# Assessing the Adoption of Learning Management Systems (LMS) in Higher Education Institutions (HEIs) of Sindh

*Ummama Khan* Zahid Memon** Ghazala Tunio***, Majida Khan*****

**Abstract**

*The study aims to explore the effect of all essential factors of the unified theory of acceptance and use of technology (UTAUT-2) to adopt Learning Management Systems (LMS) used among higher education institutes in Sindh. A quantitative research approach was used with a close-ended questionnaire to collect the data from higher education institutions faculty members and staff utilizing the learning management system (LMS) for educational purposes in different universities. There were 8 (eight) independent factors were taken for this study, i.e. performance expectancy, effort expectancy, social influence, facilitating condition, learning value, hedonic motivation, habit, and behavioural intention. One dependent variable was the adoption of a learning management system. All significance values of independent variables were observed to be less than 0.05 except for effort efficacy and hedonic motivation. This study helps to understand the LMS and its influence on the education system of Sindh and how it works efficiently for improvement and continuing the learning process according to the current situation of education systems. Further, this study will explore the legal platform for enhancing education in different institutions in Sindh, Pakistan.*

**Keywords:** ***UTAUT2; learning management system (LMS); electronic learning; higher education institutions.***

## INTRODUCTION

Thousands of software applications provide competitive advantages for human resources and continue the e-learning process such as LMS. It is also a software application for reporting, automation, administration, documentation and delivery of educational courses, training and

*Correspondence:*
** Research Scholar at MUISTD, MUET, Email: ummama_khan94@hotmail.com*
*** Professor at MUISTD Email: Zahid.memon@faculty.muet.edu.pk*
****Lecturer at MUISTD Email: ghazala.tunio@faculty.muet.edu.pk*
***** Professor at LUMS.*

development programs for human resources as we know that the first LMS was accepted in a higher education institution for providing education and gaining the competitive advantages of human resource and also their electronic management (E-HRM) (Muries & Masele, 2017). LMS is a beneficial application that allows students access to homework wherever through an internet connection each student must have a username and password the access their accounts and helps instructors instantly upload learning material (i.e., notes, assignments, lectures, activities) on time, while this allows to an administrator to collaborate and communicate with each other and save time and money on data storage. However, this can be possible just because of LMS, a tool of information technology for continuing the e-learning process (Muries, & Masele, 2017).

Currently, the usage of LMS focuses on the corporate market and also working for human resource management. For example, the LMS can cover the largest area of the learning system market. The developers designed the LMS to accomplish learning opportunities and focus on online learning delivery that's why it always acts as a platform for an online index which includes different courses and helps the human resource to enhance their skills and talent by using the internet. LMS also offer classroom management for human resource training like instructors, students, and administrations used in high education institutions (Muries, & Masele, 2017).

## LITERATURE REVIEW

Different theories explain technology adaptability and innovation acceptance in the information domain. For example, 'technology adoption model' (TAM) (Davis, 1989), the model of motivation (Davis et al., 1992), the job fit PC utilization model (Thompson, 1991), the diffusion of innovation theory (Rogers, 1996), the theory of planned behaviour (Taylor and Todd, 1995), positive expectations of the maximum outcome of social cognition theory (Compeau and Higgins, 1995), and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh, 2003) are the key contributions. These models have a limitation that needs to be avoided because the UTAUT model builds by combining these above models' constructs, which are mentioned in sequence. Theory of acceptance and use of technology UTAUT has four constructs, i.e. i) effort expectancy ii) facilitating condition iii) social influence and iv) performance expectancy. These describe the maximum percentage (70%) of the innovative technology adoption and its usage intention. The author argues that these four constructs are an essential variable of user adoption technology and its usage within different organizations (Muries & Masele, 2017).

## ADOPTION OF TECHNOLOGY

Different studies examined the factors and multiple processes influencing the adoption of information technology at different levels such as, organizational level and individual levels. Multiple new information technologies (IT) and innovations and LMS applications are part of those innovative technologies. This kind of application is useful and considered in technology acceptance and adoption. On the other side, researchers clarified the many factors helping and slowing down innovation adoption. According to the previous measurements of user acceptance, researchers found a clear difference between the organizational and individual levels, so the actual use of innovative technology required proper planning within organizations for the adoption (Muries & Masele, 2017). The results imply multiple factors which are affecting

on the intention of instructors to use LMS, this study found one characteristic on the individual level of adoption which is included as a control variable according to this study and voluntaries of the use of innovative technology within organizations (Balkaya & Akucuk, 2021).

### *Facilitating Condition (FC)*

The term facilitating factors is considered an individual's degree perceptions on which technical infrastructure and different organizations keep going to enhance systems use (Ghalandari, 2012). Specifically, the facilitating factors depend on the technical infrastructure and resources which are working as fuel for the use of innovative systems and enhance their performance. All these resources with technical and institutional infrastructure are increasing the use of LMS, and it is considered a hypothesis that positively enhances the usage of LMS (Ghalandari, 2012; Sumak, Hericko and Pusnik, 2011).

## ADOPTION OF LMS

In this study, the dependent variable is the adoption of LMS which will consider as the degree of long-term usage of the system (Lwoga and Kombi, 2015). According to an indicated result which was enhancing the human resource participation and checking the adoption of LMS. The author (Rasiamo and Mtebe, 2014) explained that the adoption of LMS increases the e-learning process's benefit and improves the e-learning environment. Many researchers used the unified theory of acceptance and use of technology (UTAUT2) for determining the different factors which are becoming reasons for stress on the usage of technology in various places. The behaviour intention is a dependent factor which is helping to find out how it is affected by the independent factors and becomes the authentic reason for adopting LMS in learning and teaching (Lwoga and Kombi, 2015).

### *Performance Expectancy (PE)*

The term performance expectancy is that which depends on individual perception, and it is used as a system to accomplish job performance. Besides the facts of previous model combinations and according to five factors which are helping to build a constant performance expectancy variable of perceived usefulness (i.e., technology adoption model) job fit, (i.e. utilization of model) competitive advantages (i.e. the theory of diffusion of innovation) positive expectations of maximum outcome (i.e. social cognition theory) and motivations externally (Ghalandari, 2012).

### *Effort Expectancy (EE)*

The term effort expectancy constantly measures the user's perceived usefulness and ease of learning and valuable services of e-learning. So many theories and different models define that maximum trouble-free technology is constantly increasing usage and adoption. Besides it is necessary to explain the complexity level of e-learning with the term degree which defines that technology is perceived as complicated to use and difficult to understand (Ahmad, Markkula and Oivo, 2012).

***Social Influence (SI)***

The term social influence is defining "the degree to which an individual perceives the significance and depends on others' perceptions and gives advice about the new system that he or wants to use the innovative system", According to the author, social influence is considered as user belief of importance when they want to use the e-learning services (Ahmad, Markkula, and Oivo, 2012).

***Learning Value (LV)***

Learning value is necessary for consumer benefits and technology cost with usage in higher education institutions. Consumers think that they are using technology by purchasing because they are willing to pay for that technology and they also have positive intentions for investment costs for the different technology (Venkatesh et al., 2012). The consumers taking benefits will affect intention to accept the cost of purchasing technology, and in this way, consumers enhanced their learning values which will be become a positive impact on consumers (teachers) towards the use of LMS. This is a massive advantage of the cost relationship which can be affected directly by the consumer's (teacher's) intention for using that technology. According to the consumer's point of view, good value for money can grip the price value of the concept, so the positive price value perception influences the use of technology by consumers (Venkatesh et al., 2012).

***Hedonic Motivation (HM)***

Different scholars think that the best experience of using technology can be determined by as individual hedonic motivation (Venkatesh et al., 2012). Enjoyment in using different techniques can be shown as their hedonic motivation in information systems research (Venkatesh et al., 2012). Thus, the current study explored that teachers of higher education institutions gain pleasure and fun through the use of LMS or its adoption which can be influenced by the use of a learning management system or its adoption with the positive intention of teachers (Brown and Venkatesh 2012).

***Habit***

Individuals' use of different technology is related to habits or automatic behaviours. It can also be defined as "prior experience results always related to a perceptual construct". According to the current period of time, the use of technology is now becoming habitual, which also shows consumers' positive intention towards using LMS, which is evocative of perfect learning action towards using LMS (Venkatesh et al., 2012). This action sequence might positively affect the situation, environment or organizations towards using LMS (Venkatesh et al., 2012). Most of the research, it showed that technology and its uses have now become critical habitual factors and are recognized as positive behavioural intentions of the consumers (teachers) on the use of LMS or its adoption (Venkatesh et al., 2012). Most of the researchers think that continuous use of LMS with its innovative and advanced features, assignments, courses, blogs, lectures, notes, contents, files, quizzes, and marks checking enhances teacher's behavioural intention positively towards LMS which will further increase the use of LMS in future (Venkatesh et al., 2012).

### *Behavioural Intension (BI)*

In the current study, consumers' intentions towards different technology for their own purposes and various tasks showed behavioural intention. In detail, individual users serve their precious time on particular behaviour which can be examined by behavioural intentions (Venkatesh et al., 2012). Researchers in multiple studies recognized that behavioural intention towards LMS and its use significantly impacts whole systems or organizations (Davis, 1989). While; in most of the research scholars predict that behavioural intention has a positive relationship with the use of LMS or the adoption of LMS by instructors or teachers according to their tasks which influences LMS usage within higher education institutions (Davis, 1989). Currently, higher educational institutions are steadily depended on LMS to effectively manage or handle the process of communication with students, instructors, and HRM because LMS can enhance the quality of education and permit technology-based learning in higher educational institutes. However, the success of LMS depends mainly on its acceptance by students, instructors and human resources. The main aim of this study is to include the all-important factors of the unified theory of acceptance and use of technology (UTAUT-2) to adopt LMS (Venkatesh et al., 2012).

## METHODOLOGY

In this research quantitative method is used to collect the data through questionnaires from the higher education institutes of Sindh and data have been analysed in IBM SPSS through multiple linear regression method. According to the unified theory of acceptance and use of technology model (UTAUT2) on the adoption of LMS usage in higher education institutes of Sindh which depends on eight factors, i.e. performance expectance, efforts expectancy, social influence, facilitating condition, learning value, hedonic motivation, habit and behavioural intention). Although the close-ended questionnaire was adopted with 30 questions for a total of 9 variables, it has been measured by a 5-point Likert scale (Venkatesh et al., 2012). The closed-ended questionnaire was sent among 150 faculty members and staff; maximum of 105 completed responses were obtained, so the responding rate remained at 70%. In the case of questionnaires, it was assured, and the missing values and errors were checked by applying the data's normality. Hence, the data was found to be normally distributed, and all the assumption of linear regression was checked before analysing of data then all these nine variables were analysed by using IBM SPSS.

### *RESEARCH HYPOTHESES:*

***H1:*** There is a significant relationship between performance expectancy and LMS usage in higher education institutes.

***H2:*** There is a relationship between effort expectancy and LMS usage in higher education institutes.

***H3:*** There is a significant relationship between social influence and LMS usage in higher education institutes.

***H4:*** There is a relationship between facilitating and LMS usage in higher education institutes.

***H5:*** There is a significant relationship between learning value and LMS usage in higher education institutes.

***H6:*** There is a relationship between hedonic Motivation and LMS usage in higher education institutes.

***H7:*** There is a significant relationship between habit and LMS usage in higher education institutes.

***H8:*** There is a relationship between behavioural intention and LMS usage in higher education institutes.

***Conceptual Framework:***

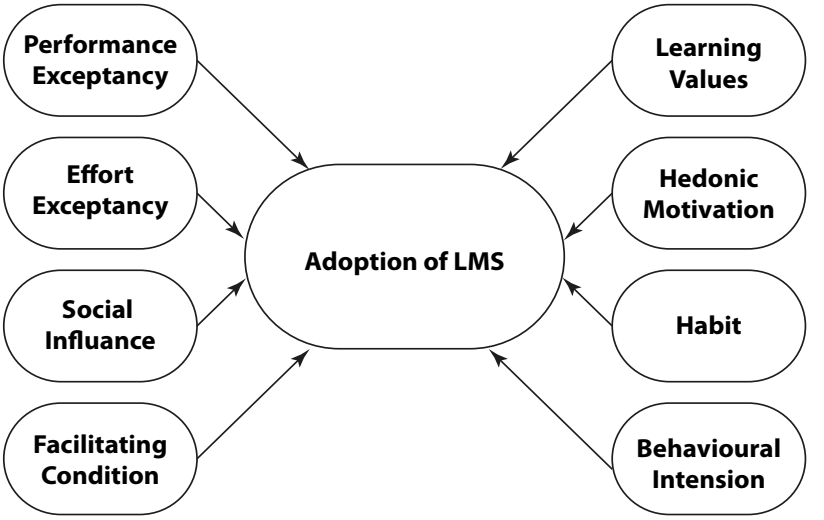


**Figure 1:** *Conceptual Framework*
*Source: (Venkatesh et al., 2003; Muries and Masele, 2017)*

## RESULTS AND DISCUSSION

### *Reliability Analysis*

As per reliability testing, the overall reliability of all variables is .913, also called combined. The reliability values between 0.7 and 0.8 of Cronbach's alpha are acceptable consistency values. So, all the values of variables are within the range except the facility condition which had a reliability of 0.680.

**Table 1:** *Reliability Analysis*

| Variables | Cronbach's Alpha | N of Items |
|---|---|---|
| Performance | .811 | 3 |
| Effort Efficacy | .732 | 3 |
| Social Influence | .858 | 3 |
| Facility Condition | .680 | 3 |
| Learning Value | .794 | 4 |
| Hedonic Motivation | .848 | 3 |
| Habit | .807 | 3 |
| Behavioural Intention | .730 | 3 |
| Adoption of LMS | .822 | 5 |

**Table 2:** *Model Fit of Dependent Variable*

| Model | R | R Square | Adjusted R Square | Durbin-Watson |
|---|---|---|---|---|
| 1 | .747[a] | .558 | .525 | 2.109 |

a. Predictors: (Constant), Behavioural Intention, Social Influence, Facility Condition, Performance, Effort Efficacy, Learning Value, Hedonic Motivation, Habit

b. Dependent Variable: Adoption

Table 2 shows the value of R-square which is known to be the coefficient of determination is 55.8% which is acceptable for the model. Cohen (1988) suggested $R^2$ values for endogenous latent variables (dependent variable) are assessed as follows: 0.26 (substantial), 0.13 (moderate), 0.02 (weak). Moreover, 55.8% of the total variation in adopting LMS is defined by the independent variables as defined by R-Square values. As a matter of thumb, Durbin-Watson values in the 1.5 to 2.5 range are considered problematic. Values other than this range may be dangerous (Hair, 2006). Durbin-Watson in this study is 2.125, which is within the normal range.

**Table 3:** *Significance Value*

| Model | Unstandardized B | Coefficients Std. Error | Sig. |
|---|---|---|---|
| (Constant) | .849 | .392 | .033 |
| Performance | .043 | .085 | .017 |
| Effort Efficacy | -.154 | .096 | .111 |
| Social Influence | .306 | .073 | .000 |
| Facility Condition | .064 | .087 | .001 |
| Learning Value | .056 | .114 | .003 |
| Hedonic Motivation | .002 | .100 | .987 |
| Habit | .205 | .097 | .036 |
| Behavioural Intention | .267 | .105 | .001 |

When the significance value is less than 0.05 hypothesis is supposed to be accepted and when the significance value is greater than 0.05 hypothesis is supposed to be rejected. Table 3 indicates all values of significantly less than 0.05 except two variables: effort efficacy and hedonic motivation. Hence it can be concluded that the performance variable has a value of 0.17 which is less than 0.05. So, there is a significant relationship between performance expectations and LMS usage in higher education institutes. Further, effort efficacy has a value of 0.111, meaning there is no relationship between effort expectancy and LMS usage in higher education institutes. Additionally, social influence has a significance value of 0.00, meaning there is a significant relationship between social influence and LMS usage in higher education institutes. Facility condition has a significance value of 0.001 which is less than 0.05, meaning there is a relationship between facilitating and LMS usage in higher education institutes. The learning value has a significance value of 0.003 which is less than 0.05, meaning there is a significant relationship between learning value and LMS usage. Likewise, hedonic motivation has a significance value of 0.987 which is greater than 0.05, however, implies no relationship between hedonic motivation and LMS usage in higher education institutes. Habit has a significance value of 0.36 which is less than 0.05 leading to a decision that there is a significant relationship between habit and LMS usage in higher education institutes. The behavioural intention has a significance value of 0.001 which is less than 0.05 means there is a relationship

between behavioural intention and LMS usage in higher education institutes. The β values of performance expectancy, effort expectancy, social influence, facilitating condition, learning value, hedonic motivation, habit, and behavioural intension are in positive figures which are 0.849, 0.043, 0.154, 0.254, 0.306, 0.064, 0.056, 0.002, 0.205, and 0.267 respectively and they have a positive effect over the adoption of LMS.

**Table 4:** *Tolerance and VIF**

| (Constant) | Tolerance | VIF |
|---|---|---|
| Performance | .602 | 1.662 |
| Effort Efficacy | .493 | 2.030 |
| Social Influence | .549 | 1.823 |
| Facility Condition | .529 | 1.890 |
| Learning Value | .409 | 2.444 |
| Hedonic Motivation | .346 | 2.886 |
| Habit | .310 | 3.225 |
| Behavioural Intention | .438 | 2.283 |

* Collinearity Statistics

Table 4 shows tolerance and VIF values are given which are perfect for the model of (UTAUT2). All the separate variables having different values of tolerance and VIF like performance tolerance (.602) and VIF is (1.662), effort efficiency tolerance is (.493) and VIF is (2.030), social influence tolerance (.549) and VIF is (1.823), facility condition tolerance (.529) and VIF is (1.890), learning values tolerance (.409) and VIF is (2.444), hedonic motivation tolerance (.346) and VIF is (2.886), habit tolerance (.310) and VIF is (3.225) and last behavioural intension tolerance (.438) and VIF is (2.283) showing that data is normal. A value of variance inflation factors greater than 10 indicates multi-collinearity is present and the assumption is violated if it is less than 10 then there is no correlation. All VIFs should be between 1 and 10 and Tolerance should be > 0.25 (Hair et al., 1995). All VIFs are within the range, and in the Tolerance section accessibility and customer perception are not within the range.

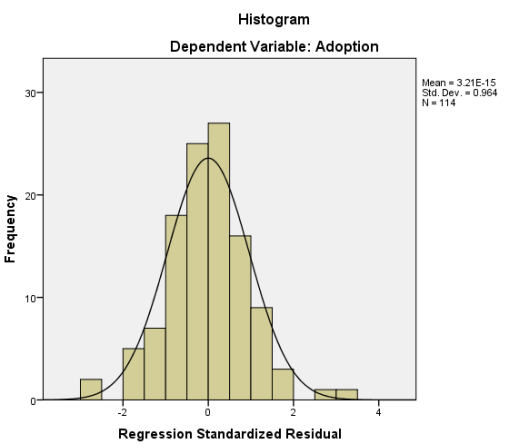


**Figure 2.** *Histogram of standardized Residuals*

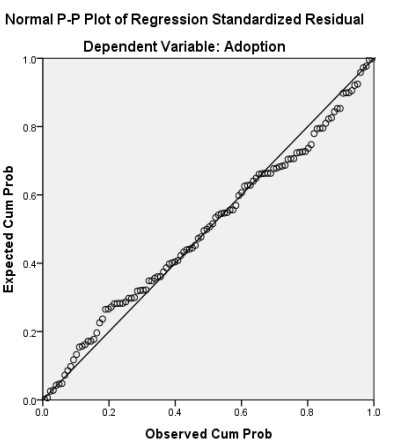


**Figure 3.** *Normal P-Plot of regression*

### *HISTOGRAM REGRESSION CHART*

The normality can be tested through various tests; however, graphical testing of the normality of data is done with a Histogram and P-p plot. The histogram is the bell-shaped curve pattern that shows the normal distribution of data with a good fit of the model, and it also shows that the adoption of LMS (dependent variable) is a good fit for the model.

### *P-P PLOT REGRESSION CHART*

While in the P-p Plot, the data points are closer to the diagonal line showing that data are normally distributed in the chart (Julie Pallant, 2013).

## CONCLUSION

The unified theory of acceptance and use of technology model (UTAUT2) framework is used with the constructs in this study. This study explores and assesses the adoption of LMS in higher education institutes of Sindh and the novelty of the study is that UTAUT-2 Model developed was loped in 2003. As the Covid-19 Pandemic situation is changed drastically, scholars still check whether the model is applicable, especially in Sindh. Additionally, this study calls attention to the various angle or aspects of the Learning Management System (LMS) that will work for the successful adoption of LMS. Currently, higher educational institutes are steadily depending on Learning Management Systems (LMS) to effectively manage or handle the process of communication with students, instructors, and HRM because Learning Management Systems (LMS) can enhance the quality of education and permit technology-based learning in higher educational institutes. But, the success of Learning Management Systems (LMS) depends mostly on their acceptance by students, instructors and HR. The main aim of this study is to include the all-important factors of a unified theory of acceptance and use of technology (UTAUT-2) and then compare the behavioral intention of instructors to adopt Learning Management Systems (LMS) (Venkatesh et al., 2012). The gap of this study is highlighted as the construct's price value will be excluded and learning value will be added for the perceived value of adopting Learning Management Systems (LMS) in higher education institutes of Sindh. The extended constructs of the framework were validated according to the Learning Management Systems (LMS) context. This study shows a perfect model because of their excellent measurements of his framework and explained the hypothesis relationships while in this study UTAUT2 model framework is used with the constructs. According to the UTAUT2 model, this study investigated and assessed the adoption of Learning Management Systems (LMS) in higher education institutes of Sindh. And the statistical results showed that all hypotheses are supported except just two. While the β values of performance expectancy, effort expectancy, social influence, facilitating condition, learning value, hedonic motivation, habit and behavioral intention have positive effects on adopting Learning Management Systems (LMS).

## REFERENCES

Ahmad, M. O., Markkula, J., & Oivo, M. (2012). Factors influencing the adoption of e-government services in Pakistan. In European, Mediterranean & Middle Eastern conference on information systems 9 pp. 118-133).

Balkaya, S., & Akkucuk, U. (2021). Adoption and use of learning management systems in education: The role of playfulness and self-management. *Sustainability, 13*(3), 1127. https://doi.org/10.3390/su13031127

Compeau, D., and Higgins, C. (1995a). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly, 19*(2): 189-211. https://doi.org/10.2307/249688

Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Compeau, D., and Higgins, C. (1995b). Application of social cognitive theory to training for computer skills. *Information Systems Research, 6*(2): 118 -143. https://doi.org/10.1287/isre.6.2.118

Davis F, D., Bagozzi, Paul, R., and Warshaw. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science, 35* (8) pp. 982-1003. https://doi.org/10.1287/mnsc.35.8.982

Davis, F., R. Bagozzi., and P, Warshaw. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology, 22*(14):1111-1132. https://doi.org/10.1111/j.1559-1816.1992.tb00945.x

Ghalandari, K. (2012). The Effect of Performance Expectancy, Effort Expectancy, Social Influence and facilitating Conditions on Acceptance of E-Banking Services in Iran: The Moderating Role of Age and Gender. *Middle-East Journal of Scientific Research, 12*(6), pp. 801–807. https://doi.org/10.5829/idosi.mejsr.2012.12.6.2536

Hair, J., Black, W., Babin, B., Anderson, R., & Tatham, R. (2006). Multivariate Data Analysis (6th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Hair, J. F. Jr., Anderson, R. E., Tatham, R. L. & Black, W. C. (1995). Multivariate Data Analysis (3rd ed). New York: Macmillan.

Lwoga, E. T. (2014). Critical success factors for adoption of web-based learning management systems in Tanzania. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT), 10*(1), pp. 4–21.

Lwoga, E. T., & Komba, M. (2015). Antecedents of continued usage intentions of web-based learning management system in Tanzania, *Education & Training, 57*(7). pp. 738–756. https://doi.org/10.1108/ET-02-2014-0014

Muries, B., & Masele, J.J. (2017). Explaining electronic learning management systems (elms) continued usage intentions among facilitators in higher education institutions (HEIs) in Tanzania. *International Journal of Education and Development Using Information and Communication Technology, 13*(1), 123-141.

Rogers, E. 1995. 'Diffusion of Innovation (3rd ed.) '. Free Press, New York.

Šumak, B., Heričko, M., & Pušnik, M. (2011). A meta-analysis of e-learning technology acceptance: The role of user types and e-learning technology types. *Computers in human behaviour, 27*(6), 2067-2077. https://doi.org/10.1016/j.chb.2011.08.005

Taylor, S., & P, Todd. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research, 6*(2): 144-176. https://doi.org/10.1287/isre.6.2.144

Thompson, R., C. Higgins., and J. Howell. (1991). Personal computing: toward a conceptual model of utilization. *MIS Quarterly, 15*(1): 125-143. https://doi.org/10.2307/249443

Venkatesh, V., & Davis, F. D. 2000. A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science, vol. 46*, no.2, pp.186–204. https://doi.org/10.1287/mnsc.46.2.186.11926

Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly: 27*(3): 425-478. https://doi.org/10.2307/30036540

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly, 36*(1), 157–178. https://doi.org/10.2307/41410412