

WHAT SHAPES E-LEARNING EFFECTIVENESS AMONG TOURISM EDUCATION STUDENTS? AN EMPIRICAL ASSESSMENT DURING COVID19

Theme: Critical challenges and factors influencing e-learning in tourism education

Abstract

Current study is undertaken to examine the role of Information & Communication Technology (ICT), motivational variables, and virtual competence towards students' e-learning effectiveness. Structural Equation Modelling (SEM) with Partial Least Squares (PLS) was used for data analysis. Findings revealed that different components of ICT, except perception, have a positive impact on e-learning effectiveness. Also, perceived usefulness, perceived enjoyment, virtual self-efficacy, and virtual social skills positively contribute towards e-learning effectiveness of students which contribute to their knowledge acquisition and satisfaction. Findings of the study have unique implications for universities, faculty and students to create/use e-platforms for effective learning experiences.

Keywords: information and communication technology (ICT); perceived usefulness; perceived enjoyment; virtual competence; e-learning effectiveness; knowledge acquisition

1. Introduction

The education system across the globe is facing a tough time due to the Covid19 pandemic forcing higher education institutions (HEI) to overcome the traditional mode of teaching through physical classroom interaction (Tarhini et al. 2017). With the use of Information and Communication Technology (ICT), higher education has moved to online platforms to reach out to the students and adopt virtual teaching to deliver courses online (Wahab, 2020; Hodges, Moore, Lockee, Trust, & Bond, 2020). In current times of the Covid19 pandemic where social distancing is seen as next level normal, there is a growing need to replace physical interaction with virtual interaction. To address the emergency of the educational institution's closure across the globe caused by Covid19, it was recommended by UNESCO that the educational institutes gear up themselves with online learning tools (Crawford et al., 2020). Due to Covid19, e-learning has become popular across the world and this can be witnessed by the increased allocation to e-learning programs in the education sector and the use of more advanced technology and tools in the domain to increase the interaction between the students and teachers.

E-learning is seen to have a great effect on the academic performance of the students (Tawafak, 2020). It has emerged as a powerful medium of learning particularly using internet technology as a mode of deliverance. Once the e-learning programs are effectively implemented, there has been a substantial increase in the satisfaction level of the learners (Al-Fraihat et al., 2020). E-learning systems provide an opportunity for instructors/faculty where they can manage, plan, deliver and keep track of the learning and teaching process. It is, therefore, imperative for educational institutions to encourage an environment of cohesive learning to encourage learners' performance and promote higher levels of knowledge acquisition for the students. Nowadays with the use of ICT, the educational system has undergone a complete evolution where the emphasis has shifted from the instructor to the learner (Valencia-Arias et al. 2018). There has been a constant shift in the relationship between the HEIs and students, where students are looked at as customers and universities as providers of educational services (Yousaf, Mishra, & Bashir, 2020; Kilburn et al., 2016; Bunce, Baird & Jones; 2017). Therefore, the success of e-learning systems entirely depends on the student's willingness and their desire to accept this system (Shahzad et al.,2020; Sahu, 2019; Pham et al., 2019).

Previous research in the area identifies certain antecedents to e-learning, albeit in a disjointed way. Martinex-Caro (2009) studied the factors affecting effectiveness in e-learning in production management courses for industrial engineering students and found that human-technology interaction is key to getting students to learn online. Mbarek and Zaddem (2013) and Lim, Lee, and Nam (2007) found that perceived usefulness, ease of use, self-efficacy, social presence, training design constructs and effectiveness constructs are determinants of effective online training. Recently, e-learning has been well recognised as mainstreaming in health sciences education (HSE) – medical, dental, public health, nursing, and other allied healthcare education. Regmi and Jones (2020) did a systematic review of the factors that enable and disable effective e-learning in health sciences education (HSE) and found raise some concerns over whether e-learning in medical education or eL-HSE would actually enhance learning. Other researchers have also studied factors affecting e-learning of students. These factors include information quality, interface quality (Zhang, Cao, Shu and Liu, 2020), ease of use, self-efficacy, social presence (Mbarek & Zaddem, 2013), perceived enjoyment, students experience, computer anxiety, and perceived self-efficacy (Alenezi & Karim, 2010; Abdullah, Ward & Ahmed, 2016; Siron, Wibowo & Narmaditya, 2020), internet accessibility, technical skills, administration support, and content design (Anggraeni & Sole, 2018).

Despite rich research on specific motives that influence e-learning effectiveness, there is a clear need to develop a framework that explains general antecedents to e-learning effectiveness. It is also argued that the research on factors affecting the use of e-learning effectiveness during this pandemic time is at its infancy (Almaiah, Al- Khasawneh & Althunibat, 2020; Maheswari, 2021) and requires immediate attention. Additionally, the authors could not find any such research for Indian tourism & hospitality students, despite abundant information about other domains. Focusing on this gap, the current study aims at exploring the factors that affect students' e-learning effectiveness. In the current study, it is argued that the students' learning effectiveness while using online platforms are impacted by ICT factors (advantage, compatibility, ease of use and perception), student motivational factors (perceived usefulness and perceived enjoyment), and students' virtual competency factors (virtual self-efficacy and virtual social skills). It is also argued that students' e-learning effectiveness positively impacts their knowledge acquisition and their satisfaction.

The current paper is organized as follows. The next section presents an overview of the research model and hypotheses, followed by a discussion of the adopted research methodology. The paper then presents a discussion of findings and their theoretical and managerial implications, followed by limitations and future research directions.

2. Research Model and Hypotheses

In the e-learning context, we were particularly interested in exploring the antecedents to e-learning effectiveness and the outcomes. Therefore, we proposed ICT usage (consisting of advantage, compatibility, ease of use, perception), motivational variables (consisting of perceived usefulness and perceived enjoyment), and virtual competence (consisting of virtual self-efficacy and virtual social skills) as the antecedents of e-learning effectiveness in the e-learning context. The outcomes of e-learning effectiveness are proposed as knowledge acquisition and student satisfaction. Figure 1 shows our research model with hypotheses. The below-mentioned section shows the critical literature on understudy variables along with the association among them in the following subsections.

2.1. ICT and E-learning effectiveness

ICT has been defined as the “technologies that handle information and enable communication among human actors” (Stephens, 2007, P. 488). Taking the cue from the study of Bhat and Bashir (2018) we have conceptualized ICT as a multi-dimensional construct that includes four factors like advantage, compatibility, ease of use, and perception. According to

Rosenberg (2001) “e-learning refers to the use of the Internet technologies to deliver a broad array of solutions that enhance knowledge and performance.” American Society of Training and Education (ASTD) defines e-learning as the process by which learners applying digital media to learning. The majority of the scholars in the context of the education sector view the internet as an ICT tool to quench the thirst for knowledge and to satisfy the necessity of information (Talebian et al., 2014). Some studies have also investigated the impact of virtual laboratories on learning have found that students who use virtual laboratories for training before using a physical laboratory, and again for post-lab exercises showed significant improvement in the learning than the ones without the virtual laboratories.

Researchers argue that ICT could not only support reflective learning but also expand students learning capacities, and boost knowledge retention (Achuthan, Francis, & Diwaker, 2017). ICT has changed the educational sector by changing the delivery of education, created new venues for learning, and brought new pedagogies to improve student results. Students can use ICT to reach and acquire information in a number of ways for exploration, personalized learning, for creativity with open-ended inquiries (Hu & Yalland, 2017). Prior to Covid-19, students were required to listen to the teachers, work in groups or individually and predominantly reproduce knowledge in assessments and overall ICT usage was limited (Fraillon et al., 2019). However, the unprecedented lockdown confronted students and as well as teachers with an entirely new situation (Huber & Helm, 2020). Therefore, students and teachers alike were compelled to move towards online education which enhanced the usage of various ICT tools for learning and problem solving (Eickelmann & Gerick, 2020). Recent studies have also highlighted how Covid-19 ICT enhanced student learning (Shehzadi et al., 2020). Therefore, based on the above arguments we propose the following hypothesis:

H1: ICT (advantage) has a direct and positive influence on e-learning effectiveness.

H2: ICT (compatibility) has a direct and positive influence on e-learning effectiveness.

H3: ICT (ease of use) has a direct and positive influence on e-learning effectiveness.

H4: ICT (perception) has a direct and positive influence on e-learning effectiveness.

2.2. *Perceived usefulness and E-learning effectiveness*

Student motivation has a big role to play in e-learning effectiveness (Ames, 1990). Perceived usefulness is defined as the degree to which a person believes that the usage of technology would enhance her or his job performance (Davis, 1989). Past research has shown that high perceived usefulness often results in a positive user performance relationship (Ong & Lai, 2006). Considering the case of online learning effectiveness Venkatesh and Davis (2000) have found that perceived usefulness has a positive effect on student's intention to use online learning. This implies that students would be inclined to use online learning when they perceive online learning to be a useful and meaningful way to attain higher performance in their studies. Research has shown that Course delivery, tutor attributes, and facilitating conditions were found out to be the main determinants of perceived usefulness (Teo, 2010). According to Mohammadi (2015), ease of use was the main determinant of perceived usefulness which is consistent with the Technology Acceptance Model. Thus, Perceived usefulness is a determinant of students' acceptance of mobile technology according to the technology acceptance model (Davis, 1989). Therefore, based on the above arguments we propose the following hypothesis:

H5: Perceived usefulness has a direct and significant impact on e-learning experience.

2.3. *Perceived enjoyment and E-learning effectiveness*

Perceived enjoyment is the “degree to which the activity of using technology is perceived to be enjoyable in its own right apart from any performance consequences that may be anticipated” (Davis, Bagozzi, & Warshaw, 1992, p. 1113). Previous studies have also found that perceived enjoyment can increase the students' intention of e-learning (Hasan, Linger, Chen, Lu, & Wang, 2016). Research from e-learning studies has shown that perceived enjoyment increases university students' usage intentions (Cabada et al., 2017; Liaw & Huang, 2011). When students experience using e-learning systems or services and feel fun or joy while using them, they are inclined towards a positive attitude with respect to their ease of use and usefulness of e-learning system (Al-Aulamie et al., 2012; Cabada et al., 2017), which then results in greater intention and learning experience. Su and Chiu (2021) studied 151 sixth-grade pupils at two elementary schools in northern Taiwan and found that young students find interactive based videos as enjoyable and interesting which result in higher adoption and greater e-learning. Therefore, we propose the following hypothesis:

H6: Perceived enjoyment has a direct and significant impact on e-learning experience.

2.4. *Virtual self-efficacy and E-learning effectiveness*

Self-efficacy is defined as the “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p. 3). It is also defined as the belief in the capabilities of what one can do in a specific domain. According to Schunk and Pajares (2002) self-efficacy influences not only task choice but also choice, persistence, and achievement. From the higher education perspective students with positive self-efficacy towards online courses perform better because they are usually more motivated (Wang, Shannon, and Ross, 2013). Hwang, Chiu, and Chen (2015) investigated that e-learning experiences engage students with inquiry-based learning in a social studies classroom. Their findings further suggested that students’ use of ICT significantly impacted the extent to which active learning occurred, which results in higher academic achievement. Previous studies have argued that technology self-efficacy has a positive correlation with online learning performance (Joo, Bong, & Choi, 2000; Wang & Newlin, 2002). However, some studies have highlighted that self-efficacy was a poor predictor of final grade and satisfaction and a higher level of self-efficacy in student increase their performance and learning (DeTure, 2004; Puzifferro, 2008). Therefore, we propose the following hypothesis:

H8: Virtual Self-efficacy skills have a direct and significant impact on e-learning experience.

2.5. *Virtual social skills and E-learning effectiveness*

Social skills have been defined as the behaviors “that result in positive social interactions and encompass both verbal and non-verbal behaviors necessary for effective interpersonal communication” (Rao, Beidel, & Murray, 2008, p. 353). According to social constructivist theory, learners need to be actively engaged in their social environment because learning is heavily influenced by the social environment in which it occurs (Vygotsky, 1978). In the e-learning context, faculty, as well as peers, are an important resource for students to learn (Borthick, Jones, & Wakai, 2003). However, the complexity of the e-learning platform makes it more difficult for students to socialize with their faculty and peers/friends and require different approaches to establish relationships. It is argued that students who have experience of online socialization would be able to approach their peers and faculty more effectively in the e-learning platform because of their familiarity with the norms and approaches (Borthick, Jones, & Wakai, 2003; Wellman et al., 1996). Such interaction would enhance the learning effectiveness of the students. E.g., a student who has high virtual self-efficacy is experienced

and familiar with online socialization and might use emoticons/animations during their conversation with an instructor or peers and might obtain a better response in comparison to students who have low virtual self-efficacy (Borthick, Jones, & Wakai, 2003; Wellman et al., 1996). Such approaches help the students to achieve favourable outcomes and impact their e-learning effectiveness. Therefore, we propose the following hypothesis:

H8: Virtual Social skills have a direct and significant impact on e-learning experience.

2.6. *E-learning effectiveness and Knowledge Acquisition*

Knowledge acquisition has been defined as obtaining knowledge from specialists on the condition of situated cognition (Compton, 2013). Knowledge acquisition includes the search for, identification of, and access to new relevant knowledge (Alavi & Leidner, 2001). The integration of ICT in the classrooms is not something new. Previous studies have investigated the application, use, and effectiveness of ICT in higher education contexts for quite some time (Proctor & Marks, 2013; Domingo & Gargnte, 2016). Students of today are unlike the students of the past as they want to create, use the tools of their time, share control and make decisions (Sanchez-Sepulveda, et al., 2020). Students today want to share their opinions not only in class but globally, and they sought an education that is relevant and connected with reality (Prensky, 2010). Therefore, in this era of ICT, the acquisition of skills and knowledge must be related to the use and control of ICT (Paes, Arantes, & Irizarry, 2017). Effective e-learning effectively has the potential to enhance students' knowledge acquisition (Supriadi & Sa'ud, 2017; Terry, 2016; Wilkinson et al., 2010). This is because e-learning has many inherent advantages like accessibility, high-quality images, and the possibility to 19 repeat practice anytime and anywhere without limitation (Moazami et al., 2014). Taking the context of and emergencies like the Covid-19 into consideration e-learning is one of the essential elements to provide online education (Shehzadi et al., 2020). Therefore, we propose the following hypothesis:

H9: E-learning effectiveness has a direct and significant influence on students' knowledge acquisition.

2.7. *E-learning effectiveness and student satisfaction*

With an ever-competitive and commercial higher education sector student satisfaction has gained more importance (Donovan, 2017). A wide body of literature from services marketing suggests that customers are usually satisfied when the quantity of the service they receive matches or exceeds their expectations (e.g Hill 1995; Munteanu et al., 2010). Taking

the context of higher education into consideration student satisfaction is defined as “the degree to which students’ expectations about the instructor, course and teaching method are met” (Arbaugh & Benbunan, 2007). Research suggests that students will be satisfied when they acquire and assimilate new knowledge, understand critical management concepts, learn to identify central topics, make managerial decisions, and solve key business problems (Rueda, Benitez, & Braojos, 2017). This satisfaction will usually depend on the instructor’s performance in teaching pedagogy and the overall course design and overall effectiveness (Chiu & Chang, 2007). According to Donovan, (2017) for universities or institutions of higher education, it is extremely important to understand what are the expectations of the students from the university so that both that the university can match or exceed the expectations of students. Therefore, based on the above arguments we propose the following hypothesis:

H10: E-learning effectiveness has a direct and significant impact on student satisfaction.

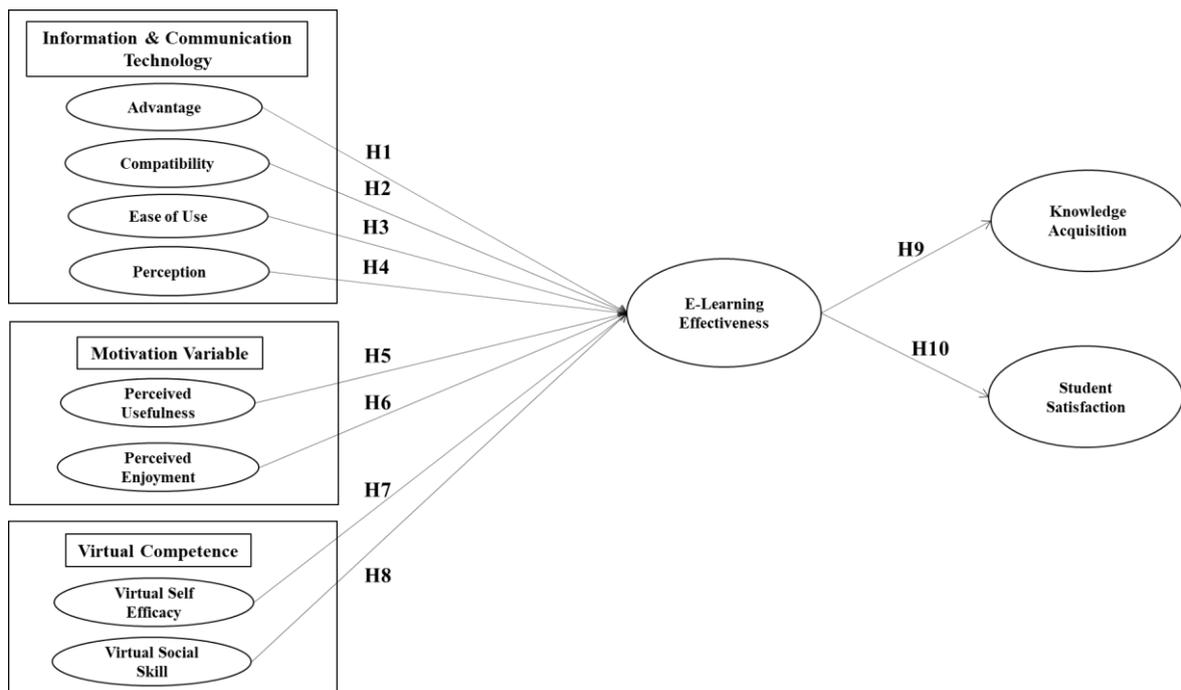


Fig 1: Proposed Framework & Hypotheses

Source: Conceptualized by authors

3. RESEARCH METHODOLOGY

3.1. Measurement items

The measurement items for the survey instrument came from the established literature and were adapted to fit the context of this study. The questionnaire consisted of 48 items. Information and communication technology (ICT) was measured via Bhat and Bashir (2018) with four dimensions and a total of 15 items from which advantage contained four items, compatibility had three items, ease of use had five items and perception had three items. The motivation variable consisted of two dimensions as perceived usefulness (four items) measured using Davis (1989) and perceived enjoyment (six items) measured using Oghuma et al. (2016). The virtual competence consisted of two dimensions, virtual self-efficacy (five items) and virtual social skills (five items), which was adapted by Wan, Wang, and Haggerty (2008). Moreover, based on a study by Mayer (2002), a four-item scale was used to measure knowledge acquisition. E-learning effectiveness was measured via five items using Alavi (1994). Lastly, the student satisfaction (four items) was measured by four items and we adapted this scale from Header et al. (2013). All items are depicted in Table 2.

The responses of the survey participants to each of the items were measured on a five-point Likert scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). The draft questionnaire was shown to three professors of marketing of a top B-School in India, familiar with the selected context, to ensure content validity. Based on their feedback, a structured questionnaire was prepared and was pre-tested with a small sample of 10 respondents, who did not participate in the final survey, to explore any language and/or typing errors.

3.2. Sampling technique and sample size

The target population of the current study is students studying tourism and hospitality courses at an undergraduate or postgraduate level in Indian universities that started to use an online learning system for educational purposes in the current situation of the COVID-19 period. The unit of analysis was defined as university students who are involved in e-learning and take their classes/session online during the Covid19 pandemic. Such individuals are expected to have memory of their e-learning experiences. Also, it was made sure that only those respondents who have attended online classes participate. A list of all tourism and hospitality students was acquired from the administrative office of three prominent universities in India. A sample of 1000 target respondents, using simple random sample, was generated from the pool of 2600 students. These respondents were then contacted through e-mails and

the online questionnaire was sent to them. To increase the interest and involvement of respondents, they were given an explanation of the purpose of the research. A total of 468 filled responses were received. 447 valid responses were obtained after data screening and omitting outliers. The data collection process continued for two months (October – November 2020). Out of all the respondents, 56.20% of the respondents were males (females = 43.8%) with 64.2% in the age category of 21-25 years, 32.40% between age 16-20 years. 77.60% of the respondents were doing their post-graduation whereas 22.40% were studying under graduation programs from the various universities and had been exposed to the online class environment. 76.50% of the respondents had a monthly household income greater than INR 40,000 whereas 15.4% of them had a monthly household income in the range of INR 25,000 to INR 40,000. Only 8.1% of the respondents had monthly household income less than INR 25000. The exposure of respondents towards online education was also checked and it was found that 57.50% respondents were not exposed (42.5% were exposed) to online teaching platforms before covid and online classes were their first-time exposure to such an environment. The results are as shown in Table 1.

Table 1: Demographics of respondents

Variable		Number of Respondents (n = 447)	Percentage
Gender	Male	251	56.2%
	Female	196	43.8%
Age	16-20 years	145	32.4%
	21-25 years	287	64.2%
	>25 years	15	3.4%
Course	Graduation	100	22.4%
	Post-Graduation	347	77.6%
	Less than Rs. 25,000	36	8.1%
Monthly Household Income	Rs. 25,000 – Rs. 40,000	69	15.4%
	Greater than Rs. 40,000	342	76.5%
Exposure to online education Before Covid	Yes	190	42.5%
	No	257	57.5%

4. DATA ANALYSIS AND RESULTS

For the current study, Structural Equation Modelling (SEM) with Partial Least Squares (PLS) was used for data analysis (Ringle, Wende, & Will, 2005). Over the last decade, PLS has emerged as a well-established technique for estimating path coefficients under conditions of data non-normality and for small sample sizes (Hair, Sarstedt, Ringle, & Mena, 2012).

Analysis of the data showed the kurtosis ranged from -1.25 to 0.10 and skewness from -0.34 to 0.22 indicating that the data was not violating normality requirements (Kline, 2011). To counter any other effects of minor non-normality, PLS algorithm procedures were performed with a 5000 sample for bootstrapping. Also, in order to make sure that common method bias is absent, some physiological barriers were used in the questionnaire in addition to randomizing the items. All the factors were constrained to 1 and exploratory factor analysis was conducted with all the items in the study. Findings of the un-rotated factor solution highlighted that no single factor explained more than 50% variance of the variables, thereby, indicating a lack of common method bias (Podsakoff et al., 2003).

The data analysis part was done in two parts. Initially, the measurement model was validated first which was followed by the structural model. This was done in accordance with the two-step data analysis process as suggested by Anderson and Gerbing (1988). The sample of 468 responses was randomly split into two equal parts with 234 responses each. The first dataset was used for the measurement model and the second dataset was used for path modeling ensuring higher validity of the overall model and measures as per Bagozzi and Heatherton (1994).

4.1. Measurement model

To examine the convergent validity of the measurement model, the factor loadings, average variance extracted (AVE) and composite reliability (CR) were assessed. All the item factor loadings and the CR values were found to exceed the recommended cut-off value of 0.70 (Chin, 1998). This indicated that the construct indicators are closely related to the latent construct than other constructs in the model (Hair et al., 2006). An introspection into the AVE values also indicated that all values exceeded the recommended cut-off value of 0.50. This means that the latent construct variance was explained by the prescribed indicators (Hair et al., 2006). The results are as shown in Table 2. Further, the comparison of cross-loadings across columns also indicated that an indicator loaded more on its own construct than its cross-loadings with other constructs. This gave more evidence of convergent validity.

Table 2:
Reliability and validity for constructs

Constructs	Item	Loading	Mean (S.D)
Advantage (Adv) AVE = .673 CR = .892 CA = .839 rho_A = .845 MSQ = .538	ICT based methodologies promote a conducive teaching and learning environment during online classes (Adv1)	.855	4.060 (.660)
	The use of the ICT based methodologies raise the curriculum standards (Adv2)	.818	4.049 (.734)
	ICT based methodologies are positively correlated with the academic performance of students during online classes (Adv3)	.794	4.019 (.756)
	The usage of ICT based methodologies brings positive change in online classroom (Adv4)	.814	4.045 (.711)
Compatibility (Comp) AVE = .674 CR = .860 CA = .757 rho_A = .784 MSQ = .550	ICT based methodologies are very supportive during our online classes (Comp1)	.867	4.057 (.658)
	Availability of ICT resources increases my knowledge even during online classes during the Covid19 pandemic (Comp2)	.868	4.045 (.732)
	ICT enabled teaching is better than traditional methods of teaching (Comp3)	.719	4.015 (.759)
	Online surfing of learning material during Covid19 pandemic makes me more effective (EoU1)	.831	4.087 (.751)
Ease of Use (EoU) AVE = .712 CR = .876 CA = .810 rho_A = .822 MSQ = .582	ICT enabled teaching methodologies build confidence in me and is easy to use (EoU2)	.88	4.026 (.752)
	It is easier to communicate through ICT applications like online quizzes, educational blogs & common e-mails (EoU3)	.707	4.011 (.720)
	It is convenient to share assignments, lecture notes and study material through ICT (EoU4)	.771	4.204 (.741)
	Different learning preferences and styles are properly handled with the help of ICT (EoU5)	.815	3.985 (.702)
	ICT enabled teaching costs physical and social activities during Covid19 pandemic (Per1)	.890	4.042 (.745)
Perception (Per) AVE = .791 CR = .873 CA = .783 rho_A = .808 MSQ = .571	ICT enabled teaching methodologies in teaching during Covid19 make teachers casual and lenient (Per2)	.821	3.996 (.726)
	ICT provides me with opportunities to plagiarize content using copy & paste (Per3)	.791	3.977 (.712)
	I could complete my task using the software package if there is no one around to tell me what to do as I go (VSE1)	.774	4.064 (.733)
	I could complete my task using the software package if I had never used one like this before (VSE2)	.821	3.992 (.718)
	I could complete my task using the software package if I had only the manuals for reference (VSE3)	.778	3.974 (.709)
Virtual Self Efficacy (VSE) AVE = .717 CR = .861 CA = .784 rho_A = .788 MSQ = .563	I could complete my task using the software package if I had seen someone else using it before trying it myself (VSE4)	.741	3.921 (.737)
	I could complete my task using the software package if I could call someone for help if I got stuck (VSE5)	.774	3.913 (.746)
	In virtual settings, I am keenly aware of how I am perceived by others (VSS1)	.769	3.864 (.705)
Virtual Social Skills (VSS)			

AVE = .714	In virtual settings, I am good at making myself visible with influential people in my groups (VSS2)	.756	4.004 (.976)
CR = .884			
CA = .837	In virtual settings, I find it simple to put myself in the position of others to understand their point of view (VSS3)	.817	3.917 (.708)
rho_A = .842			
MSQ = .601	In virtual settings, I always know what to say to others in social situations (VSS4)	.790	4.004 (.731)
	In virtual settings, I am particularly good at sensing the motivations and hidden agendas of others (VSS5)	.753	3.906 (.714)
	Using the various ICT platforms improve my work performance (PUse1)	.841	3.932 (.741)
Perceived Usefulness (PUse)	Using the various ICT platform increases my work productivity (PUse2)	.789	3.909 (.701)
AVE = .727	I find the various ICT platform useful for my studies during the Covid19 pandemic (PUse3)	.813	4.038 (.753)
CR = .907			
CA = .871	Using the various ICT platform enhances my effectiveness in my work (PUse4)	.849	3.992 (.723)
rho_A = .872			
MSQ = .485	Using the various ICT platform provides me with information that would lead to better decisions (PUse5)	.768	3.936 (.701)
	I have fun interacting with these ICT platforms (PEnj1)	.805	3.951 (.724)
Perceived Enjoyment (PEnj)	Using various ICT platforms for my studies provide me with a lot of enjoyment (PEnj2)	.831	3.906 (.730)
AVE = .710	Using different ICT platforms is a good way to spend my time (PEnj3)	.784	3.962 (.843)
CR = .924			
CA = .901	The availability of a variety of content on various ICT platforms arouse my curiosity (PEnj4)	.806	3.974 (.947)
rho_A = .902			
MSQ = .525	I enjoy my studies on various ICT platforms (PEnj5)	.845	4.004 (.749)
	Using various ICT platforms for knowledge gaining provides me with a lot of enjoyment (PEnj6)	.836	4.019 (.761)
Knowledge Acquisition (KAcq)	I have learned something new during these online interactions (KAcq1)	.806	4.053 (.661)
	I can easily explain the content covered in this course to others (KAcq2)	.834	4.042 (.735)
AVE = .773	I have noticed the difference between my prior knowledge and the knowledge they I had gained by the end of the course (KAcq3)	.777	4.015 (.759)
CR = .882			
CA = .821	I can make correct decisions and solve problems with the knowledge that I have gained via these ICT platforms (KAcq4)	.810	4.060 (.786)
rho_A = .822			
MSQ = .575	ICT enabled teaching has helped me to learn factual material during the Covid19 pandemic (ELE1)	.773	4.011 (.699)
E-learning Effectiveness (ELE)	I learned to identify central issues of the course via ICT enabled teaching during the Covid19 pandemic (ELE2)	.785	3.868 (.719)
AVE = .741	I learned to interrelate important issues of the course via ICT enabled teaching during Covid19 pandemic (ELE3)	.857	3.958 (.714)
CR = .913			
CA = .881	I developed the ability to communicate clearly about the subject (ELE4)	.852	4.038 (.679)
rho_A = .886			
MSQ = .482	I improved my ability to integrate facts and develop generalizations from the course material (ELE5)	.847	3.940 (.731)

Student Satisfaction (SSat) AVE = .794 CR = .920 CA = .870 rho_A = .872 MSQ = .671	I was satisfied with the learning flexibility and independence of this online class during Covid19 pandemic (SSat1)	0.908	4.023 (.701)
	I was satisfied with the instruction model for my online courses held during Covid19 pandemic (SSat2)	0.883	3.989 (.720)
	I was satisfied with the ICT learning environment (SSat3)	0.881	3.970 (.893)

Fornell and Larcker (1981) method and the HTMT value for correlation between each construct (Henseler, Ringle & Sarstedt, 2015) was used to assess the discriminant validity which measures the extent to which measures are not a reflection of some other variable and is indicated by the low correlations between the measure of interest and the measures of other constructs (Henseler, Ringle, & Sarstedt, 2015). The results are shown in Table 3. A closer look at Table 3 also indicates that the square root of the AVE (diagonal values) of each construct is larger than its corresponding correlation coefficients. In addition, the peak squared correlation value of each construct (MSQ) was also compared with the AVE value of that construct in which the AVE value was found to be larger in each case (refer to Table 2). Further, the HTMT values for each construct pair were found to be below 0.90 (please see Table 4) (Henseler, Ringle & Sarstedt, 2015). All these methods give sufficient proof of the existence of discriminant validity (Fornell & Larcker 1981; Henseler, Ringle & Sarstedt, 2015).

Table 3:
Inter-construct correlations and discriminant analysis

	Adv	Comp	EoU	Per	VSE	VSS	PUse	PEnj	KAcq	ELE	SSat	Mean	S.D.
Adv	.820											4.043	.714
Comp	.754	.821										4.039	.715
EoU	.675	.677	.824									4.063	.726
Per	.483	.548	.634	.807								4.005	.726
VSE	.695	.684	.705	.563	.800							3.972	.727
VSS	.662	.694	.745	.712	.653	.818						3.939	.964
PUse	.612	.630	.690	.747	.595	.802	.813					3.964	.722
PEnj	.438	.504	.488	.434	.551	.455	.418	.835				3.969	.732
KAcq	.477	.539	.668	.607	.544	.603	.582	.443	.779			4.042	.734
ELE	.642	.641	.732	.602	.597	.730	.694	.430	.560	.891		3.963	.707
SSat	.531	.532	.672	.618	.554	.653	.615	.373	.601	.567	.777	3.994	.702

Note. The square root of AVE in every multi-item construct is shown on the main diagonal.

Table 4: HTMT Ratios

	Adv	Comp	EoU	Per	VSE	VSS	PUse	PEnj	KAcq	ELE	SSat
Adv											
Comp	.83										
EoU	.61	.73									
Per	.67	.58	.65								
VSE	.73	.67	.75	.64							
VSS	.69	.63	.66	.65	.70						
PUse	.70	.69	.59	.68	.68	.73					
PEnj	.72	.65	.72	.66	.74	.62	.74				
KAcq	.71	.62	.65	.63	.74	.65	.71	.81			
ELE	.68	.63	.63	.65	.73	.63	.74	.83	.62		
SSat	.58	.72	.67	.58	.68	.67	.59	.73	.58	.64	

4.2. Structural model

Before testing the structural model, fit adjustment with Standardized Root Mean Square (SRMR) Residual value was evaluated. The result was 0.055, which indicated a good fit adjustment. Next, to explore the possibility of multicollinearity amongst constructs, the Variance Inflation Factor (VIF) value was calculated which was found to be below 5.0, thereby, indicating a lack of multicollinearity (Hair, Ringle & Sarstedt, 2011). Through the Harman one-factor test as well as the marker variable test (the brand loyalty construct, measured with the scale given by Yoo and Donthu, 2000, was used as a marker variable), lack of common method bias was established. Then, a bootstrapping procedure, 5000 samples, was performed on the second dataset to test the path values (Ringle et al., 2005). In PLS-SEM, the R^2 value for each endogenous construct is used to evaluate the explanatory power of the model as PLS-SEM does not generate conventional model fit indices like covariance-based SEM methods (Wasko & Faraj, 2005). In PLS-SEM, the overall goodness of fit (Gof) index, was used as a diagnostic tool for model assessment (Tenenhaus, et al., 2005). Gof index is calculated using the geometric mean of the average communality and the average of R^2 (for endogenous constructs) (Tenenhaus, et al., 2005). The process of calculating GoF for the structural model is as shown in Table 5. A GoF value between 0.00 and 0.25 suggests a poor fit, between 0.25 and 0.50 a medium fit and a good fit if it is between 0.50 to 1.00 (Hoffmann & Birnbrich, 2012).

Table 5:
Goodness-of-fit index

Variable	AVE	R ²
Adv	.673	
Comp	.674	
EoU	.712	
Per	.791	
VSE	.717	
VSS	.714	
PUse	.727	
PEnj	.710	
ELE	.773	.643
KAcq	.741	.403
SSat	.794	.363
Average Score	.730	.470
Average of AVE x R²	.342	
√Average of AVE x R²	.585	

Results indicated a GoF value of .557 for our research model, which indicates a good fit. Corresponding R2 values were used to explain the explanatory power of the predictor variable(s) on the respective construct which suggests that the model explains a variance of 77.3% (R2 = .773), 74.1% (R2 = .741), and 79.4% (R2 = .794) in e-learning effectiveness, knowledge acquisition and student satisfaction, respectively, implying that much of the variance of these endogenous constructs in the model is explained by the model antecedents. Once the requirements for the measurement model validity were tested and satisfied, the hypothesized relationships were assessed.

Results, Table 5, showed that all components of Information and Communications Technology (ICT) significantly affect e-learning effectiveness since advantage ($\beta = .639$; $t = 1.993$; $p < .047$), compatibility ($\beta = .463$; $t = 2.019$; $p < .043$), ease of use ($\beta = .323$; $t = 2.089$; $p < .037$) were found to have a significant effect on knowledge acquisition whereas perception ($\beta = .105$; $t = 1.059$; $p > 0.290$) was found to have a non-significant effect on e-learning effectiveness. In addition, the motivation variable was also found to have a significant impact on e-learning effectiveness since the effects of perceived usefulness ($\beta = .627$; $t = 4.614$; $p < .000$) and perceived enjoyment ($\beta = .402$; $t = 2.022$; $p < .004$) on e-learning effectiveness were found statistically significant.

Table 5:

Structural Estimates and Hypotheses Testing

Hypotheses	Relationship	β coefficient	T Statistics	P Values	Decision
H1	Adv -> ELE	.639	6.993	.047	Accepted
H2	Comp -> ELE	.463	2.019	.043	Accepted
H3	Per -> ELE	.105	1.059	.290	Rejected
H4	EoU -> ELE	.323	2.089	.037	Accepted
H5	PEnj -> ELE	.402	2.022	.044	Accepted
H6	PUse -> ELE	.627	4.614	.000	Accepted
H7	VSE -> ELE	.453	2.076	.038	Accepted
H8	VSS -> ELE	.493	2.089	.037	Accepted
H9	ELE -> KAcq	.681	14.229	.000	Accepted
H10	ELE -> SSat	.518	12.023	.000	Accepted

Likewise, virtual competence was also having a significant impact on e-learning effectiveness since virtual self-efficacy ($\beta = .453$; $t = 2.079$; $p < .003$) and virtual social skills ($\beta = .493$; $t = 2.089$; $p < .037$) were found significant for their impact. Further, it is established that e-learning effectiveness positively impacts student satisfaction ($\beta = .518$; $t = 12.023$; $p < .000$) and knowledge acquisition ($\beta = .681$; $t = 14.229$; $p < .000$). Thus, it can be inferred that the student satisfaction and knowledge acquisition of online classes among tourism and hospitality students depends on the e-learning effectiveness which, in turn, depend on the effective use of ICT resources by the concerned faculty, the motivation and virtual competence of the students.

5. DISCUSSION OF FINDINGS

Covid19 has become a global pandemic infecting millions and impacting more individuals, directly or indirectly. The education sector is no exemption to this. It has become a major issue for governments, educational organizations, and even private entities spending heavily on educational schemes to decide how to continually provide quality education to the students without personal interaction. Therefore, a critical contemporary issue for educational institutions, governments, and universities is to understand the antecedents to the effective online learning system and their relationship with students' knowledge acquisition, learning effectiveness, and student satisfaction. The unprecedented lockdown forced faculty and teachers with a situation imagined by none. Both have to move towards the online education

mode which required excessive usage of ICT tools for interaction and learning. Technological advancements have come in handy and the use of ICT has been made mandatory for all. With the increased use of ICT, it is argued that students learning capacities, as well as their ability to retain knowledge, will increase.

In the last two years, the use of ICT has changed the way/mode of delivery of education and pedagogy, thereby, creating multiple avenues for students to learn. Students use ICT to explore additional information to boost personalized learning and creativity. Working on similar lines, the purpose of this study is to understand the factors that affect the use of e-learning among tourism education students during the Covid19 pandemic. The work represents a novel effort for establishing the relationship between factors that affect students' e-learning effectiveness, knowledge acquisition, and satisfaction. To our knowledge, this is one of the few attempts made in this direction with the same focus among Asian countries in the context of tourism and hospitality students. As far as the psychometric properties of the data are concerned, they have shown high internal consistency. All reliability and validity tests like convergent validity and discriminant validity. Results revealed that all the dimensions of ICT (advantage, compatibility, and ease of use) except perception significantly impact e-learning effectiveness in the online learning platform. Findings also revealed that motivational factors such as perceived enjoyment and perceived usefulness have a significant impact on the e-learning effectiveness of students in the online learning platform. It was also found that e-learning effectiveness impacts student's ability to acquire more knowledge and makes them more satisfied with the online learning platform.

The results have also shown that motivational variables and virtual competence are the most important antecedents of e-learning effectiveness. In addition to ICT, educational institutions and individual faculty should also look to enhance students' perceived usefulness and perceived enjoyment which acts as motivational variables. On the other side, efforts should also be made to enhance students' virtual competencies such as virtual self-efficacy and virtual social skills by conducting training and workshops for students before the start of every new semester. No doubt the findings of the current study are majorly useful for educational institutions and universities in India, the study is also helpful for the individual faculty who can customize their online lectures by using the e-platforms. The findings are also helpful for students who want to increase their e-learning in the online context. The higher the virtual competence and individual motivation, the higher will be the knowledge acquisition and satisfaction. Therefore, this study provided a comprehensive solution for universities,

educational institutions, faculty, and students to continue their normal activities using the e-learning platforms during the Covid19 crisis.

6. THEORETICAL AND PRACTICAL IMPLICATIONS

The current study has significant theoretical as well as practical implications. The findings of the current study provided an overview of factors affecting students' knowledge acquisition, learning effectiveness, and student satisfaction in the context of the online learning environment used by educational institutions globally as a post-effect of Covid19. Tourism and Hospitality courses were taken as the context and a comprehensive overview was provided, thereby, making it among the initial work which considered the post-effect of Covid19 addressing tourism and hospitality students' e-learning. Second, the study is among the initial works that proposed how to enhance students' knowledge acquisition via a good online learning system to promote learning effectiveness and satisfaction. India as a country is the most affected countries from Covid19. The current study explores Covid19 as an opportunity and contributed to the existing literature by throwing light on these areas in response to the Covid19 in India, a developing nation. Another contribution of this study is its ability to establish that even in these worse conditions, ICT (advantage, compatibility, ease of use, and perception), motivation variables (perceived usefulness and perceived enjoyment), and virtual competence (virtual self-efficacy and virtual social skills) of students are the major factors that impact learning effectiveness, knowledge acquisition, and satisfaction.

Apart from theoretical implications, the current study also offers significant practical implications. Covid19 has made all educational institutions get updated in terms of technology and arrange student-faculty interactions using e-learning systems to fight Covid19. This has led to a paradigm shift in the Indian education system. The findings of the current study are helpful not only for the educational institutions but for the faculty also, who can look into factors that can impact students' satisfaction and learning effectiveness and develop an effective online learning system to cope up with this paradigm shift. In the current uncertain times of Covid19, the normal faculty-student interaction is not possible, therefore, the current study proposed a framework that can help administrators and students to understand factors that can help students gain knowledge and develop a good online learning system. This will ultimately help students' ability to learn and satisfaction.

The study has implications for educational institutions and individual faculty who should promote ICT, motivational variables, and virtual competence of their students. The

results of the study also direct in the same direction that these factors positively impact students' knowledge acquisition, learning effectiveness, and satisfaction. This is a major practical implication of this study as it provides solutions to resolve issues related to e-learning as a post-effect of Covid19. It is argued that while starting students' e-learning due to Covid19, particularly in the tourism and hospitality context, educational institutions and faculty must include important elements of ICT (advantage, compatibility, ease of use, and perception) to improve digital service quality to develop e-learning among students in the current lockdown situation.

7. LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Like all other studies, this study too has few limitations. One of the limitations of the current study is that we have made an attempt to understand what factors influence knowledge acquisition, e-learning effectiveness, and student satisfaction. There is no framework that has been provided by the researchers for the online learning system. There could be a possibility that these findings won't find a space in the context of schools or universities which are having difficulties in terms of implementation of online learning system. The current study does not deal with the difficulties or problems that can be faced by these educational institutions in the implementation of the online learning systems. Future research studies are invited to dig deeper into this issue.

Another limitation of the current study is the geographic area and context of the study. An attempt has been made to understand the factors that affect student's ability to acquire knowledge in online education especially in the context of tourism and hospitality students in India. Future research studies are welcomed to study other subject areas and contexts to see if there is any difference in terms of the factors. Also, a multi-country or studies in the context of developed nations (online education is accepted and developed) and under-developed nations (online education is new and systems not developed) might give a different result. Future studies can also explore this possibility. Another limitation is that the current study is quantitative in nature and is based on online data collection from the target respondents. Researchers are encouraged to do either a qualitative study or a mixed-method approach, involving multiple stakeholders, to get a clear picture of factors affecting students' knowledge acquisition.

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