Student Acceptance Of Online Educational Processes In Wake Of Covid-19

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Abstract

Covid-19 has increased the pace of inclusion of digital technologies for the learning of students as opposed to learning in a traditional classroom setting. It has altogether transformed the learning and teaching environment and has quickly created the space to adapt to the online mode of learning. This investigation aims to analyze the impact of online methods and processes used by students focusing on the acceptance of technologies that universities adopt due to the global pandemic. Technology Acceptance Model is used as a basis for this study. An online survey was conducted through a questionnaire, and 426 responses were collected from students. The Structural Equation Model was used for processing the data. The findings have suggested that Technology Acceptance Model is helpful in the understanding of students' acceptance of online mode of education in the current scenario of a global pandemic.

Keywords: Attitude; Expected benefits; Intention to use; Utility; Perceived costs

1. Introduction

Technology has redefined various aspects of life, as it has advanced its role in work knowledge, human resources trainings and academic learning in early decades of twenty first century. (Barbara White, 2014; Butler, Camilleri, Creed, & Zutshi, 2021).

One of the important Technology that plays vital role is internet of things (IoT) as internet has drastically changed the way people do interaction virtually; in their social and work relationships (Shammar & Zahary, 2019). Internet of things (IoT) technology is not just unique arrangements of technology and devices for education but also it is the complete paradigm shift in main stream education systems. Findings suggest that potential impact of IoT can be redesigning the whole education system and learning facilities (Rodney, 2020). Technological innovations and interventions have resulted in prioritization of digital literacy and there is strong positive relationship between employment and digital skills. Governments and employers try to promote digital literacy through various strategies because of its increasing role in socio-economic development (Bejaković & Mrnjavac, 2020).

Technology advancements and digital literacy has brought online learning opportunities along with existing traditional face-to-face learning methods. Online learning has seen growth in last two decades and it has become important in short run as well as in long term strategy for chief academic officers and program managers. Online programs and courses have seen 20% or more growth per year along with consistent improvement in quality (Allen & Seaman, 2007). Along with face-to-face and remote online education, blended learning has also been introduced where required by many educational institutes. Blended learning which includes online classes, flipped classrooms and normal face-to-face classes has significantly improved achievements of students of higher education at UAE (Ayob, Daleure, Solovieva, Minhas, & White, 2021). Blended learning is also found to be helpful for exceptional students to turn their life around in schools of North Carolina (Dikkers, Lewis, & Whiteside, 2015).

Through Technology acceptance model (TAM), it is found that attitudes of people towards usage of information technologies has direct relationship to the perceptions of people regarding those technologies (Davis, 1989). A review of current literature on acceptance behavior regarding digital learning suggests that most of studies on this subject widely used Technology Acceptance Model (TAM) for investigating acceptance behavior of students (Kaushik & Verma, 2019).

Covid-19 (coronavirus) has resulted in a mass shift towards online education as education community is significantly impacted by the virus. This alternative method of learning (Online learning) may prevent the loss of education and thus loss of future earnings as it will control the potential human capital supply. It also helps in achieving sustainable development goal of Education by providing access to millions of students and learners. The examples of mass access provided by online education technologies are very visible in large populated countries like china, India and Indonesia (Joshi, 2021). Covid-19 has also caused to digitalized accounting education in Gulf Cooperation council in private and public universities (Sarea, Alhadrami, & Taufiq-Hail, 2021). Remote teaching practice has also been recommended for schools besides Universities as it has received positive response for sustaining education in community lockdowns (Eutsler, Antonenko, & Mitchell, 2020).

This study aims to examine acceptance of technology by those students who have acquired their education mainly through online process that have been adopted by universities in wake

of Covid-19. Even though this study uses Technology Acceptance Model, it also incorporates other factors which include perceived costs and expected benefits.

Findings of this study will be helpful for universities in implementation of new technologies and these findings will also reinforce the positive impacts of online methods on learning process. This study will be highly useful for universities and the program managers in order to understand the perception of students pertaining to changes in educational processes.

This article is divided into five sections, the aspects of theory and conceptual background is detailed in Section 1; the methodology is presented in section 2; section 3 is utilized to present results while section 4 follows a discussion and conclusions are discussed in section 5.

1.1. Theoretical Framework: Technology Acceptance Model for Analysis of Online Education Process Adoption

One of the widely used frameworks to analyze intentions of consumer acceptance is Technology acceptance model (TAM), initially introduced by (Davis, 1989). Technology acceptance model analyses the intentions of consumer acceptance through perceived ease of use and perceived usefulness (Davis, 1989).

Technology Acceptance Model postulates that acceptance of a technology by an individual is affected by one's behavioral intention to use which then influences the actual system use as shown in Fig. 1 (Change above sentence please; can't make any sense).
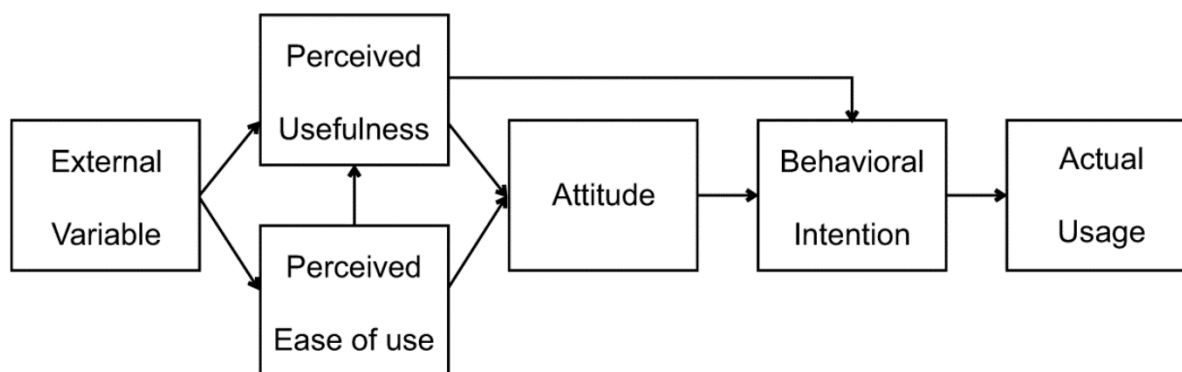

Figure 1. Technology Acceptance Model (Davis, 1989)

Technology acceptance model has been widely used to explore acceptance behavior pertaining to innovative methods of education (Al-Emran, Mezhuyev, & Kamaludin, 2020), acceptance of computer technologies by users (Davis, Bagozzi, & Warshaw, 1989), adoption of fantasy sports league websites (Kwak & McDaniel, 2011), behavior of users in mobile learning (Huang, Lin, & Chuang, 2007), adoption of e-payments in retail market in Hong Kong (Lok, 2015), acceptance of web-based employee self-service technology (Marler & Dulebohn, 2005), and analysis of students behavior in acceptance of technologies in methods and processes of education (Briz-Ponce, Pereira, Carvalho, Juanes-Méndez, & García-Peñalvo, 2017).

1.2. Hypotheses

The hypotheses are stated as followed for following dimensions: Attitude, expected benefits, Intent of use, expected costs and perceived usefulness.

1.2.1. Attitude

Attitude toward a system is defined as "the degree to which an individual is of belief that usage of a specific system would result in enhancement of job performance"(Davis, 1989; Venkatesh & Davis, 2000). Therefore, if students believe that there is benefit in using online resources of education system, the attitude of students towards technology acceptance and online methods will be positive.

Perceived ease of use is defined as "the degree to which an individual is of belief that usage of a specific system would exert no mental or physical effort" (Davis, 1993). Together, perceived usefulness and perceived ease of use regarding a technology explain the extent to which end user is comfortable and motivated to use the system (Lin & Lu, 2000). Positive attitude due to perceived usefulness strongly predicts intent to use the actual system (Calisir, Altin Gumussoy, Bayraktaroglu, & Karaali, 2014). Perceived usefulness is persistently the factor that determines adoption of technology in its initial stage (J.-H. Wu & Wang, 2005). Perceived usefulness also significantly predicts acceptance of online learning system by students (Martins & Kellermanns, 2004; Selim, 2003). There is also significant impact of perceived ease of use on attitude towards using the resource (Lee, Cho, Gay, Davidson, & Ingraffea, 2003; Olson & Boyer, 2003).

Keeping in view above arguments, hypotheses one is proposed as under:

H1: There is positive and significant relationship between attitude regarding usage of online system and intent to use that system by end users.

1.2.2. Expected Benefits

The benefits that are expected to be gained by a user significantly impacts response and attitude of the users of online platforms (Chung & Buhalis, 2008; Stepchenkova, Mills, & Jiang, 2007). The benefits identified include functional benefits along with hedonic benefits and social benefits. Functional benefits are primarily related to product's quality and its functions. Meanwhile, hedonic benefits are more related with the satisfaction, emotional feelings and entertainment which is gained from using the online platforms. Social benefits on the other hand are described as the connection with the members of a group and the recognition that is obtained by an individual in terms of admiration, respect, increased esteem and perceived status (Mimouni & Volle, 2006).

It is suggested by earlier research that acceptance and participation of user in using the technology depends on benefits that user expects to gain which can be functional or social benefits (Parra-López, Bulchand-Gidumal, Gutiérrez-Taño, & Díaz-Armas, 2011).

Keeping in view the above arguments, second hypothesis is proposed below:

H2: There is positive relationship between attitudes of students regarding usage of online systems and student's expected benefits by using online systems.

1.2.3. Intention to use

Literature has suggested that addition of gamification strategies which would enhance the perceived functional benefits for end user; can greatly increase intention of students to use the online system. This can be useful tool not only in online education but also can add value in face-to-face learning (Aguiar-Castillo, Hernández-López, De Saá-Pérez, & Pérez-Jiménez, 2020). Satisfaction regarding use of online systems is related to the effectiveness of the online resource (Chiu, Hsu, Sun, Lin, & Sun, 2005; B. Wu & Chen, 2017).

Perceived social and hedonic benefits enhance the gamification tool usage and social benefits arising from gamification is determining factor for intent to use the resource (Hamari & Koivisto, 2015). Along with behavioral attitude, social influence (perceived social benefit) can reliably predict intention for taking active action (Fishbein & Ajzen, 1977). When a lecturer intends to use technology, it produces social pressure for student to accept the technology and gain connection with members of the class. A teacher's intention of using technology increases motivation of student to take action (Scherer, Siddiq, & Tondeur, 2019).

Keeping in view the above arguments, third hypotheses is proposed below:

H3: Intension of students pertaining to using online systems depend on the students perceived benefits

1.2.4. Utility

Technology acceptance model can be used to predict willingness to accept technology of a user based on the perceptions(I.-F. Liu, Chen, Sun, Wible, & Kuo, 2010). Students interact with each other and it creates perceived social benefit for a student to accept the technology in the learning process as students want to be competent and accepted, perceived benefits impacts the perceived usefulness for users(Al-Azawei, Parslow, & Lundqvist, 2017)

Keeping in view the above argument, it is hypothesized:

H4: Perceived benefits by a student in usage of online system will have positive influence on perceived usefulness of system by student.

1.2.5. Perceived costs

Some aspects of technology can be seen as difficult and generating a cost for users as shown by the research. Difficulty occurring in usage of technology and Loss of privacy are two of perceived costs that play vital role in adoption process of a new technology. Difficulty is using technology due to less flexibility, unease in learning and no clarity of interface results into less value given to that technology(Gefen & Straub, 2000). When an application in not easy to use, it can hinder people in using it, difficulty in using the technology can determine the hesitation and doubtfulness of a person to use that technology (Yoo, Lee, & Gretzel, 2007). Difficulty in use and hence doubts and unawareness can result in people not realizing the potential positive aspects of a technology. Hence, perceived cost of difficulty in use may influence a student's attitude towards technology and intention to use it.

In addition to this, user may also lack technical awareness and competency regarding usage of user's private information(Drozdenko, Jensen, & Coelho, 2011) . when a user is unsure of how personal information will be used by the technology, user feels threatened, this uncertainty and perceived negative outcome of a service can significantly impact intention to use and attitude towards technology of the user(Angst & Agarwal, 2009). Relationship between perceived cost of privacy loss and resulting impact on attitude towards using that technology has been found(Garrison, Rebman Jr, & Kim, 2018; C. Liu, Marchewka, Lu, & Yu, 2005).

Keeping in view above arguments, following hypotheses are proposed:

H5: Perceived costs by students of using a technology will influence their attitude towards using the technology.

H6: Perceived costs by students of using a technology will impact their intention to use the technology.

2. Methodology

2.1. Data Collection

An online survey was conducted among students who are studying currently at private as well as public universities in Pakistan and Portugal for testing the hypotheses.

Students who participated in the survey were required to have mandatory experience of enrollment in online classes as well as face-to-dace mode of learning, students belonged to third and fourth years of their undergraduate studies.

Online survey was conducted during the period of 15th May to 18th July, a sample of 426 students was used to conduct the investigation. Google forms were used to form questionnaire and it was sent to students online, Students were from private as well as public universities, particularly University of Karachi, Sukkur IBA University, University Institute of Lisbon. Review and pre-test of questionnaire was done to identify problems by four lecturers of university who possess expertise in subject area and methodology.

2.2. Measures and Method of analysis

Perceived costs which is dependent variable is measured using five-point Likert scale which ranges from 1 (Completely disagree) to 5 (Completely agree). Table 1 is given below where it shows measurement of variables. Model applied was explained to students along with questionnaire.

Table 1. Questionnaire and variables:

Questionnaire	Variable	Meaning
It is important to me that the application provides me with information about the subject (of study)	EFB	
I hope that it will be fun to use the app	EHB	Expected Benfits
People that are important to me would gladly see that I used the application	ESB	
I consider my self-learning activities to be effective because: (I have good concentration skills)	AT_AUTOCON	
I consider my self-learning activities to be effective because: (I have the support of my family)	AT_AUTOFAM	
I believe that self-learning during COVID-19 is necessary because: (I can maintain my learning habits)	AT_AUTOMAN	
find my self-learning activities effective because: (I am motivated to self-learn)	AT_AUTOMOT	Attitude
During the COVID-19 lockdown, how many hours do you spend for: (Offline learning)	AT_CONHOOF	
During the confinement for COVID-19, how many hours do you spend for: (Online learning)	AT_CONHOON	
How many hours do you study a day, on average? (During confinement as a result of COVID-19)	AT_HOURAFT	
How many hours do you study a day on average? (Before confinement as a result of COVID-19)	AT_HOURBEF	
I believe that self-learning during COVID-19 is necessary because: (My siblings show me that self-learning is necessary)	IN_AUTOBRO	
I believe that self-learning during COVID-19 is necessary because: (My friends show me that self-learning is necessary)	IN_AUTOFRI	
I believe that self-learning during COVID-19 is necessary because: (My parents show me that self-learning is necessary)	IN_AUTOPAR	
I believe that self-learning during COVID-19 is necessary because: (My teachers show me that self-learning is necessary)	IN_AUTOTEA	Intent to Use
Based on my overall experience of regular university courses taught online: (Many of my expectations were confirmed)	IN_EXPCONFIR	
I intend to continue taking regular university courses taught online.	IN_LEARCONTI	
If I could, I would stop taking regular college courses taught online.	IN_LEARNOTO	
I have high expectations for my learning by taking the regular university courses online.	IN_LEARONL	
The regular face-to-face courses of the university dictated online (I must continue using them)	IN_PONDO	
Being asked for identification affects me when I am thinking of using an application	LP	Expected costs
In my opinion, new applications are usually difficult to use	(DUT	
The regular face-to-face courses of the university dictated online (They improve my learning process)	US_PONIMPR	
The regular face-to-face university courses taught online (It allows me to complete my assignments more easily.)	US_PONTASK	Usefulness
The regular face-to-face courses of the university dictated online (They are useful in my learning process)	US_PONUSEF	

Structural Equation Model was used in this study, latent variables show the concepts and indicators represent the input data. A casual relationship is searched between latent variables complex relationship is assumed(with indirect and direct effect) through structural equation model(Ringle, Wende, & Will, 2005)

Student's response was collected through questionnaire and method was applied on that data, responses obtained were n=426. Structural equation model was used to analyze the data for estimation and testing casual relationships among multiple independent and dependent constructs with a single analysis.

3. Results

Out of 426 respondents who were students, 230 students (54%) were female while 196 (48%) were male students. Out of 426 students, 342 students were representative of social sciences field (business administration, law, economics, IR), 46 students were studying engineering while 38 respondents had other chosen area of study.

Structural Equation Model was developed for testing the relationships among latent constructs and the indicators along with structural relationship between the latent constructs.

Partial least squares process was applied to construct the model with the help of Smart PLS Software(Ringle et al., 2005). PLS algorithm was used as it met the following criteria: phenomenon under study is relatively new, accuracy in prediction, minimal recommendations in PLS regarding size of the sample along with relative low requirements regarding multi normality of the data (Henseler & Chin, 2010; Ringle et al., 2005).
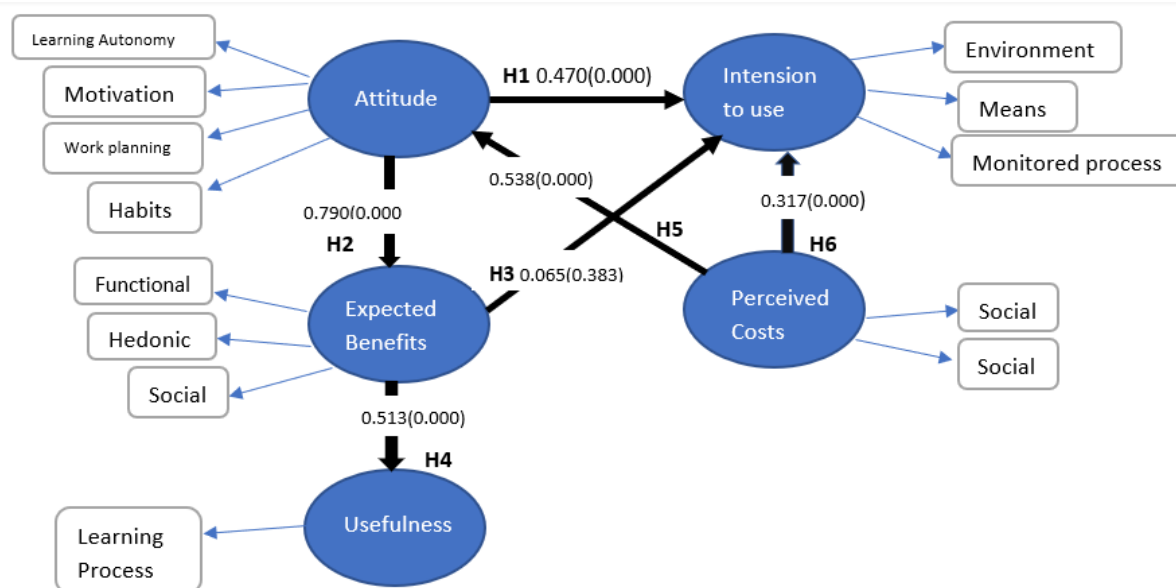

Figure 2 shows the general model which is proposed including its indicators and the constructs. The numbers alongside the arrows represent relationship strength ranging from -1 to +1, corresponding p value is provided in parenthesis.

Validation of model was done in two phases, initially measurement model was assessed and secondly structural model was evaluated. Regarding measurement model, loadings for the factors are above the threshold of 0.600.

Cronbach's alpha along with composite reliability(Dillon–Goldstein rho) was used to measure internal consistency(Cronbach, 1951), minimum values proposed for explorative research are surpassed in both measurements by threshold of 0.600(Gibson, Harris, & Colaric, 2008), resampling bootstrap was used to assess statistical significance. Concerning reliability of the indicators, values of all paths are significant (r<0.01).

Results have indicated a significant positive relationship attitude and intent to use (H1: b = 0.470 , r < 0.000), attitude and expected benefits (H2: b = 0.790 , r < 0.000), expected benefits and usefulness (H4: b = 0.513 , r < 0.000), perceived costs and attitude (H5: b = 0.538 , r < 0.000), perceived costs and intent to use (H6: b = 0.317 , r < 0.000). however, relationship between expected benefits and intent to use (H1: b = 0.065 , r < 0.383) was not supported at confidence interval of 95%.

Keeping in view the above results, hypotheses of this study are affirmed as follows:

- RH1: There is significant relationship between positive attitude regarding usage of online system and intent to use the system.

- RH2: Attitude of students regarding usage of online system depends on expected benefits.
- RH3: Intention of students to use the online system is not dependent on expected benefits.
- RH4: Expected benefits from using the online system will have positive influence on perceived usefulness of the system.
- RH5: Perceived costs concerning online system will impact on attitude of students towards using the system.
- RH6 Perceived costs regarding online system will influence on student's intent to use the system.

4. Discussion

Technology acceptance model has proved to be important in understanding perceptions of students concerning shift towards online mode of education from face-to-face mode in universities due to the wake of Covid-19. Relationship between attitude and intent to use, attitude and expected benefits, expected benefits and usefulness, perceived costs and attitude, perceived costs and intent to use have been found. The measurement model and the independent explanatory variable are satisfactory as per results and value of samples, composite reliability and reliability of each individual item is also adequate. In addition to this, high levels of reliability and internal consistency has been found among latent variables. Hypothesis were validated, measurement values of discriminant validity were adequate, the significant relationships were found in all hypotheses except for the hypothesis of relationship between intent to use and expected benefits. Above discussed analysis is consistent with the previously published research regarding perception of students of online mode of education(Al-Azawei et al., 2017; Gibson et al., 2008; Kaushik & Verma, 2019; Lee et al., 2003; Scherer et al., 2019).

5. Conclusion

This research has its roots from technology acceptance model whose applicability in model for this study is also validated. The proposed model affirms a set of indicators which help in determining the attitude of students keeping in view its expected benefits and perceived costs in wake of the Covid-19 scenario. Importance of attitude, intention, environment in which learning takes place is highlighted in this study.

Proposed model of this study is built on technology acceptance model which provides a useful theoretical model in understanding and explanation of user's acceptance of technology and online learning environment especially in a sudden environment due to various reasons such as spread of virus. It is confirmed in this study that attitude, if positive, will have positive influence on the student's intention to use the online resource, perceived costs will also influence attitude and intention of students, practical implications for this include using gamification in online resource and making it easy to use along with providing necessary digital skills to students to increase their confidence and influence their attitude. Differences in gender concerning technology acceptance can be a potential topic for further investigation.

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