***Perceived benefits and challenges in digital learning continuance after Covid-19 pandemic***

*Dr. Diksha Khera\*,*

*Assistant Professor, Department of Commerce, Shyam Lal College, University of Delhi*

***Email id:*** ***diksha.khera@******shyamlal.du.ac.in***

***Perceived benefits and challenges in digital learning continuance after Covid-19 pandemic***

**Abstract**

Digital learning means utilize the information and communication technology in a way to provide students with various resources of knowledge and information challenging geographical and time limitations. It is not a new phenomenon but the advent of Covid-19 pandemic had increased its acceptance rate, as online education was only option to sustain education during pandemic. This pandemic had significantly transformed learning style from face-to-face learning to digital learning. Therefore, it is significant to answer the research questions whether the users really want to continue digital learning after pandemic and what benefits and challenges they feel in digital learning continuance. The present research is an attempt in this direction. For achieving proposed research objectives, a descriptive research design was framed. By using convenience sampling and online medium, total 374 responses were collected from students enrolled in higher institutions of Haryana state. The findings recommended to technology providers and policymakers that they really need to solve investigated challenges and improve the benefits and personal satisfaction of users for long-term digital learning continuance, as students don’t want to continue digital learning in future. Lastly, present study also suggested to educational institutions that they should use blended learning over digital or face-to-face learning for improvement in students’ task performance and overall personality development.

**Key Words:** Digital Learning, Covid-19 pandemic, Continuance Intention, Perceived Benefits, Perceived Challenges

**Introduction**

Digital learning refers to “*online learning which is basically a type of training and tuition that is based on technology*” (Al-Rahmi et al. 2019). It means “utilizing the information and communication technology (ICT) in a way to provide students with various resources of knowledge and information challenging geographical and time limitations" (Liaw and Huang 2013). In addition, digital learning also named as e-learning, virtual learning, internet-based learning, computer-aided learning or network-based learning (Kesim 2011). However, it is not a simple procedure rather it involves virtual management, dealing with digital tools, feeling of social isolation, digital fluency, internet access, anxiety, psychological stress and privacy risk (Agnoletto and Queiroz 2020). In digital learning, work-artificiality is the main focus than the interaction and study tasks as in traditional face-to-face learning (Doll and Torkzadeh 1988; Mayisela 2013). In other terms, teachers and students interact and communicate with each other by using various synchronous and asynchronous digital tools and deliver the study contents for education (Başal and Gürol 2011).

Nowadays, not only primary and higher institutions are using technologies for education but corporate and government sectors are also using digital learning to train their employees (Al-Rahmi et al. 2018; Pereira et al. 2015). Moreover, educational institutions are offering various opportunities to students for accepting digital learning education. Even the advent of Covid-19 pandemic had increased the acceptance rate of digital learning, as online education was only option to sustain education during pandemic (Çevik and Bakioğlu 2021). In pandemic, the fear of contact with Corona virus and getting sick or infectious diseases had locked down whole world economy and also forced people to maintain social distancing among them. This pandemic had indeed significantly transformed learning style from face-to-face learning to digital learning. According to Mulenga and Marbán (2020), Covid-19 pandemic has played a significant mediating role in making people to use digital devices, digital resources and e-learning effectively. During that time, teachers and students were compelled to spend more time in online learning environment for education and use the digital apps such as Microsoft teams, Zoom app, Google classroom etc. as suggested by their institutions. From this compulsory adoption, every student, teacher and institution had experienced the benefits and challenges of digital learning.

Now it is significant to answer this research question whether students, teachers and educational institutions really intend to continue digital learning for long-term after pandemic when almost institutions have opened and their fear of contacting with virus has also reduced. The answer of this question only depends on perceived benefits and challenges of digital learning which they experienced during pandemic. This study is an attempt to understand those benefits and challenges. Undoubtedly, this will help to forecast the future of digital learning. Furthermore, it will also be beneficial for technology providers to understand the challenges and motivation in acceptance of technology so that they can make effective strategies and policies for the better future of technology. However, the present study has only focused on students’ population and studied their continuance intention and experienced challenges and benefits for digital learning.

**Literature Review**

“Digital learning is the use of new multimedia technologies and the internet to improve the quality of learning by facilitating access to resources and services, as well as remote exchange and collaboration” (Al-Rahmi, Othman, and Yusuf 2015). It is also known as e-learning, virtual learning, internet-based learning, computer-aided learning or network-based learning (Kesim 2011). It provides several benefits to the organizations that use digital learning in compare of others such as dynamic course content, easy course access, performance improvement, skills & knowledge improvement, abundance information, quality information and updated information (Amado-Salvatierra et al. 2016; Lee et al. 2011; Venkatesh et al. 2003). Digital learning also provides full freedom to students for choosing any online course and study from their home, and they can manage their time according to their preferences (Al-Rahmi et al. 2019). Moreover, in terms of time and distance, digital learning is more effective and useful in compare of traditional face-to-face learning (Al-Rahmi et al. 2018). However, continuous use of digital devices for learning and other life’s activities generally becomes the reason for eyesight problems, psychological stress, body ache, internal diseases, environmental pollution and social isolation. Additionally, virtual management, dealing with digital tools, privacy risk, insufficient digital fluency and access problems in internet and electricity become the hindrances in acceptance of digital technology (Agnoletto and Queiroz 2020). Therefore, digital learning is not just a home education rather it involves various challenges and constraints.

 As the main objective of present study is to identify those benefits and challenges in use of digital learning which may prevent the users to accept digital learning. Therefore, the existing literature on acceptance of technology was deeply reviewed. The existing literature provided the great insights for the benefits and challenges that may be felt by the users in acceptance of technology.

In existing literature, “Perceived usefulness” and “perceived ease to use” are widely identified as significant motivator in e-learning acceptance (Al-Rahmi et al. 2015; Davis, Bagozzi, and Warshaw 1989; Leem and Lim 2018). These are derived by Davis et al. (1989) in technology acceptance model (TAM). The main aim of TAM was to explain the acceptance of information technology by perceived usefulness and perceived ease to use in acceptance of system technology (Davis 1993; Venkatesh and Davis 2000).

Some previous researches also argued that task-technology-fit is significant in acceptance of technology, as a great fit between task and technology will enhance the task performance of users and it will further lead satisfaction and motivation among them for technology acceptance (Cheng 2020; Gan, Li, and Liu 2017; Goodhue and Thompson 1995).

Furthermore, information quality and service quality were also found as the main contributors in technology acceptance decision (Cheng 2020; Daghan and Akkoyunlu 2016; Li et al. 2012). Information quality, service quality and system quality of technology are the main pillars of information system success model (ISSM) which was developed by DeLone and McLean in 2003. The ISSM had argued that information quality, service quality and system quality of technology significantly affect the usage and satisfaction for technology acceptance. Petter, Delone, and McLean (2013) also stated that with usage and satisfaction, long-term continuance intention for technology acceptance also effected from information quality, service quality and system quality of technology.

 Although, previous studies claimed that despite of numerous benefits, digital learning has various challenges and disadvantage which actually limit the technology uses in education. Self-efficacy is the one of those significant challenges that prevent the technology use in education (Bates and Khasawneh 2007; Compeau and Higgins 1995; DeTure 2004; Hill, Smith, and Mann 1987; Lim 2001; Simmering, Posey, and Piccoli 2009). It is defined as “the level of confidence that someone has to perform a particular task, activity, action or challenge” (Alqurashi 2016). It is “People's judgments of their capabilities to organize and execute courses of actions required to attain designated types of performances” (Bandura 1986). It is believed that if students have no confidence to use technology and achieve results, they will not make necessary efforts to use technology and achieve results (Alqurashi 2019; Bandura 1997). Students with higher level of technology self-efficacy regard the technology uses as a challenge of skill development and performance improvement rather than the problem to avoid (Joo, Lim, and Kim 2013; Kuo et al. 2014). Besides this, technology self-efficacy improves by the frequency of technology use and access to technology (Aşkar and Aysun 2001). Generally, in female students, level of technology self-efficacy is low (Liaw 2008). In previous studies, self-efficacy reported as the significant predictor of e-learning acceptance (Chen and Chung 2008; Demiralay and Karadeniz 2010; Hsu and Chiu 2004; Kovalchick, Milman, and Elizabeth 1998; Pellas 2014). Also, Çevik and Bakioğlu (2021) reported that fear of Covid-19 has played a significant moderating role in relationship of computer self-efficacy and academic motivation.

Similarly, hedonic goals are also treated as a challenge in technology acceptance continuance. Hedonic element means fun or pleasure in performing a particular task. In previous studies, it was claimed that hedonic goals dissatisfaction may discontinue the use of information technology among its users for future (Barnes 2011; Holsapple and Wu 2007).

Not only this, in technology acceptance and continuance, facilitating conditions of required digital tools, digital infrastructure, best internet and electricity access, digital trainer also play an important role and it should be available at the right time, otherwise, users’ acceptance and continuance intentions for technology use will negatively influenced (Adedoyin and Soykan 2020; Bhattacherjee, Perols, and Sanford 2008; El-Masri and Tarhini 2017; Maillet, Mathieu, and Sicotte 2015).

Moreover, cost-factor is also considered as a main factor in choosing digital learning over face-to-face learning (Bartley and Golek 2004). With the advancement in technology and access to computers and internet at low cost, online education is pervasive in overall world (Clarke and Hermens 2001; Kilby 2001). If the technology providers fail to fulfill the time and resources commitment, a significant reluctance in technology acceptance and continuance could be arise (Bartley and Golek 2004; Evans and Haase 2001; Wild, Griggs, and Downing 2002).

Additionally, digital literacy is also one of cognitive element which influences the user’s acceptance decision. It is the level of skills and knowledge which determine the ability to understand the features and usage of innovation technology. In existing literature, it was claimed that information technology is considered as less complex, if users have adequate amount of skills and knowledge to use that technology (Harnischfeger, Kolo, and Zoche 1999). Thus, there is positive relationship exists in digital literacy and technology acceptance (Moreau, Lehmann, and Markman 2001).

However, many times the continuous use of digital devices and technology become the reasons of severe health issues such as psychological stress, anxiety, eyesight problems, body ache, cervical problem and other dangerous diseases among its users and which demotivate them for technology acceptance (Akinbinu and Mashalla 2014; Khosravi, Rezvani, and Wiewiora 2016).

One more limitation of technology advancement and acceptance may be social isolation among the people. In this modern time, people are getting isolate from their family, friends and relatives due to mobile and other technologies advancement. People are spending more time in digital environment and which getting them far away from physical interaction with others. It has also curtailed their social life. This social isolation due to technology acceptance generally demotivates the users to continue the technology acceptance for long-term (Khosravi et al. 2016; Raza et al. 2021).

In addition, users prevent the use of technology and digital devices due to various types of risks involvement such as privacy risk, financial risk and security risks, time risks, performance risks, social risks and psychological risks for them (Featherman and Pavlou 2003). Risks means skepticism or psychological discomfort that felt in regards of outcome of particular activity (Featherman and Pavlou 2003; Peter and Ryan 1976). Digital risks are generally emerged due to the lack of required digital skills and knowledge among users. If technology involves any type of risk then it will negatively influence the users’ satisfaction and attitude for technology use and it will further demotivate them to accept and continue the technology use (Abramova and Böhme 2016; Lai 2008; Ling and Moi 2007; Pereira et al. 2015).

Lastly, the unexpected appearance from family members and pets’ intrusion during online learning at home negatively causes the attention of online learning participantsand also creates a great disruptions in online learning process, which further negatively influence acceptance and continuance intention for digital learning (Adedoyin and Soykan 2020; Manfuso 2020).

Thus, existing literature provided a great insight for perceived benefits and challenges that may be emerged in digital learning continuance after Covid-19 pandemic and also provided assistance in deciding the research objectives of current study.

**Objectives and Significance of Study**

As the emergence of Covid-19 pandemic had locked the whole world economy and forced to restrict physical interaction between people to prevent the spread of Corona virus. People were compelled to maintain social distancing among them during pandemic. Education is also one of those which got seriously affected by pandemic, as all educational institutions in overall world had transformed their face-to-face learning to digital learning for sustaining the education in this infectious epidemic. Digital learning is not a new phenomenon, rather it existed in educational world since many years ago with the face-to-face learning but during pandemic digital learning was only option to continue the educational activity. During pandemic, students and teachers had spent a lot of time on computers and digital applications like Google Classroom, Microsoft Teams, Zoom app etc. for educational purpose. Thus, each student and lecturer had experienced the benefits and challenges of this new-age pedagogy which was compulsorily adopted by all educational institutions in pandemic. However, pandemic situations have now improved and almost all educational institutions are also opened. So, it is important to investigate whether students, teachers and institutions want to continue digital learning after Covid-19 pandemic or not and what benefits or challenges they experienced in using digital learning. After considering the research limitations, only student’s population was focused in this study. Thus, to solve the above important research problem, the following research objectives were attempted to achieve in this study;

1. To study the digital learning continuance intentions of students after Covid-19 pandemic.
2. To understand the perceived benefits in digital learning continuance after Covid-19 pandemic for students.
3. To understand the perceived challenges in digital learning continuance after Covid-19 pandemic for students.

In deciding the above research objectives, the existing literature on technology acceptance and continuance had greatly helped the researcher of this study.

It is added here the investigation of above research questions will actually help technology providers in better estimation of future of technologies in education sector and plan their effective strategies for long-term digital learning continuance. It will also give insights to policymakers for estimating the challenges and making the effective plans in fulfilling the dream of “Digital India”. Furthermore, this study will be beneficial for educational institutions, as it will provide a guidance to better use digital learning with face-to-face learning for improving the students’ performance and skills.

**Research Methodology**

As, the main objectives of this research were to study the perceived benefits and challenges in continuing digital learning after Covid-19 pandemic, therefore, a descriptive research design was framed to execute this research. Under this, the population of students who were enrolled in higher institutions of Haryana state was focused. For collecting responses, a structured questionnaire in Google form was sent to total of 500 students by medium of Whatsapp, Facebook and Instagram. In structured questionnaire, demographic questions on nominal scale and questions related to benefits, challenges and continuance intentions were asked on interval scale. In collecting responses for benefits, challenges and continuance intentions, 5 point Likert scale from strongly disagree (1) to strongly agree (5) was used. The questions related to benefits, challenges and continuance intentions are given in Appendix. In addition, in data survey, convenience sampling was used to reach the respondents. Finally, out of 500, a total 396 responses were collected. However, 22 responses were totally discarded due to incomplete responses and outlier presences. Thus, a total of 374 responses were deemed fit for data analysis. In structured questionnaire, questions related to perceived benefits and challenges and continuance intentions were decided on the basis of literature review, author’s her own knowledge and pandemic situation. However, before sending to respondents, the content validity of questionnaire was also checked by the experts’ opinion and pilot survey.

Furthermore, in assessing the perceived benefits and challenges for digital learning continuance, descriptive statistics such as mean and standard deviation were used. For example: to assess the level of digital self-efficacy of students, overall mean score was computed for the responses given by students for the four questions related to self-efficacy. Although, before computing mean scores and S.D. values, reliability was also assessed for each variable corresponding to benefits, challenges and continuance intentions by using Cronbach’s alpha. In actual, Cronbach’s alpha tests the inter-consistency and reliability among the items related to one latent variable and if its value exceeds 0.7 then variable is considered as reliable and there is sufficient amount of inter-consistency among items (Churchill 1979). Thus, research design and sampling design were framed to execute this research.

**Data Analysis & Interpretation**

In executing this research, a total 374 students were participated. As Table 1 shows, out of 374 students, 223 (59.6%) were male and 151 (40.4%) were female. Moreover, 38.2% (143) were in graduate course, 37.2% (139) were pursuing post-graduation, 17.1% (64) were in PhD course and 7.5% (28) were in post-doctorate course. At the time of observing course frequency, it was found that 120 (32.1%) students were in science stream, 112 (29.9%) were in arts stream and 142 (38%) were in commerce stream. Lastly, 233 (62.3) students were enrolled in public university and 141 (37.7%) were in private university.

**Table1: Demographic details of respondents**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Category** | **Frequency** | **Percent** |
| Gender | Male  | 223 | 59.6 |
| Female | 151 | 40.4 |
| Total | 374 | 100.0 |
| Course Level | Graduation | 143 | 38.2 |
| Post-Graduation | 139 | 37.2 |
| PhD | 64 | 17.1 |
| Post-Doctorate | 28 | 7.5 |
| Total | 374 | 100.0 |
| Stream | Science | 120 | 32.1 |
| Arts | 112 | 29.9 |
| Commerce | 142 | 38.0 |
| Total | 374 | 100.0 |
| University | Public | 233 | 62.3 |
| Private | 141 | 37.7 |
| Total | 374 | 100.0 |
| Note: N=374 |

**Source: Field survey**

Furthermore, computed Cronbach’s α value for each latent variable of benefits, challenges and continuance intention confirmed their good reliability, as all alpha values were greater than 0.7 (as shown in Table 2). In Table 2, mean and standard deviation (S.D.) values are also given. The lower values of S.D. indicated that mean values adequately represent the responses for a particular variable. The numbers of items and mid-point for each sub-scale are also given in Table 2.

**Table2: Descriptive and Reliability Statistics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Items** | **Mid-point** | **Mean** | **S.D.** | **Cronbach’s α** |
| Digital Self-efficacy | 4 | 3 | 2.7714 | 1.22702 | 0.968 |
| Digital Literacy | 4 | 3 | 2.7493 | 1.12185 | 0.916 |
| Perceived Risk | 3 | 3 | 3.5294 | 1.02495 | 0.775 |
| Social Isolation | 3 | 3 | 4.0526 | .71573 | 0.811 |
| Disruptions | 4 | 3 | 4.0060 | .77243 | 0.858 |
| Health Issue | 4 | 3 | 4.0642 | .70561 | 0.835 |
| Hedonic Motivation | 3 | 3 | 2.6266 | 1.04467 | 0.786 |
| Cost-effectiveness | 4 | 3 | 3.0107 | 1.13006 | 0.886 |
| Facilitating Conditions  | 4 | 3 | 2.5114 | .88934 | 0.845 |
| Perceived Ease of Use | 4 | 3 | 3.8743 | .94694 | 0.918 |
| Perceived Usefulness | 10 | 3 | 3.3532 | 1.13117 | 0.968 |
| Service Quality | 3 | 3 | 3.1783 | 1.18664 | 0.927 |
| Information Quality | 6 | 3 | 3.4492 | 1.04484 | 0.963 |
| Task-Technology-Fit | 4 | 3 | 3.3910 | 1.17901 | 0.940 |
| Continuance Intention | 3 | 3 | 2.2014 | 1.12059 | 0.944 |
| Note: N=374 |

**Source: Field survey**

Finally, at the time of analyzing the mean scores for each variable, it was found that mean value for continuance intention is 2.20143, which is less than mid-point 3. Moreover, mean scores for digital self-efficacy (mean =2.7714 and S.D. = 1.22702), digital literacy (mean= 2.7493 and S.D. = 1.12185), hedonic motivation (mean= 2.6266 and S.D. = 1.04467) and facilitating conditions (mean= 2.5114 and S.D. = .88934) are also less than 3. The results also shown that mean score for cost-effectiveness is 3.0107, which is approximately equal to 3. Also, mean scores were higher than 3 for perceived risk (mean =3.5294 and S.D. =1.02495), social isolation (mean =4.0526 and S.D. =.71573), disruptions (mean =4.0060 and S.D. =.77243) and health issues (mean =4.0642 and S.D. =.70561). However, mean scores for perceived ease of use (mean =3.8743 and S.D. =.94694), perceived usefulness (mean =3.3532 and S.D. =1.13117), service quality (mean =3.1783 and S.D. =1.18664), information quality (mean =3.4492 and S.D. =1.04484) and task-technology-fit (mean =3.3910 and S.D. =1.17901) were also greater than 3. Thus, findings have indicated that although students are agree with benefits of digital learning such as perceived ease of use, perceived usefulness, service quality, information quality and task-technology-fit but they also perceiving the lack of digital self-efficacy, inadequate digital literacy, hedonic goals dissatisfaction, less facilitating conditions, cost-ineffectiveness, risk-involvement, social isolation, disruptions in digital learning and various health issues as the major challenges in digital learning continuance after pandemic.

**Discussion**

This study is a significant addition in existing literature of technology acceptance and continuance intention, as it has worked in direction which estimates the benefits, challenges and continuance intentions of users for long-term digital learning continuance. By focusing the findings of current research, technology providers and policymakers could better estimate the future of digital learning and also design effective strategies for the flourish future of digital learning.

In current study, findings indicated that mean scores for digital self-efficacy, digital literacy, hedonic motivation and facilitating conditions were less than 3. It means on an average students have no adequate experience and digital knowledge to efficiently use the digital learning apps and computer. They fear with the use of computers and digital apps in learning activities. They also agree that their digital self-efficacy is not enough to handle any emergent problem in using e-learning. Also, digital learning is not a fun and entertaining for them and they didn’t enjoy the digital learning use in compare of face-to face learning. They have no enough resources, access to internet connectivity and other facilitating conditions in using digital learning.

The results also shown that mean score for cost-effectiveness is equal to 3 which indicated that students neither agree nor disagree with the cost saving in digital learning. It may be possible that enhancement of cost involved in internet access, electricity or computer purchasing are balancing the cost involved in physical classroom learning.

Moreover, mean scores higher than 3 for perceived risk, social isolation and health issues also indicated that students are considering their privacy at risk in digital learning. They got isolate from their social life by using digital learning, as face to face learning was a best medium to meet and know the new people and enhance their social life. Also, they agree that the continuous use of computers and digital resources in pandemic time enhanced the numbers of health issues such as anxiety, stress, obesity, eye-sight problems, muscles pain and other dangerous diseases.

However, mean scores for perceived ease of use, perceived usefulness, service quality, information quality and task-technology-fit were greater than 3. It indicated that on an average students didn’t denied with the benefits of digital learning. They agree that digital learning is really easy to use and it has numbers of useful quality that will improve their study performance. They stated that it provides large number of updated knowledge and study contents at the users’ convenience. They also agree that digital learning is almost fit with their study tasks.

Lastly, on the basis of findings, it was determined that although students are agree with the various benefits of digital learning such as perceived ease of use, perceived usefulness, service quality, information quality and task-technology-fit but their challenges of digital self-efficacy, digital literacy, perceived risk, social isolation, health issues, hedonic motivation, cost-effectiveness and facilitating conditions are really deviating them from continuing the digital learning in future. Therefore, they don’t want to continue to digital learning after pandemic.

**Conclusion**

As, this study has attempted to investigate the digital learning continuance intentions among students with perceived benefits and challenges that were experienced by them in using digital learning during pandemic. This study is a significant research to estimate the future of technology and make it better with effective strategies and policies. The findings of study have attempted to bring the attention of technology providers on a serious fact that students really don’t want to continue the digital learning in education after pandemic. Although, they are satisfied with digital learning benefits such as perceived ease of use, perceived usefulness, service quality, information quality and task-technology-fit but their challenges of digital self-efficacy, digital literacy, perceived risk, social isolation, digital learning disruptions, health issues, hedonic motivation, cost-effectiveness and facilitating conditions are actually deviating them from continuing the digital learning in future. On the basis of findings, current research has suggested to the technology providers and policymakers that they really need to solve investigated challenges for long-term digital learning continuance which were experienced by users during pandemic. Moreover, they should also improve the benefits and personal satisfaction of users from digital learning. Thus, the current research provides a significant insight to the technology providers and policymakers to better plan effective strategies for flourish future of digital learning by focusing on investigated perceived benefits and challenges. Lastly, current study has suggested to the educational institutions for blended learning over digital learning or face-to-face learning for improvement in students’ task performance and overall personality development.

**Limitations & Recommendations**

Although, this study has attempted to study the students’ digital learning continuance intentions and perceived benefits and challenges in digital learning continuance after pandemic but this has also some limitations. One limitation is, it has focused on students’ population and in future researches population of teachers and educational institution may be focused for wide generalization of current findings. Also, it limited upto Haryana state of Indian economy. Other means of measuring responses such as interview, case-study or other better qualitative measures may be used in future researches which were not used in current research. Future research may also investigate the significant impact of these perceived benefits and challenges on digital learning continuance and may also investigate the significant predicator of continuance intention. Future researchers may also assess the satisfaction and adoption rate of students, teachers and educational institutions for digital learning to make the better future of digital learning. In future researches, demographic variables should also be used to compare the results of benefits, challenges, satisfaction, continuance behavior for digital learning.

**References**

Abramova, Svetlana, and Rainer Böhme. 2016. “Perceived Benefit and Risk as Multidimensional Determinants of Bitcoin Use: A Quantitative Exploratory Study.” Pp. 1–20 in *Thirty Seventh International Conference on Information Systems, ICIS 2016*.

Adedoyin, Olasile Babatunde, and Emrah Soykan. 2020. “Covid-19 Pandemic and Online Learning: The Challenges and Opportunities.” *Interactive Learning Environments* 0(0):1–13. doi: 10.1080/10494820.2020.1813180.

Agnoletto, R., and V. Queiroz. 2020. “COVID-19 and the Challenges in Education. Centro de Estudos Sociedade e Technologia, Universidade de Sao Paulo, Bulletin, 5 (2), 1-2.”

Akinbinu, T. R., and Y. J. Mashalla. 2014. “Medical Practice and Review Impact of Computer Technology on Health : Computer Vision Syndrome ( CVS ).” *Academic Journals* 5(November):20–30. doi: 10.5897/MPR.2014.0121.

Al-Rahmi, Waleed Mugahed, Norma Alias, Mohd Shahizan Othman, Ahmed Ibrahim Alzahrani, Osama Alfarraj, Ali Ali Saged, and Nur Shamsiah Abdul Rahman. 2018. “Use of E-Learning by University Students in Malaysian Higher Educational Institutions: A Case in Universiti Teknologi Malaysia.” *IEEE Access* 6:14268–76. doi: 10.1109/ACCESS.2018.2802325.

Al-Rahmi, Waleed Mugahed, Mohd Shahizan Othman, and Lizawati Mi Yusuf. 2015. “The Effectiveness of Using E-Learning in Malaysian Higher Education: A Case Study Universiti Teknologi Malaysia.” *Mediterranean Journal of Social Sciences* 6(5S2):625–37. doi: 10.5901/mjss.2015.v6n5s2p625.

Al-Rahmi, Waleed Mugahed, Noraffandy Yahaya, Ahmed A. Aldraiweesh, Mahdi M. Alamri, Nada Ali Aljarboa, Uthman Alturki, and Abdulmajeed A. Aljeraiwi. 2019. “Integrating Technology Acceptance Model with Innovation Diffusion Theory: An Empirical Investigation on Students’ Intention to Use E-Learning Systems.” *IEEE Access* 7:26797–809. doi: 10.1109/ACCESS.2019.2899368.

Alqurashi, Emtinan. 2016. “Self-Efficacy In Online Learning Environments: A Literature Review.” *Contemporary Issues in Education Research (CIER)* 9(1):45–52. doi: 10.19030/cier.v9i1.9549.

Alqurashi, Emtinan. 2019. “Predicting Student Satisfaction and Perceived Learning within Online Learning Environments.” *Distance Education* 40(1):133–48. doi: 10.1080/01587919.2018.1553562.

Amado-Salvatierra, Hector R., José R. Hilera, Salvador Otón Tortosa, Rocael Hernández Rizzardini, and Nelson Piedra. 2016. “Towards a Semantic Definition of a Framework to Implement Accessible E-Learning Projects.” *Journal of Universal Computer Science* 22(7):921–42.

Aşkar, Petek, and UMAY Aysun. 2001. “İlköğretim Matematik Öğretmenliği Öğrencilerinin Bilgisayarla Ilgili Öz-Yeterlik Algısı.” *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi* 21(21).

Bandura, Albert. 1986. “Social Foundations of Thought and Action.” *Englewood Cliffs, NJ* 1986(23–28).

Bandura, Albert. 1997. “Self Eflicacy. The Exercise of Control, New York: W H.” *Freeman & Co. Student Success* 333:48461.

Barnes, Stuart J. 2011. “Understanding Use Continuance in Virtual Worlds: Empirical Test of a Research Model.” *Information and Management* 48(8):313–19. doi: 10.1016/j.im.2011.08.004.

Bartley, Sharon Jeffcoat, and Jennifer H. Golek. 2004. “Evaluating the Cost Effectiveness of Online and Face-to-Face Instruction.” *Journal of Educational Technology & Society* 7(4):167–75.

Başal, A., and M. Gürol. 2011. “E-Öğrenmenin Geleneksel Sınıflara Entegrasyonu [Integration of e-Learning into Traditional Classes].” *Akademik Bilişim* 2–4.

Bates, Reid, and Samer Khasawneh. 2007. “Self-Efficacy and College Students’ Perceptions and Use of Online Learning Systems.” *Computers in Human Behavior* 23(1):175–91. doi: 10.1016/j.chb.2004.04.004.

Bhattacherjee, Anol, Johan Perols, and Clive Sanford. 2008. “Information Technology Continuance: A Theoretic Extension and Empirical Test.” *Journal of Computer Information Systems* 49(1):17–26. doi: 10.1080/08874417.2008.11645302.

Çevik, Mustafa, and Büşra Bakioğlu. 2021. “Investigating Students’ E-Learning Attitudes in Times of Crisis (COVID-19 Pandemic).” *Education and Information Technologies* 27:65–87. doi: 10.1007/s10639-021-10591-3.

Chao, Cheng Min. 2019. “Factors Determining the Behavioral Intention to Use Mobile Learning: An Application and Extension of the UTAUT Model.” *Frontiers in Psychology* 10(JULY):1–14. doi: 10.3389/fpsyg.2019.01652.

Chen, Chih Ming, and Ching Ju Chung. 2008. “Personalized Mobile English Vocabulary Learning System Based on Item Response Theory and Learning Memory Cycle.” *Computers and Education* 51(2):624–45. doi: 10.1016/j.compedu.2007.06.011.

Cheng, Yung Ming. 2020. “Quality Antecedents and Performance Outcome of Cloud-Based Hospital Information System Continuance Intention.” *Journal of Enterprise Information Management* 33(3):654–83. doi: 10.1108/JEIM-04-2019-0107.

Churchill, Gilbert A. 1979. “A Paradigm for Developing Better Measures of Marketing Constructs.” *Journal of Marketing Research* 16(1):64–73.

Clarke, Thomas, and Antoine Hermens. 2001. “Corporate Developments and Strategic Alliances in E‐learning.” *Education+ Training*.

Compeau, Deborah R., and Christopher A. Higgins. 1995. “Computer Self-Efficacy: Development of a Measure and Initial Test.” *MIS Quarterly: Management Information Systems* 19(2):189–210. doi: 10.2307/249688.

Daghan, Gökhan, and Buket Akkoyunlu. 2016. “Modeling the Continuance Usage Intention of Online Learning Environments.” *Computers in Human Behavior* 60:198–211. doi: 10.1016/j.chb.2016.02.066.

Daʇhan, Gökhan, and Buket Akkoyunlu. 2016. “Modeling the Continuance Usage Intention of Online Learning Environments.” *Computers in Human Behavior* 60:198–211. doi: 10.1016/j.chb.2016.02.066.

Davis, Fred D. 1989. “Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology.” *MIS Quarterly* 13(3):319–39. doi: 10.2307/249008.

Davis, Fred D. 1993. “User Acceptance of Information Technology: System Characteristics, User Perceptions and Behavioral Impacts.” *International Journal of Man-Machine Studies* 38:475–87. doi: 10.1080/09500693.2019.1693081.

Davis, Fred D. .., Richard P. .. Bagozzi, and Paul R. .. Warshaw. 1989. “User Acceptance of Computer Technology: A Comparison of Two Theoretical.” *Management Science* 35(8):982–1003.

DeLone, William H., and Ephraim R. McLean. 2003. “The DeLone and McLean Model of Information Systems Success: A Ten-Year Update.” *Journal of Management Information Systems* 19(4):9–30.

Demiralay, Raziye, and Sirin Karadeniz. 2010. “The Effect of Use of Information and Communication Technologies on Elementary Student Teachers’ Perceived Information Literacy Self-Efficacy.” *Educational Sciences: Theory and Practice* 10(2):841–51.

DeTure, Monica. 2004. “Cognitive Style and Self-Efficacy: Predicting Student Success in Online Distance Education.” *International Journal of Phytoremediation* 21(1):21–38. doi: 10.1207/s15389286ajde1801\_3.

Doll, William J., and Gholamreza Torkzadeh. 1988. “The Measurement of End-User Computing Satisfaction.” *MIS Quarterly* 12(2):259–74.

El-Masri, Mazen, and Ali Tarhini. 2017. “Factors Affecting the Adoption of E-Learning Systems in Qatar and USA: Extending the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2).” *Educational Technology Research and Development* 65(3):743–63. doi: 10.1007/s11423-016-9508-8.

Evans, Joel R., and Ilene M. Haase. 2001. “Online Business Education in the Twenty‐first Century: An Analysis of Potential Target Markets.” *Internet Research*.

Featherman, Mauricio S., and Paul A. Pavlou. 2003. “Predicting E-Services Adoption: A Perceived Risk Facets Perspective.” *International Journal of Human Computer Studies* 59(4):451–74. doi: 10.1016/S1071-5819(03)00111-3.

Gan, Chunmei, Hongxiu Li, and Yong Liu. 2017. “Understanding Mobile Learning Adoption in Higher Education An Empirical Investigation in the Context of the Mobile Library.” *Electronic Library* 35(5):846–60. doi: 10.1108/EL-04-2016-0093.

Goodhue, Dale L., and Ronald L. Thompson. 1995. “Task-Technology Fit and Individual Performance.” *MIS Quarterly: Management Information Systems* 19(2):213–33. doi: 10.2307/249689.

Harnischfeger, Monika, Castulus Kolo, and Peter Zoche. 1999. “Elemente Eines Akzeptanzmodells.” *Perspektiven Der Medienwirtschaft: Kompetenz–Akzeptanz–Geschäftsfelder. Lohmar, Köln: Josef Eul Verlag*.

Hill, Thomas, Nancy D. Smith, and Millard F. Mann. 1987. “Role of Efficacy Expectations in Predicting the Decision to Use Advanced Technologies: The Case of Computers.” *Journal of Applied Psychology* 72(2):307–13. doi: 10.1037/0021-9010.72.2.307.

Holsapple, Clyde W., and Jiming Wu. 2007. “User Acceptance of Virtual Worlds: The Hedonic Framework.” *ACM SIGMIS Database: The DATABASE for Advances in Information Systems* 38(4):86–89.

Hsu, Meng Hsiang, and Chao Min Chiu. 2004. “Internet Self-Efficacy and Electronic Service Acceptance.” *Decision Support Systems* 38(3):369–81. doi: 10.1016/j.dss.2003.08.001.

Joo, Young Ju, Kyu Yon Lim, and Jiyeon Kim. 2013. “Locus of Control, Self-Efficacy, and Task Value as Predictors of Learning Outcome in an Online University Context.” *Computers and Education* 62:149–58. doi: 10.1016/j.compedu.2012.10.027.

Kesim, E. 2011. “Uzaktan Eğitimde Meydana Gelen Değerler Dizisi (Paradigma) Değişimlerinin e-Öğrenme Ekonomisi Alanına Yansımaları.” *Türkiye’de E-Öğrenme Gelişmeler ve Uygulamalar (2. Bs.)* 2–19.

Khosravi, Pouria, Azadeh Rezvani, and Anna Wiewiora. 2016. “The Impact of Technology on Older Adults’ Social Isolation.” *Computers in Human Behavior* 63:594–603.

Kilby, Tim. 2001. “The Direction of Web‐based Training: A Practitioner’s View.” *The Learning Organization*.

Kovalchick, Ann, Natalie B. Milman, and M. Elizabeth. 1998. “Instructional Strategies for Integrating Technology: Electronic Journals and Technology Portfolios as Facilitators for Self-Efficacy and Reflection in Preservice Teachers.” *Technology and Teacher Education Annual 1998* 236–40.

Kuo, Yu Chun, Andrew E. Walker, Kerstin E. E. Schroder, and Brian R. Belland. 2014. “Interaction, Internet Self-Efficacy, and Self-Regulated Learning as Predictors of Student Satisfaction in Online Education Courses.” *Internet and Higher Education* 20:35–50. doi: 10.1016/j.iheduc.2013.10.001.

Lai, Ming Ling. 2008. “Technology Readiness, Internet Self-Efficacy and Computing Experience of Professional Accounting Students.” *Campus-Wide Information Systems* 25(1):18–29. doi: 10.1108/10650740810849061.

Lee, Yi-hsuan, Yi-chuan Hsieh, Chia-ning Hsu, Source Journal, Advanced Learning, Yi-hsuan Lee, Yi-chuan Hsieh, and Chia-ning Hsu. 2011. “International Forum of Educational Technology & Society Adding Innovation Diffusion Theory to the Technology Acceptance Model : Supporting Employees ’ Intentions to Use E-Learning Systems Published by : International Forum of Educational Technology & Soci.” *Journal of Educational Technology & Society* 14(4):124–37.

Leem, Junghoon, and Byungro Lim. 2018. “The Current Status of E-Learning and Strategies to Enhance Educational Competitiveness in Korean Higher Education.” *International Review of Research in Open and Distributed Learning* 32(3):83–93.

Li, Yan, Yanqing Duan, Zetian Fu, and Philip Alford. 2012. “An Empirical Study on Behavioural Intention to Reuse E-Learning Systems in Rural China.” *British Journal of Educational Technology* 43(6):933–48. doi: 10.1111/j.1467-8535.2011.01261.x.

Liaw, Shu Sheng. 2008. “Investigating Students’ Perceived Satisfaction, Behavioral Intention, and Effectiveness of e-Learning: A Case Study of the Blackboard System.” *Computers and Education* 51(2):864–73. doi: 10.1016/j.compedu.2007.09.005.

Liaw, Shu Sheng, and Hsiu Mei Huang. 2013. “Perceived Satisfaction, Perceived Usefulness and Interactive Learning Environments as Predictors to Self-Regulation in e-Learning Environments.” *Computers and Education* 60(1):14–24. doi: 10.1016/j.compedu.2012.07.015.

Lim, Christina Kyounghee. 2001. “Computer Self–Efficacy, Academic Self–Concept, and Other Predictors of Satisfaction and Future Participation of Adult Distance Learners.” *International Journal of Phytoremediation* 21(1):41–51. doi: 10.1080/08923640109527083.

Lin, Tung-Ching, and Chien Chih Huang. 2008. “Understanding Knowledge Management System Usage Antecedents: An Integration of Social Cognitive Theory and Task Technology Fit.” *Information and Management* 45(6):410–17. doi: 10.1016/j.im.2008.06.004.

Ling, Lai Ming, and Chong Moi Moi. 2007. “PROFESSIONAL STUDENTS’TECHNOLOGY READINESS, PRIOR COMPUTING EXPERIENCE AND ACCEPTANCE OF AN E-LEARNING SYSTEM.” *Management & Accounting Review (MAR)* 6(1):85–100.

Maillet, Éric, Luc Mathieu, and Claude Sicotte. 2015. “Modeling Factors Explaining the Acceptance, Actual Use and Satisfaction of Nurses Using an Electronic Patient Record in Acute Care Settings: An Extension of the UTAUT.” *International Journal of Medical Informatics* 84(1):36–47. doi: 10.1016/j.ijmedinf.2014.09.004.

Manfuso, L. G. 2020. “How the Remote Learning Pivot Could Shape Higher Ed IT.” *EdTech Magazine*.

Mayisela, Tabisa. 2013. “The Potential Use of Mobile Technology: Enhancing Accessibility and Communication in a Blended Learning Course.” *South African Journal of Education* 33(1):1–18. doi: 10.15700/saje.v33n1a629.

Moreau, C. Page, Donald R. Lehmann, and Arthur B. Markman. 2001. “Entrenched Knowledge Structures and Consumer Response to New Products.” *Journal of Marketing Research* 38(1):14–29. doi: 10.1509/jmkr.38.1.14.18836.

Mulenga, Eddie M., and José M. Marbán. 2020. “Is Covid-19 the Gateway for Digital Learning in Mathematics Education?” *Contemporary Educational Technology* 12(2):1–11. doi: 10.30935/cedtech/7949.

Pellas, Nikolaos. 2014. “The Influence of Computer Self-Efficacy, Metacognitive Self-Regulation and Self-Esteem on Student Engagement in Online Learning Programs: Evidence from the Virtual World of Second Life.” *Computers in Human Behavior* 35:157–70. doi: 10.1016/j.chb.2014.02.048.

Pereira, Fernando Antonio De Melo, Anatália Saraiva Martins Ramos, Maria Aparecida Gouvêa, and Marconi Freitas Da Costa. 2015. “Satisfaction and Continuous Use Intention of E-Learning Service in Brazilian Public Organizations.” *Computers in Human Behavior* 46:139–48. doi: 10.1016/j.chb.2015.01.016.

Peter, J. Paul, and Michael J. Ryan. 1976. “An Investigation of Perceived Risk at the Brand Level.” *Journal of Marketing Research* 13(2):184–88.

Petter, Stacie, William Delone, and Ephraim R. McLean. 2013. “Information Systems Success: The Quest for the Independent Variables.” *Journal of Management Information Systems* 29(4):7–62. doi: 10.2753/MIS0742-1222290401.

Raza, Syed A., Wasim Qazi, Komal Akram Khan, and Javeria Salam. 2021. “Social Isolation and Acceptance of the Learning Management System (LMS) in the Time of COVID-19 Pandemic: An Expansion of the UTAUT Model.” *Journal of Educational Computing Research* 59(2):183–208. doi: 10.1177/0735633120960421.

Shen, Demei, Moon Heum Cho, Chia Lin Tsai, and Rose Marra. 2013. “Unpacking Online Learning Experiences: Online Learning Self-Efficacy and Learning Satisfaction.” *Internet and Higher Education* 19:10–17. doi: 10.1016/j.iheduc.2013.04.001.

Simmering, Marcia J., Clay Posey, and Gabriele Piccoli. 2009. “Computer Self-Efficacy and Motivation to Learn in a Self-Directed Online Course.” *Decision Sciences Journal of Innovative Education* 7(1):99–121. doi: 10.1111/j.1540-4609.2008.00207.x.

Singh, Archana, Sarika Sharma, and Manisha Paliwal. 2020. “Adoption Intention and Effectiveness of Digital Collaboration Platforms for Online Learning: The Indian Students’ Perspective.” *Interactive Technology and Smart Education*. doi: 10.1108/ITSE-05-2020-0070.

Venkatesh, Viswanath, and Fred D. Davis. 2000. “A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies.” *Management Science* 46(2):186–204.

Venkatesh, Viswanath, Michael G. Morris, Gordon B. Davis, and Fred D. Davis. 2003. “User Acceptance of Information Technology: Toward a Unified View.” *MIS Quarterly* 27(3):425–78.

Venkatesh, Viswanath, James Y. L. Thong, and Xin Xu. 2012. “Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology.” *MIS Quarterly* 36(1):157–78.

Wild, Rosemary H., Kenneth A. Griggs, and Tanya Downing. 2002. “A Framework for E‐learning as a Tool for Knowledge Management.” *Industrial Management & Data Systems*.

**Appendix:**

**Table A1: Survey Items**

|  |  |  |  |
| --- | --- | --- | --- |
| **Construct** | **Coding** | **Item** | **Reference** |
| Task-Technology Fit (TTF) | TTF1 | Digital learning is enough to help me use the study contents | (Gan et al. 2017; Lin and Huang 2008) |
| TTF2 | In general, digital learning fully meets my study needs |
| TTF3 | Digital learning made the study tasks easy |
| TTF4 | Digital learning best fit the study tasks |
| Information quality (IQL) | IQL1 | Digital learning platforms provide relevant information for my homework. | (Daʇhan and Akkoyunlu 2016) |
| IQL2 | Digital learning platforms present the information in an appropriate format. |
| IQL3 | The information content on the digital learning platforms is good. |
| IQL4 | The information on digital learning platforms is up-to-date enough for my study purposes. |
| IQL5 | The reliability of output information from digital learning platforms is high. |
| IQL6 | Digital learning platforms provide the information I need in time. |
| Service Quality (SQL) | SQL1 | Overall, digital learning platforms have excellent service quality. | (Daʇhan and Akkoyunlu 2016) |
| SQL2 | Digital learning platforms give fast service to users. |
| SQL3 | The operation hours of the digital learning platforms are convenient to its users. |
| Perceived Usefulness | PU1 | I find digital learning is quite useful for attending lectures | (Davis 1989; Singh, Sharma, and Paliwal 2020) |
| PU2 | It is a fast and easy medium to get connected with teachers |
| PU3 | Using digital learning leads to effective communication with teachers |
| PU4 | It is easy to pass useful information using digital learning  |
| PU5 | Through digital learning, it is easy to understand the subject taught |
| PU6 | The use of digital learning would enhance my effectiveness in learning. |
| PU7 | Using digital learning would improve my course performance. |
| PU8 | Using digital learning would increase my productivity in coursework. |
| PU9 | I find digital learning to be useful. |
| PU10 | Digital learning provides wide range of learning contents |
| Perceived ease of use | PEU1 | I find digital learning is easy to use | (Davis 1989; Singh et al. 2020) |
| PEU2 | My interaction with digital learning platforms is clear and understandable. |
| PEU3 | It would be easy for me to find information on digital learning platforms |
| PEU4 | Digital learning platforms features are quite flexible |
| Facilitating conditions | FC1 | I have the necessary resources for digital learning | (Venkatesh, Thong, and Xu 2012) |
| FC2 | I have the necessary knowledge for digital learning |
| FC3 | Digital learning is compatible with other teaching/learning methods that I use. |
| FC4 | I can get help from others when I have difficulties in using digital learning. |
| Cost-effectiveness | CE1 | I find digital learning is affordable | (Singh et al. 2020) |
| CE2 | Digital learning suits my need of low-cost education |
| CE3 | I get value for money by using digital learning for education |
| CE4 | I get the value of efforts and time by using digital learning  |
| Hedonic Motivation | HM1 | Digital learning is fun. | (Venkatesh et al. 2012) |
| HM2 | Digital learning is enjoyable. |
| HM3 | Digital learning is entertaining |
| Health Issue | HI1 | Continuous use of computers in digital learning increase eyesight problem | Author |
| HI2 | Continuous use of computers in digital learning increase body muscles pain  |
| HI3 | Digital learning contributes in anxiety and mental stress |
| HI4 | Lack of physical movement in digital learning increases obesity level and other diseases |
| Digital self-efficacy | SE1 | Understand complex concepts of digital learning | (Shen et al. 2013) |
| SE2 | Willing to face challenges of digital learning |
| SE3 | Successfully complete all of the required digital activities |
| SE4 | Willingly adapt digital learning styles to meet course expectations |
| Perceived Risk | PR1 | I think using digital learning puts my privacy at risk. | (Chao 2019) |
| PR2 | Using digital learning exposes me to an overall risk |
| PR3 | Using digital learning will not fit well with my self-image |
| Digital Literacy | DL1 | I have adequate experience how to use computer | Author |
| DL2 | I have necessary knowledge how to efficiently use digital applications in my study tasks |
| DL3 | I have required skills how to efficiently deliver learning contents |
| DL4 | I have enough literacy how to efficiently use digital technologies to improve my performance |
| Social Isolation | SI1 | Digital learning use enhances social isolation among people | Author |
| SI2 | Digital learning use prevents people for socialization |
| SI3 | Digital learning use reduces people’s social life |
| Disruption | D1 | Digital learning at home generally disrupts by interaction of family members | Author |
| D2 | Pets distract the attention during digital learning at home |
| D3 | Electricity cuts interfere digital learning |
| D4 | Internet connection problem generally disrupts effective digital learning |
| Digital Learning Continuance Intention | CI1 | I intend to continue the digital learning in the future. | (Daʇhan and Akkoyunlu 2016) |
| CI2 | I will continue the use of digital learning in the future. |
| CI3 | I will regularly use digital learning in the future. |