning. However, Kang and Im (2013) suggested that in the Korean online learning environment, social or private interaction between instructor and learner has no impact or even may result in a negative effect on learner's accomplishment and satisfaction in an online environment. The pandemic of COVID-19 has changed the nature of learning and almost all learning institutes have shifted to online education. Understanding the severity of pandemic and infection, may have an impact on the characteristics of instructors. Although the other characteristics might be also relevant in normal online education, however, the pandemic influence on the instructors who were used to classroom teachings will have to realize its severity and motive behind the shift from offline to online.

Student motivation is an important success factor of online education which is quite evident from this study in line with the findings of past studies (Kerr et al., 2006; Menchaca & Bekele, 2008; Ogunseye & Sharma, 2006). Students become self-motivated in online education over a period of time as this learning is self-regulated (Kauffman, 2015). Regular and timely feedback can promote motivation in students in online education (Eom, Wen, & Ashill, 2006). Student motivation is an important aspect of student characteristics which is determined by self-efficacy. A student who is active and engages in classroom discussions and activities is most likely to be

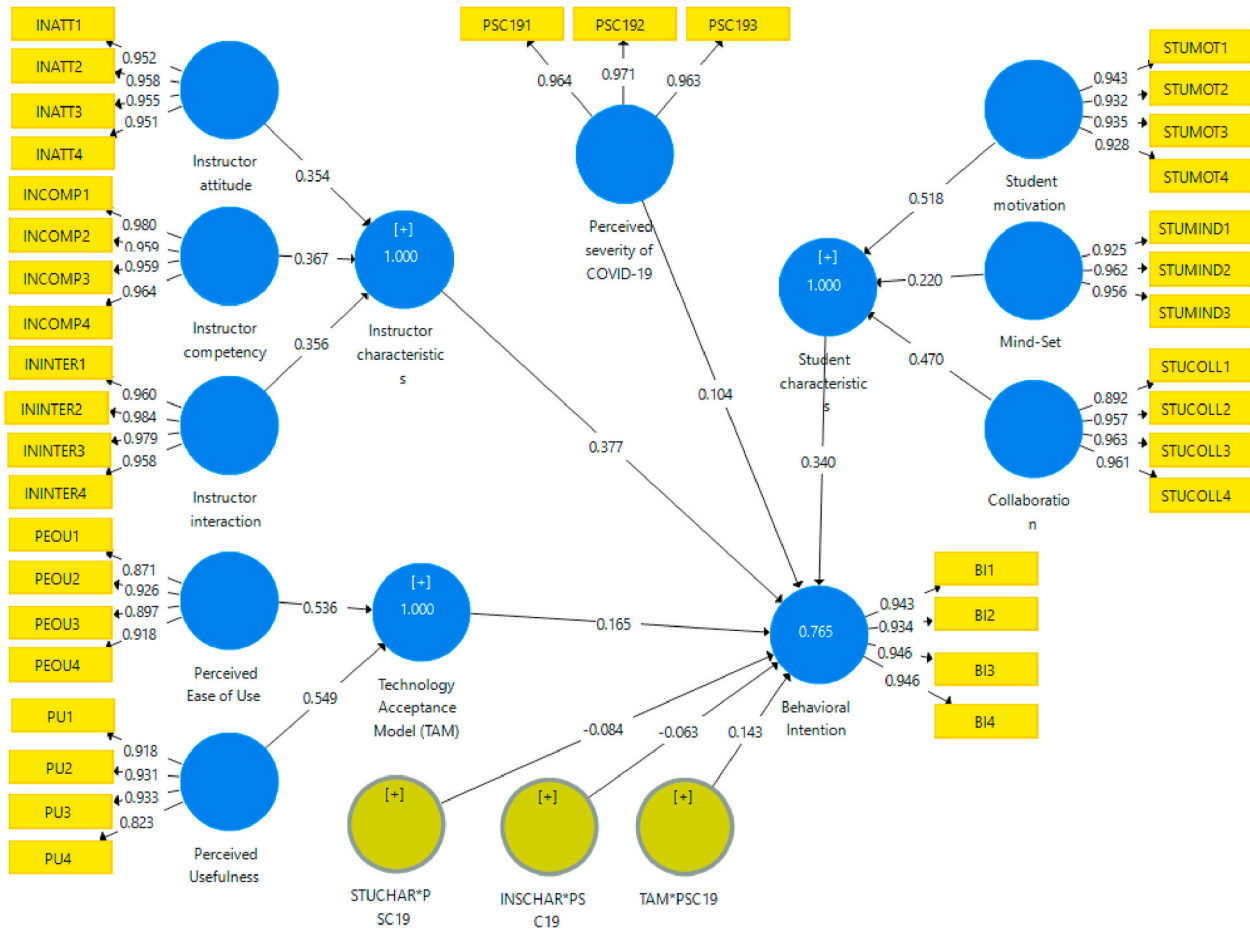


Fig. 2. PLS-SEM measurements.

**Table 5**  
Moderating effect.

H#	Proposed relationship	Path coefficient	T-value	Remarks
H7a	Instructor characteristics * Perceived severity of COVID-19 → Behavioural Intention	-0.063	1.231	Rejected
H7b	Student characteristics * Perceived severity of COVID-19 → Behavioural Intentions	-0.084	1.320	Rejected
H7c	Technology Acceptance Model (TAM) * Perceived severity of COVID-19 → Behavioural Intentions	0.143*	2.836	Accepted

\*Significant at  $P < .01$ .

motivated. The instructors' role will be very crucial in upholding the motivation of already motivated students and enhance the motivation of students who are not motivated to engage in online learning.

The student mindset reflects the way students perceive and acquire knowledge from an instructor. Some students just sit and absorb whatever is imparted to them rather than showing participation in discussions. This type of mindset doesn't provoke critical thinking. Asian mindset (about learning) is still following an absorption-based model (Soong et al., 2001). Constructive learning is highly preferred in the university set up where discussions may lead to critical thinking. In an online environment, constructive learning is always better than absorption as it encourages interaction and discussion. This study suggested that student mindset about the perceived learning forms an important component of student characteristics. Student collaboration in the classroom discussion in the learning process can help to turn the vacuum, a limitation of online classrooms, into the activities of discussion and collaboration (Mahdizadeh, 2007). The discussion in the classroom should start from either side which motivates students to speak and participate in it. Collaborating in the discussion will not only make the classroom lively but also enhance the knowledge and confidence of the learners. The shy students will find it easy to discuss things online behind the screen rather than in the classroom. The collaboration will make the learning two-way and overcoming the monotonous of monologue learning.

The technology acceptance model (TAM) has three core components i.e. perceived ease of use, perceived usefulness, and attitudes toward technology. Out of these variables, perceived usefulness (PU) and perceived ease of use (PEOU) are considered important factors that directly or indirectly explain the behavioural intention (Marangunic & Granic, 2015). In various studies, the external variable is associated with the model to check the influence on the intentions (Schepers & Wetzels, 2007). The external variables were used to test the effectiveness of the model in various contexts of online education (Saadé & Bahli, 2005; Scherer et al., 2019). To examine the e-learning acceptance, it is important to measure the TAM components. Both PEOU and PU seems to be important components in the e-learning acceptance model as suggested by (Al-Azawei et al., 2017; Farahat, 2012; Liu et al., 2010), however, Ibrahim et al. (2017) found only PEOU having a positive impact on intention while as PU being an insignificant influencer on the intent to use e-learning. The current study added the external variable of perceived severity of COVID-19, which showed a good positive relationship with the interaction of TAM with intention. The perceived severity of pandemic will help to perceive the usefulness of technology better than the usual. With the help of technology, education was continued, and every stakeholder of learning realized the usefulness of the technology. The e-learning might have seen protests from all sides if instructors, parents, and students do not acknowledge the severity of the situation. The students and parents who have paid fees for offline classes have had unaccepted e-learning if they don't have perceived the severity of the situation.

Instructor characteristics have a significant influence on the e-learning acceptance by the students which is contradicting the findings of (Ibrahim et al., 2017). In an e-learning environment, the role of the instructor is enhanced and enlarges from being a teacher to a facilitator. Students expect an instructor to have a positive attitude towards e-learning, which will indirectly encourage them to have a positive attitude towards it. Instructors' competency to use e-learning tools will help students to learn and utilize the resources effectively. E-learning is different from the regular classroom as students are in isolation from each other and the level of interaction with students which will fill the gap of missing physical socialization is important. At the time of the COVID-19 pandemic, when social distancing becomes the norm, an instructor has to empathize with the students for missing the amusement of the classroom and hence will have to broaden its role further. E-learning before this pandemic was different, both students and instructors were psychologically ready to be part of remote learning. However e-learning during this pandemic is more of by force than choice, so the instructor's characteristics have been enriched with more responsibilities. Student characteristics are found vital and crucial to accept the e-learning during the situation of the pandemic. They have to be motivated to participate and collaborate in the classroom discussions. Most students are under lockdown or restrictions, which might have given rise to stress and frustration. Thus, having enough motivation to study online will be important to the acceptance of e-learning. Every student has a different style of learning. Students who prefer constructive learning by participating in discussions and debates will have to do extra bit to motivate themselves and others to be part of fruitful discussion. The technology acceptance model also influences e-learning acceptance under the effect of the perceived severity of COVID-19. Until students do not perceive the easiness and usefulness of the system, e-learning may not achieve success. The learning management system (LMS) and zoom platform have together made e-learning effective in the delivery of live lectures supported by the learning materials already uploaded. A simple and easy system will not add to the already existing frustration of being in lockdown and taking classes online.

Infrastructure from both sides of e-learning is an important factor to be considered before going for the transition. Developed countries like South Korea have advanced internet infrastructure which will facilitate learning. South Korea started back traditional classes in schools on May 13, 2020 after controlling the spread of infection exceptionally well because of the efficient tracking and testing system, but it will take some time for other countries to get back. During this pandemic of COVID-19, the perceived severity of this spread will form a part of student characteristics. Students do know that offline classes may result in exposure to infection and thus this perception will have an impact on the characteristics of a student.

### 6.1. Theoretical contribution

This research adds to the existing body of literature, by identifying the main characteristics of student and instructor, technology acceptance and students' acceptance of e-learning during the COVID-19 pandemic. This study provides important insights about the larger starring role of an instructor in e-learning of management courses where students are disconnected physically from the classroom during the pandemic, which was not considered so critical in the recent study of [Alqahtani and Rajkhan \(2020\)](#). Interaction has been found very critical for effective e-learning during the pandemic ([Baber, 2021](#)), and this study confirms the role of the instructor as an interaction initiator in the class. The study further ascertains the role of motivation to continue learning as a student characteristic during the pandemic and forceful shift towards e-learning which is confirmed by [Rahiem \(2021\)](#). The study also offers useful information on the technology acceptance during the unprepared and emergency shift towards online learning, which is supported by [Al-Okaily et al. \(2020\)](#). The study also suggested that the perceived severity of COVID-19 pushed all stakeholders to online mode and accepted it fairly, otherwise they may have protested under normal conditions. Therefore, the results of this study offer useful suggestions for policy-makers, academicians, administrators and researchers, which will empower them to get better accustomed with the key characteristics of students and instructors, which they should possess to adopt e-learning successfully.

## 7. Conclusion

Most of the educational institutes in the world have shifted to e-learning setting to continue imparting knowledge and make learning accessible to the learners. As the situation has forced us to adopt this system, it is essential to investigate the behavioural intention of students to use e-learning in the future. The study was aimed to know the influence of instructor characteristics (instructor attitude, competency & interaction), student characteristics (student motivation, mindset & collaboration) and technology acceptance model (perceived usefulness & perceived ease of use) on behavioural intention to use e-learning and its acceptance by students during this pandemic of COVID-19. An external variable of perceived severity of COVID-19 was tested on all the constructs to see the assessment of the perceived severity of the current situation by the students. The study revealed that all the above factors have a significant influence on the behavioural intention to use e-learning which will result in the acceptance of this system during the pandemic. Students acknowledge that situation is not conducive to hold classroom learning and show positive intentions to accept the e-learning. The study will be helpful for the academicians, institute administrators and students to understand the important characteristics of instructors' and students' responsible for shaping positive behavioural intentions towards e-learning. The study will help researchers to understand what factors hold importance in the minds of a learner to accept this forced shift towards online learning. This study also offers insights for instructors, who were not exposed to this kind of learning before, to make this transition easy and beneficial by the knowing factors which can help them to engage learners.

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### Availability of data and material

Data will be available on request.

### Ethics approval

Not applicable.

### Consent to participate

Not applicable.

### Consent for publication

Author agree to submit in The International Journal of Management Education.

### Declaration of competing interest

There is no conflict of interest.

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## Appendix A

### *Instructor characteristics*

#### *Instructor attitude*

- The instructor has a genuine interest in students.
- The instructor is enthusiastic about teaching the class.
- The instructor's style of presentation holds my interest.
- The instructor is friendly towards individual students.

#### *Instructor competency*

- The instructor handles the e-learning units effectively.
- The instructor explains how to use the e-learning components.
- I feel the instructor is keen that we use the e-learning based units.
- The instructor encourages and motivates me to use e-learning.

#### *Instructor interaction*

- We were invited to ask questions/receive answers.
- We were encouraged to participate in class.
- Students felt welcome in seeking advice/help.
- The instructor encourages student interaction.

### *Student characteristics*

#### *Student Motivation*

- In an online class, I prefer assignments and questions that challenge me so that I can learn new things.
- When I have the opportunity in the online class to choose class assignments, I choose the assignments that I can learn from even if they don't guarantee any grades.
- I want to do well in the online class because it is important to show my ability to my family and friends.
- I like to be one of the most recognized students in the online class.

#### *Mind-Set*

- I learn best by absorption (i.e. "sit still and absorb")
- I learn best by construction (i.e. by participation and contribution).
- I learn better by construction than absorption.

#### *Collaboration*

- I only read the messages posted in the discussion group.
- I read as well as participate in the discussion group.
- The facilitator initiated most of the discussions.
- Students initiated most of the discussions.

### *Technology acceptance model*

#### *Perceived Ease of Use*

- I find it easy to use e-learning (Zoom and LMS) to do what I want it to do.
- I find the e-learning (Zoom and LMS) is clear and understandable for me.
- It is easy for me to become skilful at using e-learning (Zoom and LMS).
- I find the e-learning (Zoom and LMS) easy to use.

#### *Perceived Usefulness*

- E-learning (Zoom and LMS) improves my ability to accomplish academic tasks.
- E-learning (Zoom and LMS) increases my productivity in accomplishing academic tasks.
- E-learning (Zoom and LMS) enhances my effectiveness in accomplishing academic tasks.
- I find the online learning system E-learning (Zoom and LMS) useful in my study completion.

#### *Perceived severity of COVID-19*

- If anyone gets the **COVID-19**infection, it will be severe.
- If anyone gets the **COVID-19**infection, it will be risky.
- If anyone gets the **COVID-19** infection, he/she won't be able to manage daily activities.

### Behavioural Intention

- I intend to use e-learning (Zoom and LMS) in the near future.
- I predict I would use e-learning (Zoom and LMS) in the near future.
- I plan to use e-learning (Zoom and LMS) in the near future.
- I intend to use e-learning (Zoom and LMS) for learning as often as needed.

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