The Technology Acceptance Model and Learning Management System: A Study on Undergraduate Tourism and Hospitality Students

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Abstract

The roles of educational online tools are very prevalent in the current time due to the advancement in technology, digital transformation, and the better speed of the internet. The digital platform is the most preferable and convenient platform to support advanced educational practices. Being a prominent study tool to manage the lectures, study materials, assignments and other necessary elements related to academics, the learning management system (LMS) has been implemented in most institutions, especially after the lockdown amid the COVID-19, pandemic. The purpose of this paper is to investigate the level of acceptance of the LMS in the North Indian regions of Punjab, Himachal Pradesh, and Haryana with the adoption of the Technology Acceptance Model (TAM) framework. To check the hypotheses (framed as per the TAM model), the structural equation model (SEM) has been applied which reveals that the acceptance level and the adoption of the LMS system is quite low across the chosen population. The complexity and the novelty of technology in addition to the alternative options of LMS can be the reason for the lower level of acceptance and adoption. The exact reason for the lower level of adoption can be explicitly understood from future research.

Keywords: technology acceptance model (TAM); learning management system (LMS); online education; online learning platform; COVID-19;

JEL Classification: O39; I23;

DOI: http://doi.org/10.24818/ejis.2021.13

1. Introduction

A large number of universities across the world are taking a shift towards online mode from the traditional and physical form of the educational system. Computer technology and the internet are capable of motivating, engaging, and stimulating the learning behaviour of learners. E-learning is an effective communication tool that collaborates teachers with their fellow students (Haven and Botterill, 2003). Now e-learning is in trend as teaching and learning is growing faster than ever amid the rapid transformation from the offline to the virtual space and technological revolution (Afolabi, 2015). This transformation and revolution are getting reflected in the education system with the influence of various aspects which include but are not limited to artificial intelligence, cognitive psychology, computer

science, library, and information science, and broadly education (Recker *et al.*, 2007). COVID-19 also has pushed academia to bring digital technology into practice (Teräs *et al.*, 2020). India being a majorly populated country has a huge market in the online education system (Gaba, 2015).

Many arguments have been made in the recent past by various researchers related to e-learning. Flexibility, affordability, learning pedagogy, accessibility, policy, and lifelong learning are some of the arguments associated with online pedagogy. The online mode of learning is easily reachable to remote and rural areas. E-learning is considered a cheaper mode of education due to the lower cost of physical components which include the cost of accommodation, transportation, and overall institution learning cost (Dhawan, 2020b). Online learning tools have a lot of flexibility as these tools can be used any time and at any place in addition to the real-time learning provision. ICT has the potential to encourage reflective, practiced-based, and professional learning through online environments (Wenger, 1998). The usage of ICT-aided tools for sharing knowledge and communication has been adopted by educational institutions worldwide (Brazelton and Gorry, 2003). Among the many tools, LMS has been playing a significant role in the student's e-learning practice for a decade and so in India (Lohani, 2018). `Tourism and hospitality` is a growing industry that has a large market in India. The government and the universities have been roping in implementing different professional educations related to tourism and hospitality for the youth of the country (Dahiya, 2013).

The adoption of online digital tools depends upon many factors. This research looks at students' adoption of the Learning Management System (LMS) among tourism and hospitality students. This can be achieved by employing a model for understanding the technological adoption among its ultimate users. The previous studies as highlighted in the literature review section have covered the adopting factors of LMS in different ways with the implementation of various models. Geography also plays a significant role in the adoption of any kind of technology which can also be witnessed in the current online education system. The diversity in the culture and lifestyle across the globe influences the adoption of any kind of technology as well (Hall, 2003). The previous studies have also highlighted the geography and cultural influence on the adoption of technology in the education system.

The changing trend in the Indian education system has been influenced quite significantly from the traditional physical delivery of education to the virtual and flexible form, especially after the lockdown amid the COVID-19 pandemic. Online learning during COVID-19 has served as a panacea to maintain the quality of education among the educational units (Dhawan, 2020a), and has also been playing a significant role in mobilizing the academic calendar and in controlling the spread of pandemics by restricting the students to move to the institutions and continuing their study (Adedoyin and Soykan, 2020; Teymori and Fardin, 2020).

The current study aims at understanding the abrupt shift in the adoption of technology in the education system on the verge of lockdown in the Indian context with having a unique culture and lifestyle with a different geographical context, unlike the previous researcher's work area. This study also aims at understanding the similarity and differences of these researchers' work in the Indian context by hypothesizing the trends and practices in the adoption of a learning management system as per their concluded results.

The outcome of the study can help future researchers and academicians in understanding the real challenges of the adoption of LMS in the given geography and to provide a better orientation towards LMS. The research on the adoption of LMS among the students can

also help the businesses dealing in LMS system in crafting an appropriate strategy for the Indian context in consideration to the previous practices, the changing scenarios and their impact, the alternative available options in addition to the present practice of LMS adoption as per the outcome of the current study. This will help them in growing their business and increasing the market share in the Indian context. The bottom line is to influence the LMS providers in finding out the reasons for insignificant intention and interest of students in adopting LMS which will help them in changing strategies to increase revenue, decrease cost, rising profit, and expand outreach. Besides that, it will also help in framing strategies for improving attitude towards LMS usage, by stimulating the behavioral intention and putting positive social pressure.

2. Literature Review

Tourism and hospitality management courses aim at preparing the students as per the latest and dynamic requirements of the industry. There are several job opportunities available in the public and private sectors, especially in travel agencies, destination management companies, cargo handling companies, hotels, catering, guide service, etc. (Singh, 1997). Educational technological tools assist in promoting student engagement, retention, and interaction. In the context of tourism and hospitality courses, the adoption of online educational techniques for delivering, engaging, and motivating students have been advocated by many researchers. Sigala and Christou (2003) have argued that the advantages of the use of internet tools are improving and enhancing in the teaching and learning of tourism and hospitality courses. Balula *et al.* (2019) have illustrated the benefits of digital technology in tourism and hospitality education in terms of flexibility, time, space, authentic learning, and development of technical competencies.

The teachers are offered the chance, not only to understand online learning by themselves but also to enhance the learning experience as an educator for future development (Kennedy and Archambault, 2012). Internet and ICT have had a huge impact and are considered vital for the education system, especially in the field of tourism (Tassiopoulos, 2010). The digital insurgency has emphasized the latest ways of organizing the work, and the innovation in the learning process (Sheldon, 2004). E-learning is one of the flexible ways of learning. E-learning is defined as a method of learning and teaching that partially or fully enhances the educational model with the adoption of electronic devices and media (Pituch and Lee, 2006). LMS is a prime e-learning tool that helps in the interaction, communication, and delivery of the study material (Coates *et al.*, 2005).

Several digital educational tools have been mentioned in various studies which are recently being practiced in academia. These educational tools include electronic discussion boards, video lecture capture technology, content management systems, and podcasts (Salazar, 2010), the integrated mobile devices like tablets, cell phones, personal computers (PCs), e-book readers, and personal digital assistants (Sung *et al.*, 2016), the computer software like Microsoft office the internet browsers like Google Chrome, Internet Explorer, Mozilla Firefox, and the video streaming websites and applications like YouTube and Vimeo, etc. (Adeyinka-Ojo *et al.*, 2020; Adukaite *et al*., 2016). The supportive digital learning tools like SWAYAM, MOOC, e-PG Pathshala (Bast, 2019; Lin and Cantoni, 2018). The tourism industry-specific digital learning tools like world span, Galileo, SABRE, Amadeus, and the other digital guiding platforms like Tripadvisor and Lonely Planet, etc. (Bondarenko *et al.*, 2018; Schulz, 1996).

The development of a web-based application to manage the education system with a focus to serve the students is very helpful with the adoption of LMS (Ros *et al.*, 2014). LMS is a software application or web-based technology used to implement, assess, and plan the specific learning process. The LMS platforms encompass various systems including course management systems, learning systems, content management systems, instructional management systems, and portals, etc. (Coates *et al.*, 2005). Many researchers mentioned various LMS platforms in their research papers, published in reputed journals which include Zoom Cloud, Google classroom, Cisco WebEx, Blackboard, MOODLE, Sakai, and ATutor, etc. (Hasan and Khan, 2020; Singh and Soumya, 2020; Rodriguez-Segura *et al.*, 2020). The LMS systems are equipped with key features like gamification, cloud-based system, talent management, personal learning environment (PLE), etc. which allow learners the ability to create customized content, profile management, and participate with the others (Radwan, 2014).

Various models and frameworks have been developed to check users' adoption of technologies involved in LMS. These models explain the factors which can influence the user's acceptance such as Theory of Planned Behaviour, Diffusion of Innovation Theory, Technology Acceptance Model, Theory of Reasoned Action, Model of PC Utilization, Motivational Model, Social Cognitive Theory, Unified Theory of Acceptance and use of technology (UTAUT), etc. (Taherdoost, 2018). Various theories and models of technology adoption have been presented in Table 1 along with the constructs.

Table 1: Theories and models of technology adoption

Theory/Model	Constructs	Brief explanation	Source
Diffusion of Innovation Theory (DOI)	The innovation, communication channels, time, and social system	This theory entails users' passes through a five-stage process after encountering a new technology till its adoption which is namely knowledge, persuasion, decision, implementation, and confirmation. As per this theory, users who adopt innovation in the primary stage have different characteristics than that those who adopt the innovation in the later stage. This theory characterizes six categories of users those are leap-froggers, laggards, late majority, early majority, early adopters, and innovators.	Rogers & Everett (1962)
Theory of Reasoned Action (TRA)	Behavioural intention, Attitude, and Subjective Norm	This theory is a fundamental theory of human behaviour and not designed for specific adoption of technology or human behaviour. As per this theory, it can be explained that human behaviour is influenced by attitude and subjective norms with the mediating effect of behavioural intention.	Fishbein & Ajzen (1975)
Theory of planned behaviour (TPB)	Behavioural intention, attitude, subjective norm, and perceived behavioural control	This theory is an extension of TRA which includes perceived behaviour control as a new variable, which influences human behaviour in addition to the existing model of TRA where the attitude towards act or behaviour and subjective norms influence behaviour with the mediating effect of behavioural intention. Perceived behavioural control was added by Ajzen (1985), by understanding the fact that it complements the earlier existing TRA theory in the study of human behaviour.	Ajzen (1985)

Theory/Model	Constructs	Brief explanation	Source
Social Cognitive Theory (SCT)	Reciprocal determinism, behavioural capability, observational learning, reinforcements, expectation, and self-efficacy	The Social Cognitive Theory was proposed by modifying Social Learning Theory (SLT) which was originally developed by Bandura (1986). Three main factors that predict the behaviour of both individual and group are namely behavioural, personal, and environmental factors that interact bidirectional. The SCT explains the way people regulate their behaviour through control and reinforcement to achieve goal-directed behaviour over some time.	Bandura (1986)
Technology Acceptance Model (TAM)	External variables, perceived usefulness, perceived ease of use, attitude towards using, and actual system use	The TAM model was originally devised by F. Davis (1986) by deriving from TRA in which the motivation factor was replaced by three variables namely perceived usefulness, perceived ease of use, and attitude toward use. This model was proved as the most relevant model for technology adoption in information and communication technology (ICT) enabled services, unlike its precursors.	Davis (1986)
Technology Acceptance Model (TAM)-First revision	External variables, perceived usefulness, perceived ease of use, attitude towards using, behavioural intention to use, and actual system use	The model was further revised by F. Davis, (1989) where he modified the earlier proposed theory. He proposed this model to check the adoption of the computer where the determinants of actual system use were influenced by the attitude towards use which was again influenced by two specific beliefs of the individuals are namely Perceived usefulness (PU) and Perceived ease of use (PEU) where both these components were influenced by several external variables.	Davis (1989)
Technology Acceptance Model (TAM)-Second revision	External variables, perceived usefulness, perceived ease of use, behavioural intention to use, and actual system use	This model was again modified by Venkatesh and Davis (1996) where perceived usefulness and perceived ease of use were having a direct influence on behaviour intention, by eliminating the need for attitude as a construct.	Venkatesh and Davis (1996)
Technology Acceptance Model (TAM-2)	Voluntariness, experience, subjective norm, image, job relevance, output quality, result demonstrability, perceived usefulness, perceived ease of use, behavioural intention to use, and actual system use	TAM-2 is the modified version of the earlier modified TAM model and was proposed by Venkatesh and Davis (2000). This model explains the reasons why the users find a given system useful in different phases including pre-implementation, one-month post-implementation, and three-month post-implementation.	Venkatesh and Davis (2000)

Theory/Model	Constructs	Brief explanation	Source
Technology Acceptance Model (TAM-3)	Voluntariness, experience, subjective norm, image, job relevance, output quality, result demonstrability, perceived usefulness, perceived ease of use, behavioural intention to use, and actual system use, (Anchor: computer self-efficacy, perception of external control, computer anxiety, computer playfulness), (Adjustment: perceived enjoyment, objective usability)	TAM-3 is the modified version of TAM-2 for checking the adoption of IT and was proposed by Venkatesh & Bala, (2008) by combining TAM-2 with the model of the determinants of perceived ease of use. This model includes four determinants of perceived usefulness and perceived ease of use those are individual differences, system characteristics, social influence, and facilitating conditions. In the TAM-3 research model, the perceived ease of use to perceived usefulness, computer anxiety to perceived ease of use, and perceived ease of use to behavioural intention was moderated by experiences.	Venkatesh and Bala (2008)
Model of PC Utilization (MPCU)	Job-fit, complexity, long-term consequences, social factors, affects towards use and facilitating conditions	This model was governed by Thompson *et al.* (1991) for the utilization of personal computing (PC). This theory entails that the PC utilization of any individual is influenced by various factors which include social factors, the complexity of using PC, job-fit of the users, long term consequences of using PC, affect towards the usage of PC and facilitating conditions for the usage of PC.	Thompson *et al.* (1991)
The Motivational Model (MM)	Extrinsic motivation (such as perceived usefulness, perceived ease of use, and subjective norm) and intrinsic motivation (such as perceptions of satisfaction and pleasure).	The theory was proposed by Davis *et al.*, (1992) to study the adoption and usage of information technology. The model includes two major constructs which are the namely extrinsic and intrinsic motivation of the users. Extrinsic motivation refers to the user's perception to perform any activity for achieving valued outcomes. The perception of the users includes job performance, pay, and promotions related to the job. The examples of extrinsic motivations are perceived usefulness, perceived ease of use, and subjective norm. The intrinsic motivation is the outcome of those activities, which results in satisfaction of the individual. The example of intrinsic motivation is the amount of derived enjoyment out of the usage of any technology.	Davis *et al.* (1992)

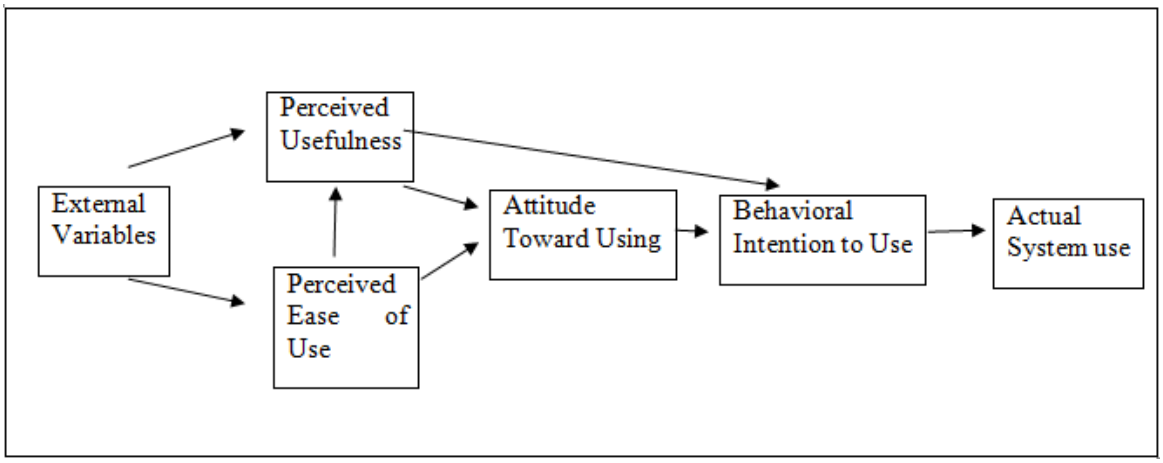
Theory/Model	Constructs	Brief explanation	Source
Unified Theory of Acceptance and Use of Technology (UTAUT)	Performance expectancy, effort expectancy, social influence and facilitating conditions	This theory was proposed by Venkatesh *et al*., (2003) by compiling eight previously proposed models which are namely TRA, TAM, MM, TPB, TAM2, DOI, SCT and MPCU. The author included four important constructs out of seven key constructs included in the above theories those are performance expectancy, effort expectancy, social influence and facilitating conditions as independent variable. The remaining three constructs attitude toward using technology, self-efficacy, and anxiety were mediated by ease of use which was considered as performance expectancy in this unified model hence were eliminated.	Venkatesh *et al.* (2003)
Unified Theory of Acceptance and Use of Technology (UTAUT-2)	Hedonic motivation, price value, and habit	UTAUT was developed by Venkatesh *et al*., (2012) by integrating three constructs into UTAUT namely hedonic motivation, price value, and habit. Individual differences such as name, age, gender, and experience moderate the effects of these constructs on behavioural intention and technology use.	Venkatesh *et al.* (2012)

In this study, the modified TAM Model proposed by Davis (1989) has been considered to check the adoption of LMS among the students of tourism and hospitality, the reason being this version of TAM is one of the finest, simplified, and most adopted model, to check the adoption of technology related to IT (Al-Adwan *et al*., 2013). TAM is flexible to include a wide range of external factors in addition to the behavioural factors to check the adoption of technology among the users (Seyal and Rehman, 2007). TAM has also been empirically proven and validated to operate with high quality (Chau, 1996). It articulates the way users decide to accept or reject technology and simultaneously assists in identifying the external variables which influence the attitude, behaviour, and intention to use (Park, 2009). TAM is a widely used model to check the adoption of technology in the e-learning process (Alshammari *et al.*, 2016). Out of the number of theories related to technology adoption TAM modified version suggested by (F. Davis, 1989) was considered as the most suitable theory due to its flexibility, simplicity, adaptability, and inclusiveness.

2.1 Technology Acceptance Model (TAM)

Davis proposed the TAM in 1989 to enlighten the potential user's behavioural purpose in the adoption of innovative technology (King & He, 2006). The base of the TAM model is the theory of reasoned action (TRA) which is a psychological theory (Fishbein and Ajzen, 1977). The theory of reasoned action explains that a person's behaviour is influenced by behavioural intention whereas behavioural intention is a function of a person’s attitude toward the subjective and behavioural norms adjoining the performance of the behaviour. Meanwhile, TAM advocates the perceived usefulness and perceived ease of use of technology influence the individual’s attitude towards using the technology, which further influences the behavioural intention to use and actual system use (Davis, 1989). The conceptual model of the technology acceptance model (TAM) has been presented in Figure 1.

Figure 1: The TAM model



2.2 Learning Management System (LMS)

Initially, LMS term was known as integrated learning system (ILS) which emphasizes functionality in addition to the instructional content such as integration across the system, personalized instructions, management, and tracking (Brush and Armstrong, 1999). The ILS term was conceived by Jostens Learning (Watson and Watson, 2007). LMS is the most flexible approach to e-learning from the classical to the modern era (Du *et al*., 2012). LMS comprises of the delivery system, follow-up system, profile-learner system, content management system, test/evaluation system, educational course management system, and sequence-tracing system (Forouzesh, Milad Forouzesh, 2012). LMS handles all aspects of the learning framework (Watson and Watson, 2007). LMS is a dominant system of e-learning and new technological innovation in the dynamism of education delivery (Watson and Watson, 2007).

2.3 TAM and LMS

In this study, TAM has been used to explore and investigate the student's acceptance of LMS at the institutions. In TAM, perceived usefulness means using technology will improve an individual's performance or not, on the other side perceived ease of use means how effortless and comfortable will be an individual while using the technology. Both are considered important factors which influence an individual's attitude towards the adoption of technology. Two other constructs in TAM are attitude towards using and behavioural intention to use. Attitude towards use is an individual's desirability of using a particular ICT application. Behavioural intention to use is a measure of the possibility an individual is likely to get engaged in the application (Lederer *et al.*, 2000). TAM has strength as it specifically focuses on the adoption of IT. TAM model is based on the theory of social psychology, validity, reliability, and parsimony (Mathieson *et al.*, 2001).

3. Research Framework and Hypotheses

Two distinct external variables, such as system quality and perceived enjoyment stand out as the most employed external variables. Therefore, two external variables have been taken into consideration in this study because of their apt relevance. The external variables are namely system quality and perceived enjoyment. System quality of any technology plays an integral role in the adoption and acceptance on the part of its user (Fathema *et al.*, 2015;

Yalcin and Kutlu, 2019). In the same way perceived enjoyment encourages the users in using any particular technology in the long run (Ching-ter *et al.*, 2017; Kanwal and Rehman, 2017). External variables have been shown in Table 2 along with references.

Table 2. External variables with references

External Variable	References
System Quality	Mailizar *et al*. (2021), Salloum *et al.* (2019), Yalcin and Kutlu (2019)
Perceived Enjoyment	Munabi *et al.* (2020), Balog and Pribeanu (2010), Hussein (2018)

3.1 LMS Quality

LMS quality influences the usage of LMS on the part of the students. Research indicated that system quality plays a crucial role in using and adopting e-learning (Mailizar *et al.*, 2021; Salloum *et al.*, 2019). It has been found from the previous studies that the LMS quality had a significant effect on the perceived usefulness of e-learning systems *(Fathema et al.*, 2015; Salloum *et al.*, 2019). The studies have also reported that the system quality had a significant effect on the user's attitude (Fathema *et al.*, 2015; Yalcin and Kutlu, 2019) and behavioural intention to adopt the e-learning (Calisir *et al.*, 2015; Salloum *et al*., 2019). Therefore, the following hypotheses have been formulated.

H1: LMS quality positively and significantly affects the perceived usefulness of LMS.

H2: LMS quality positively and significantly affects attitude towards using.

H3: LMS quality positively and significantly affects behavioural intention to use.

3.2 Perceived Enjoyment

Perceived enjoyment can be defined as the action of using a particular system out of the perception of getting enjoyment out of it (Venkatesh, 2000). It has been found from the previous studies that perceived enjoyment had a significant effect on the perceived ease of use and perceived usefulness (Ching-ter *et al.*, 2017; Kanwal and Rehman, 2017). When the students know that studying with an e-learning platform is enjoyable then there is a greater possibility that students will have a positive impact on the ease of use and usefulness of such a system (Ching-ter *et al.*, 2017). Therefore, the following hypotheses have been formulated.

H4: Perceived enjoyment positively and significantly affects perceived ease of use of LMS.

H5: Perceived enjoyment positively and significantly affects the perceived usefulness of LMS.

3.3 Perceived ease of use

Perceived ease of use is the extent to which users feel that the e-learning system is not complicated (Chen, 2011). It has been found from the previous studies that the perceived ease of use has a significant effect on the perceived usefulness (Binyamin *et al*., 2018; Joo *et al.*, 2018). Furthermore, it has also been found that the perceived ease of use has a significant effect on the attitude towards using (Teo *et al.*, 2016; Wong, 2015). Therefore, the following hypotheses have been formulated.

H6: Perceived ease of use positively and significantly affects perceived usefulness of LMS.

H7: Perceived ease of use positively and significantly affects attitude towards using LMS.

3.4 Perceived usefulness

Perceived usefulness refers to the extent to which users believe that an e-learning system can help them to accomplish their learning objectives (Ching-ter *et al.*, 2017). It has been found in previous studies that perceived usefulness has a significant effect on the attitude towards using (Teo *et al.*, 2016; Wong, 2015). Furthermore, it has also been found that perceived usefulness has a significant effect on the behavioural intention to use e-learning systems (Martinho and Cordeiro, 2018; Wong, 2015). Therefore, the following hypotheses have been proposed.

H8: Perceived usefulness positively and significantly affects attitude towards using LMS.

H9: Perceived usefulness positively and significantly affects behavioural intention to use LMS.

3.5 Attitude towards the use

Attitude is a tendency to which a user has a negative or positive feeling towards an e-learning system (Kaplan, 1972). It has been found in previous studies that attitude influences behavioural intention to use (Teo *et al.*, 2016; Hussein, 2017). Therefore, the following hypothesis has been formulated.

H 10: Attitude positively and significantly affects behavioural intention to use LMS.

3.6 Behavioural Intention

Behavioural intention is defined as the intent of the users to use the e-learning system and to engage the users consistently (Liao and Lu, 2008). It has been found in previous studies that behavioural intention has a significant effect on actual system use (Khor, 2021). Therefore, the following hypotheses have been proposed.

H 11: Behavioural intention to use positively and significantly influence the actual system use.

4. Research Methodology

The respondents were taken based on two satisfying criteria; the first criteria being undergraduate students studying in regular mode and the second, students pursuing tourism and hospitality management courses. Undergraduate students who are located in the North Indian region, specifically Punjab and Himachal Pradesh, and Haryana have been considered for the study. Punjab, Himachal Pradesh, and Haryana regions have been taken, the reason being thousands of students pass out from various institutes of Hospitality and Tourism, year on year and due to the convenience in data collection, attributes to the strong geographical connectivity between the three states. According to the statistics, there are 4000 enrolled students in the undergraduate tourism and hospitality courses during the period of data collection. As per Krejcie and Morgan, the minimum sample size for a population of 4000 is 351. (Krejcie and Morgan, 1970). A total of 446 questionnaires have been distributed through online mode out of which 370 responses have been recorded, with a response rate of 82.9% which is far more than the minimum sampling requirement. For

this study, judgmental sampling was used based on the strength of the students studying in undergraduate tourism and hospitality courses in the 5 districts of Punjab, 5 districts of Himachal Pradesh, and 5 districts of Haryana with an equal proportion of respondents. The pilot study was performed on 65 students and a few statements were modified by understanding the challenges the respondents face in reading, understanding, and filling out the questionnaire. To test the hypotheses, a survey instrument was developed with 24 items that measure seven constructs as shown in Annex 1.

The demographic profile of the respondents has been presented in Table 3.

Table 3. Demographic Profile

Profile	Frequency (Number of Students)	Percentage of Students (%)
Gender		
Male	233	62.97
Female	137	37.02
Total	**370**	**100**
Age		
Below-18	93	25.13
20 -25	240	64.86
25-30	37	10.00
Class of the students		
1st year	126	34.05
2nd Year	74	20.00
3rd year	96	25.94
4th year	74	20.00

Out of the total students surveyed during the data collection process 233 male students and 137 female students filled up the questionnaire correctly, this comes to 62.97% and 37.02 % of the total sample size respectively. The significant proportionate differences in the number of male and female students attribute to the differences in the enrolment and strength of the students in undergraduate tourism and hospitality courses. There is a difference in the age group of the students enrolled in the tourism and hospitality courses, as 93 students were found below 18 years of age which is 25.13%, 240 students were found in the age group of 20 to 25 bracket which is 64.86% and 37 students were found in the age group of 25 to 30 years of age which is 10 % of the total population. Out of the total respondents 126 students from the first year, 74 students from the second year, 96 students from the 3rd year, and 74 students from the 4th year turned up to fill the questionnaire which comes to 34.05%, 20%, 25.94%, and 20 % respectively.

5. Data Analysis and Results

The current study applies Structural Equation Model (SEM) which includes two models; those are measurement model followed by the structural model. To apply the SEM, AMOS software has been used. SEM is a useful technique to analyze the complex model with

several variables and it satisfies the requirement of the current study. The testing of the hypothesized model having the impact of some variables on one another can easily be done with the adoption of SEM (Vandenberg and Lance, 2000).

A conceptual model has been framed out to check the LMS usage among the undergraduate students in the North Indian states of Himachal Pradesh Punjab and Haryana using the existing TAM model. TAM model is a widely used conceptual model for checking the adoption and acceptance of technology in a wider mass, which satisfies the purpose of the current study.

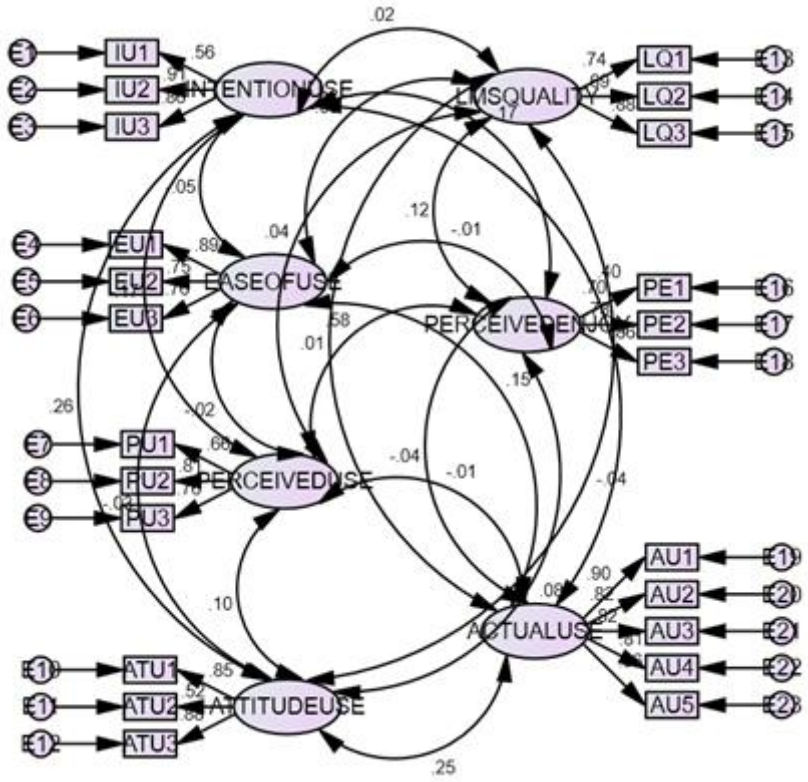
5.1 Measurement Model

The confirmatory factor analysis (CFA) is used to check the extend up to which the measured variables represent the constructs of the model. CFA model is also termed the measurement model. The observed variables are represented by the latent constructs in a measurement model. The Measurement Model has been shown in Figure 2. The observed variables are represented by a square and the latent variables are represented by the circle and the representations are depicted with the arrow heading towards the observed variable from the latent constructs. The relationships between the latent constructs are represented by a double-headed arrow which shows the covariance between the constructs. The fitness and the validity of the constructs are measured with the help of the measurement model. The fitness of the model is checked based on several fit indices where the CMIN score indicates the better a sample represents the total population. The goodness of fit indices measures the fitness of the hypothesized model and the badness of fit indices measure how far the model varies from the perfect model. Incremental fit indices, also known as comparative (Miles and Shevlin, 1998) or relative fit indices (McDonald and Ho, 2002), are a group of indices that do not use the chi-square in its raw form but compare the chi-square value to a baseline model (Mcdonald and Ho, 2002). Parsimonious Fit Index indicates the better a model measures both fit and parsimony.

The composite reliability is performed while applying CFA analysis. The composite reliability (CR) is used to measure internal consistency in scale items. The acceptable value of CR should be greater than or equal to .07. Construct validity was measured for the scale. Construct validity includes the performance of both convergent and discriminant validity. The convergent validity shows how better the measurement model measures the theoretical concept. In other words, it shows the itemized correlation of the construct. However discriminant validity explains how effectively the constructs are distinct or co-vary with each other (Carmines and Zeller, 1979). The discriminant validity is measured with the average variance extracted (AVE). The AVE is the measurement of total true score variance relative to the total score variance (Brunner, 2005). As a “rule of thumb”, AVE should be greater than .5 (AVE > .5) and composite reliability should be more than 0.7 *(Anderson et al.*, 2010). Average variant explained (AVE) should be more than maximum shared variance (MSV) under discriminant validity.

After the analysis of the measurement model, the structural model is performed under SEM analysis. The structural model represents the theory which also shows the effects between the latent constructs supporting the theory. The hypotheses created during the framing of the conceptual model are tested for their significance and the strength of the relationships are assessed. The p-value represents the level of significance of the relationships between the constructs whereas the standardized regression weight, i.e. beta coefficient shows the strength of the relationships and the positive are negative sign represents the direct or indirect impacts respectively.

Figure 2. Measurement Model



Source: Authors' model

From the measurement of fitness of the measurement model, the CMIN score or chi-square ($\chi 2$) value was found as 335.725 for the default model with p =.000 which is statistically significant. Fit indices of the Measurement Model have been shown in Table 4. The CMIN/DF value was found as 1.606 which is less than 3 and hence is satisfactory *(Maat et al.*, 2015). The chi-square value seems to be sensitive to the sample size, hence further adjustment indices have been thought to use for showing model fitness. The goodness of fit scores was measured in terms of GFI. The GFI score was found as .93 which is above .9 and hence is satisfactory (Miles and Shevlin, 1998). The badness of the fit index was measured in terms of RMSEA. In the current study RMSEA index was found as 0.04 which is less than 0.08 and is satisfactory (Steiger, 1990). The Incremental fit index was measured in terms of TLI which is more than .9 and is .962, hence is satisfactory (Steiger, 1990). Finally, the parsimonious fit index was measured in terms of PNFI which is the higher the better (Mishra, 2016). The PNFI value was found as .762 which is satisfactory as well.

Table 4. Fit indices of Measurement Model

Fit index	**CMIN/DF**	**GFI**	**PNFI**	**TLI**	**RMSEA**
Acceptable value	<5	>0.8	Higher is Better	>0.9	<0.08
Model fit score	1.606	0.93	0.762	0.962	0.041
Explanation	Accepted	Accepted	Accepted	Accepted	Accepted

Source: Authors' Calculations

In this study, all the values were found satisfactory as per the criteria. The CR & AVE value of each construct has been shown in Table 5. The square root of AVE for the constructs has been displayed diagonally. The CR values are greater than .7 and the AVE values are greater than .5. The AVE values of the constructs are more than their corresponding MSV values. The convergent validity statistics of the variables have been represented in Table 5. The results of discriminant validity as shown in Table 6 indicate that all the values on the diagonals are greater than the desired value; hence the discriminant validity has been established. Finally, the model fitness was established based on the satisfactory indices scores.

Table 5. Convergent Validity Statistics of variables

	CR	AVE	MSV	MaxR(H)
LQ	0.818	0.602	0.013	0.847
IU	0.827	0.624	0.164	0.887
EU	0.843	0.643	0.022	0.865
PU	0.788	0.554	0.338	0.800
ATU	0.806	0.592	0.070	0.867
PE	0.811	0.590	0.338	0.831
AU	0.924	0.709	0.164	0.930

Note: 1 Validity master was used to analyze the validity which was fully established

Note: 2 LQ= LMS quality, IU= Intention to use, EU= ease of use, PU= Perceived usefulness, ATU = Attitude towards using, PE= Perceived Enjoyment, AU= Actual system use.

Table 6. Discriminant Validity Statistics of variables

	LQ	IU	EU	PU	ATU	PE	AU
LQ	**0.776**						
IU	0.019	**0.790**					
EU	-0.081	-0.054	**0.802**				
PU	0.042	-0.168	-0.018	**0.745**			
ATU	-0.037	0.264	-0.033	0.099	**0.770**		
PE	0.116	-0.171	-0.013	0.581	0.077	**0.768**	
AU	0.011	0.405	0.147	-0.010	0.250	-0.045	**0.842**

Note: 1 Validity master was used to analyze the validity which was fully established

Note: 2 LQ= LMS quality, IU= Intention to use, EU= ease of use, PU= Perceived usefulness, ATU = Attitude towards using, PE= Perceived Enjoyment, AU= Actual system use

5.2. Structural Model (Model Fitness)

From the measurement of fitness test of the structural model, the CMIN score or chi-square ($\chi 2$) value was found as 358.394 for the default model with p =.000, which is statistically significant as shown in Table 7. The CMIN/DF value was found as 1.637 which is less than 3 and hence is satisfactory (Maat *et al.*, 2015). The goodness of fit scores was measured in terms of GFI. The GFI score was found as .926 which is above .9 and hence is satisfactory (Miles and Shevlin, 1998). The badness of the fit index was measured in terms of RMSEA.

In the current study RMSEA index was found as 0.042 which is less than 0.08 and is satisfactory (Steiger, 1990). The Incremental fit index was measured in terms of TLI which is more than .9 and is .960 which is satisfactory (Steiger, 1990). Finally, the parsimonious fit index has been measured in terms of PNFI which is the higher the better (Mishra, 2016). The PNFI value was found as .794 which is satisfactory as well. Finally, the model fitness was established based on the satisfactory indices scores.

Table 7. Model fitness

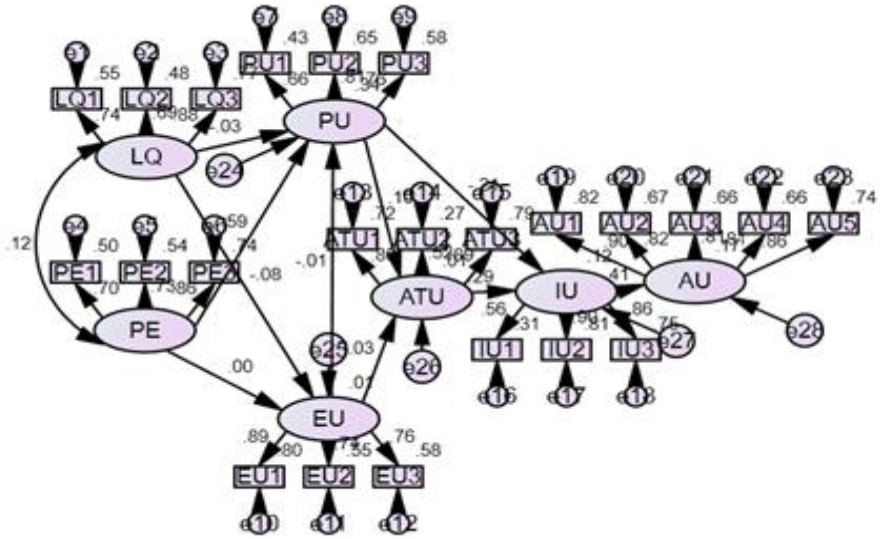
Indices	Recommended Value	Model Fit Indices	Explanation
Absolute Fit Measures			
Chi-Square ($\chi 2$)	Expected to be Small	358.394 (p=.000)	Accepted
CMIN/DF	< 3	1.637	Accepted
GFI	>.9	.926	Accepted
RMSEA	< .08	.042	Accepted
Incremental Fit Measure			
TLI	>.9	.960	Accepted
Parsimonious Fit Measure			
PNFI	>.6	.794	Accepted

Source: Authors' calculations

5.3. Structural Model

After the confirmation of the measurement model, the analysis of the structural model was performed based on SEM. Structural Model has been shown in Figure 3. AMOS-20 version software has been used for performing the analysis of both measurement and structural models.

Figure 3. Structural Model



Source: Authors' model

The bootstrap method has been applied with 2000 bootstrap samples for removing the biases. The structural model helps in analyzing the significance, effect types, and the related strength of the Latent Constructs, derived from the observed variables in the previous step under the measurement model. The hypotheses, framed as per the conceptual model were checked for their acceptance based on the collected data under the structural model.

There were three types of effects, i.e., direct, indirect, and the combination of both. The direct effects do not contain any mediating factors in between the two latent constructs whereas the indirect effects were assessed for the latent constructs, having mediating factors in between them. The analysis has been started with the assessment of direct effects. The results have shown that the hypotheses, as shown in Table 9: H1 (PU←LQ), H4 (EU ← PE), H6 (PU← EU), H7 (ATU← EU), and H8 (ATU← PU) have been rejected as the p-value of the hypotheses are not found significant with 95% confidence level. The result of the structural model has been shown in Table 8. However, the hypotheses H9 (IU← PU), H10 (IU← ATU) and H11 (AU←IU) have been accepted as their p values have been found significant. It has also been found that the direct effect of PU on IU is negative with standardized regression weight or beta coefficient -.207. It indicates, when PU goes up by 1 standard deviation, IU goes down by 0.207 standard deviations. The direct effect of ATU on IU is positive with standardized regression weight or beta coefficient .292 which indicates When ATU goes up by 1 standard deviation, IU goes up by 0.292 standard deviations. The direct effect of AU on IU is positive with standardized regression weight or beta coefficient .41 which indicates when IU goes up by 1 standard deviation, AU goes up by 0.41 standard deviations.

Table 8. Result of Structural Model (Direct Effect)

Hypothesis	Relationships			Estimates	S.E.	CR	P	Beta Coefficient	Result
H1	PU	<---	LQ	-.023	.042	-.537	.591	-0.030	Rejected
H4	EU	<---	PE	-.006	.095	-.059	.953	-0.004	Rejected
H6	PU	<---	EU	-.007	.036	-.190	.849	-0.011	Rejected
H7	ATU	<---	EU	-.035	.062	-.568	.570	-0.034	Rejected
H8	ATU	<---	PU	.163	.099	1.645	.100	.102	Rejected
H9	IU	<---	PU	-.271	.080	-3.387	***	- 0.207	Accepted
H10	IU	<---	ATU	.240	.049	4.924	***	.292	Accepted
H11	AU	<---	IU	.314	.043	7.360	***	.41	Accepted

Source: Authors' calculations

Notes: 1. *** p-value < 0.01; ** p-value < 0.05 and * p-value < 0.10.

LQ= LMS quality, IU= Intention to use, EU= ease of use, PU= Perceived usefulness, ATU = Attitude towards using, PE= Perceived Enjoyment, AU= Actual system use.

5.4. Path Analysis

After the analysis of the direct effect, the indirect paths about the hypotheses have been analyzed. The results of the indirect effects under path analysis have been depicted in Table 9. The hypotheses H2 (ATU← LQ), H3 (IU← LQ), H5 (ATU← PE), and H9 (IU← PU) have been rejected as the p-value is found insignificant. While checking the hypothesis H2, it has been found that the standardized indirect effect of LQ on ATU under mediation is significantly different from zero at the 0.001 level (p=.913 two-tailed). In the same way for hypothesis H3, it has been found that the standardized indirect effect of LQ on IU under mediation is significantly different from zero at the 0.001 level (p=.540 two-tailed), for hypothesis H5, the standardized indirect effect of PE on ATU under mediation is significantly different from zero at the 0.001 level (p=.136 two-tailed) and for hypothesis H9, the standardized indirect effect of PU on IU under mediation is significantly different from zero at the 0.001 level (p=.093 two-tailed).

From the analysis of both direct and indirect effects, it has been found that hypothesis H9 has a significant negative direct effect with standardized regression weight – 0.207 and has no mediating effect.

Table 9. Result of Structural Model (Indirect Effect)

Hypotheses	Paths (Direct & Indirect Effects)	P	Result
H2	LQ→PU→ATU + LQ→EU→ATU (Indirect)	.913	Rejected
H3	LQ→PU→IU + LQ→EU→ATU→IU (Indirect)	.54	Rejected
H5	PE→EU→ATU + PE→PU→ATU (Indirect)	.136	Rejected
H9	PU→ATU→IU (Indirect)	.093	Rejected

Source: Authors' calculations

6. Limitations and Future Scope

The results of this study show the low adoption rate of LMS among the students due to various reasons. However, the study involves some limitations. First, the study was only conducted on undergraduate students of tourism and hospitality. Students of different specializations, post-graduation students, teachers and administrators can also be considered in the scope of the study in future research. The second limitation is that the study is a kind of cross-sectional study as data was only collected once. To get a better understanding of students' adoption of LMS in the long run a longitudinal study can be conducted. It will help in understanding the change in intention and perception of the students after the thorough training and continuous usage. The third limitation is the exclusion of alternative options of LMS under the purview of the study. The consideration of alternative options can help in conducting the research, better. The acceptance of LMS can also be checked by considering other external factors.

7. Conclusion

This study has adopted the TAM model to validate the LMS adoption among undergraduate students in the field of tourism and hospitality. The hypotheses were framed based on the previous studies and the TAM model. There were seven hypotheses with only direct effects and three hypotheses with indirect effects and one hypothesis that involved both paths of direct effect and indirect effects. After the hypotheses testing using SEM it was found that the direct impact of perceived usefulness on intention to use, attitude to use on intention to use, and intention to use on actual use was accepted and the other hypotheses were rejected. The study indicates that the adoption and acceptance level of LMS is very low among the students across the North Indian states of Punjab, Himachal Pradesh, and Haryana. It can be inferred that the complexity of the structure of LMS deters the students from using LMS and are adopting the alternative tools to learn and manage the courses, materials, learning schedules and learning outcomes as the perceived usefulness negatively impacts the intention to use, though the attitude to use the LMS impacts the intention to use LMS system and intention to use LMS impacts the actual usage of LMS positively. The inference can also be backed by the interpretation that perceived ease of use has no impact on the attitude towards the usage of LMS and the external factors like LMS quality and perceived enjoyment have no impact on the actual system use either directly or with mediation on the given geographical region during this scenario.

It can also be concluded that after perceiving the usefulness of LMS, the students do not intend to use LMS, due to the availability of alternative convenient options or difficulties in the understanding of the LMS system. It can also be concluded that the attitude to use LMS, impacts the intention of the users to use LMS, which may further lead to the actual LMS usage.

The outcome of the current study is not in agreement with the previous researcher's work in many ways. The study conducted by Abdel-maksoud (2018) reveals that the perceived ease of use and perceived usefulness of LMS are significant indicators of satisfaction among students because these variables are critical in determining users' intention to use new technology in the future. Salloum *et al.*, (2019) conducted a study on the acceptance of technology in e-learning systems and the result of the study indicates that computer self-efficacy, system quality, and computer playfulness have a significant impact on the perceived ease of use of e-learning systems. Similarly, Mailizar *et al.*, (2021) conducted a study in a public university in Indonesia and suggested that the attitude toward e-learning has a positive impact on university students' behavioural intention to use e-learning during the pandemic. Ros *et al.* (2014) had taken two external variables to check the acceptability of LMS with the help of TAM out of them gadget design was found as the most significant determinant which affects the perceived usefulness of LMS. The contradictory result of this study may attribute to the poor knowledge of LMS technology, lack of training, alternative available software for the delivery of education, or any other reasons. The exact understanding of the reason can also come to the picture based on future research about this subject. However, this is outside the scope of the current study.

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ANNEX 1

Construct Measurement

Constructs	**Source**	**Reframed/ Self-developed**
Perceived LMS ease of use items		
It is easy to operate the LMS app	Calisir *et al.* (2015)	Reframed
The LMS is easy to use for me	Salloum *et al.* (2019)	Reframed
Getting the information from LMS is easy	Lederer *et al.* (2000)	Reframed
Perceived LMS usefulness		
The LMS enhances my learning performance	Salloum *et al.* (2019)	Reframed
The LMS enhances my learning effectiveness	Salloum *et al.* (2019)	Reframed
Overall LMS is useful	Binyamin *et al.* (2018)	Reframed
Attitude towards using		
I like the idea of using LMS	Calisir *et al.* (2015)	Reframed
Working with LMS is fun	Mafuna and Wadesango, (2017)	Reframed
The LMS provides me with an attractive learning environment.	Salloum *et al*. (2019)	Reframed
Overall my attitude towards LMS is favourable	Fathema *et al.* (2015)	Reframed
Intention to use		
I intend to use the LMS	Calisir *et al.* (2015)	Reframed
I intend to use LMS as much as possible	Calisir *et al.* (2015)	Reframed
I will recommend others to use the LMS	Salloum *et al.* (2019)	Reframed
Actual system use		
I use the LMS frequently	Salloum *et al.* (2019)	Reframed
I use the LMS on daily bases	Salloum *et al.* (2019)	Reframed
I tend to use LMS as long as it is necessary	Binyamin *et al*, (2018)	Reframed
I usually get involved with LMS	Binyamin *et al.* (2018)	Reframed
Overall, LMS is useful	Binyamin *et al*. (2018)	Reframed
LMS quality		
I am satisfied to access the study material on LMS easily	Mailizar *et al.* (2021)	Reframed
The LMS visual display has a pleasing design	Mailizar *et al*. (2021)	Reframed
I am satisfied with the LMS interaction	Salloum *et al.* (2019)	Reframed
Perceived Enjoyment		
I find the use of LMS is to be fun	Salloum *et al.* (2019)	Reframed
The use of LMS arouses my learning curiosity	Salloum *et al.* (2019)	Reframed
The overall use of LMS is a fun activity	Salloum *et al.* (2019)	Reframed