

IOP Conference Series: Materials Science and Engineering

PAPER • **OPEN ACCESS**

Students' Continuance of Using E-Learning System: A Review of Conceptual Frameworks

To cite this article: N S A Rahman *et al* 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **769** 012044

View the [article online](#) for updates and enhancements.

Students' Continuance of Using E-Learning System: A Review of Conceptual Frameworks

N S A Rahman¹, A N Rosman¹ and N A Sahabudin¹

¹Faculty of Computing
Universiti Malaysia Pahang
26300 Kuantan, Pahang, Malaysia

shamsiah@ump.edu.my

Abstract. This research presented a review of conceptual framework regarded to find the factors of students' continued use of online learning system. The outcomes were reported according to a systematic review on the recent research articles (from 2013 until 2019) related with continued use of e-Learning system. From review of theoretical models and related theories we recommend to use Unified Theory of Acceptance and Use of Technology (UTAUT) to measure students' intention to continued use of e-learning system. The discussion of this research obtained revealed that the most common factors influence students' intention to continued use e-learning are performance expectancy, effort expectancy, social, self-efficacy, perceived usefulness and behavioral intention to continued use.

1. Introduction

E-learning is important in the educational process nowadays, that information and also communication technology is used to distribute learning content. For the management of studies, communication between students and teachers is important. Although students used E-learning to complete their task and for studying, they tend to face success and also the failure of understanding the online instruction. This may be related to student motivation, lecturer need to take part to stimulate the students to explain how the online environment may be used and study groups need to be built and always be aware of student's anxiety in using E-learning which might affect them in a negatively [1].

In universities nowadays, E-learning was found been used as an essence tool for learning management system. E-learning provides students an interactive web-based platform to perform exercises and other education activities [1]. The important thing to use E-learning in higher education is the level of satisfaction of the students towards online learning activity is paramount for efficient and for understanding its efficiency. The satisfaction of students is identified in terms of environment, it can be said that many factor affecting during face to face and online learning will determine the effect [2]. From previous research, E-learning was growing significantly due to the importance and implementation of E-learning at all universities all over the world. Despite the popularity of E-learning at universities level, there is a very low research paper on student continued usage interaction in E-learning in Malaysia [3]. Although many research on E-learning was done all over the world, the antecedents which affecting the use of E-learning in learning institution need to investigate due to the different way of implementation such as instructor teaching style and E-learning support [4, 5]. Some of the research considers whether countries work well on cross-border issues such as challenges and successfulness of



E-learning implementation [5]. The usage of E-learning had their own factors that affect students' success in using E-learning [6] and student level of satisfaction for efficient design [2].

Another study highlighted the needs of motivation to play as important role in ensuring effective use of E-learning. A student is motivated to strongly involve to explore and try a new system that will give them benefits [7]. In addition, the UTAUT model was applied to explain E-learning adoption which can assist in understanding behavioural intention to use E-learning. Preliminary works were conducted using survey on universities students to assess the application of UTAUT in E-learning [5]. Therefore, this research will discuss the detail of previous work done by other researchers to identify the factor of continued used E-learning. The following sections describes E-Learning, discussion of related theories and models, discussion of related work done by previous researchers and finally discussion of conclusion and future work.

2. E-Learning

E-learning in Malaysia is growing significantly from years to years due to the improvement in technologies. Universities in Malaysia implement E-learning in their education system for keeping up with technology development. E-learning is accepted due to the capability to connect students and teachers in education [5]. There are trends on implementation of E-learning in Malaysia which are learning management system (LMS), E-learning policy, E-learning governance, E-learning training and integration into teaching and learning [8]. From the recent research of E-learning in Malaysia at Universities Technology Malaysia (UTM), the Centre of Teaching and Learning (CTL) provide various educational supported based on courses in E-learning. Important feature of CTL is effectiveness than traditional computer-based [9]. Besides the implementation of E-learning in UTM, other universities in Malaysia also implement E-learning in their education whether IPTA or IPTS. There is research that show 20 public universities, seven private universities and three polytechnics that implement E-learning in their education [10]. University Malaysia Pahang (UMP) is one of 20 public universities that use E-learning in their education. UMP has implemented open source LMS in their education which is Moodle that is known and widely used because it is free and east to modify.

In the past two years, the use of E-learning was increased. E-learning also had been used as essential tool for learning management system through universities. Students used E-learning as a tool to conduct interactive web-based exercises [1]. This was supported by Embi [10] who found that most of the students' access E-learning based on course that they are taking daily and most of them can access their E-learning easily and everywhere either from computer laboratory, their hostel and their home. The important thing to use E-learning in higher education is the level of satisfaction of the students towards online learning activity is paramount for efficient and for understanding its efficiency. The satisfaction of students is identified in terms of environment, it can be said that many factor affecting during face to face and online learning will determine the effect [2].

3. Theoretical Model

The UTAUT is well-known as one of the common technology acceptance theories which derived bases of the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), Diffusion of Innovations (DOI) and Theory of Planned Behaviour (TPB) [11, 12]. The UTAUT model in Figure 1 explains the intent to continue usage behaviour of the user and use an Information system (IS). The theory has four key that direct determiners of usage intention and behaviour of the user. These include the performance expectancy, effort expectancy, social influence, and facilitating conditions [3, 11]. The UTAUT model also theorized experience, age, voluntariness and gender in the constructs list of the four key on the behavior of the user as moderators of the impact [12, 13, 14].

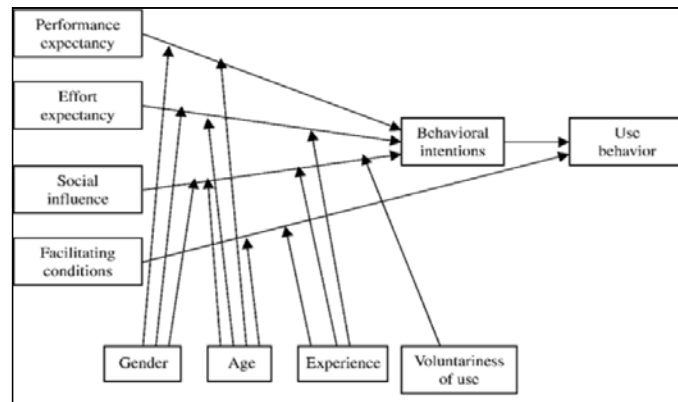


Figure 1. UTAUT [14]

Performance expectancy (PE) is defined where the system provides benefits in using of E-learning system to the user in performing their assignment or learning task. For effort expectancy (EE) is defined as a degree that easy to associate with the user in using E-learning. Social influence (SI) is defined as the extent which individual perceive for others to believe the importance of use in E-learning system [15].

Besides Technology Acceptance Model (TAM), UTAUT included social element which considered an important element in the learning environment. The advantages in today's society are the use of social networks and online communication that show significant social component [12, 16]. Although TAM acceptance theory in E-learning is used the most in other research, their result shows that literature in the field of E-learning and the acceptance theories other than TAM based on previous studies. The UTAUT model explains more on individual acceptance by using four moderators including age, gender, voluntariness and experience [11]. Some of the research paper used the UTAUT model as it seems reasonable to be used to study continued used of E-learning. These arguments lead us that UTAUT is a suitable and appropriate theory for this research [12, 17].

3.1. Related Prior Research

In this research, ten articles comprising journals and conference proceedings obtained from relevant databases between from 2013 until 2019 were used to review the previous frameworks used in prior research related to continued use intention in using e-learning. This section will discuss four frameworks related to the current research as follows:

Lin et al. [18] conducted a study towards using e-learning systems by extending of UTAUT. The study's goal was to centers around the level of correspondence between showing styles and perceived learning of students, which the aim and use of e-learning frameworks will legitimately direct together. Figure 2 represents the Education Behavioral Intention (EduBIM) model proposed by researchers of this study. The study enriches the determinants from UTAUT by coordinating intellectual individual contrasts to integrate the impacts of demographic moderators.

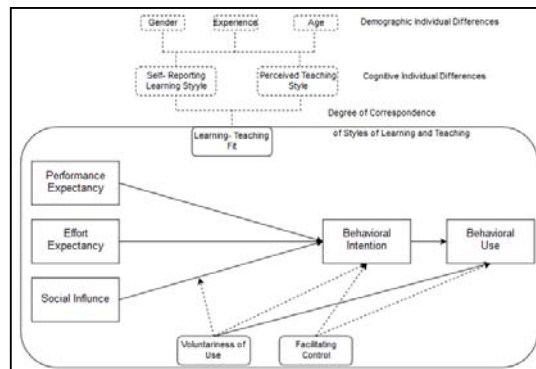


Figure 2. Education Behavioural Intention Model [18]

Zawaideh [3] in an article conducted a case study at one of Malaysian institution by proposing an acceptance model for e-learning services. The researcher recognized antecedents in clarifying the practice of e-learning situations among students’ in that institution by using UTAUT model as shown in Figure 3. The investigation uncovered, performance expectancy, facilitating conditions, effort expectancy, social factors, cultural, behavioral intention, and user behavior as the variables that impact availability of students in Malaysia to utilize e-Learning regarding its degree.

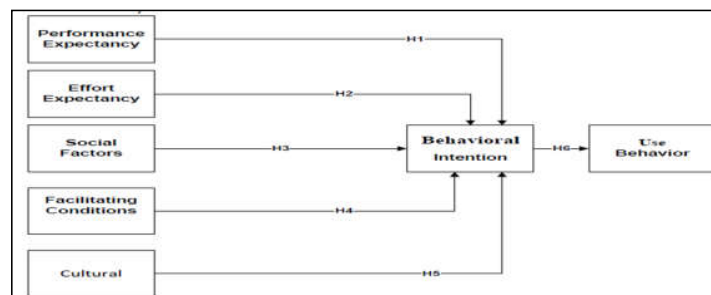


Figure 3. Research Framework [3]

Decman [12] carried out an investigation on the influences of previous education and gender by modeling the e-learning acceptance in higher education mandatory environments. The investigation’s aimed to conduct a survey to assess the suitability of UTAUT inside a particular required e-learning condition in higher education. A model was constructed (see Figure 4) comprising fundamental determinants from UTAUT including social influence, effort expectancy, performance expectancy and behavioral intention. The investigation also looks forward on the other moderating factors including students’ past education and gender in the displayed structure.

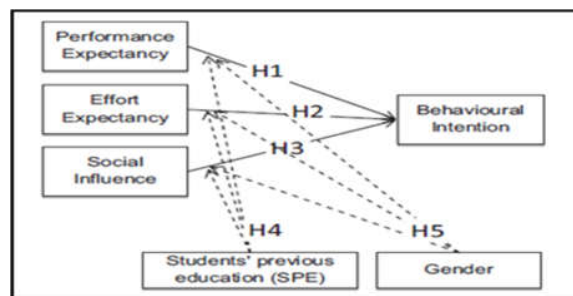


Figure 4. Adapted UTAUT model [12]

Bellaaj et al. [15] performed an empirical investigation on continuance using e-learning at University of Tabuk. The research built up a model (see Figure 5) in light of certain factors in the UTAUT. The discoveries uncover that performance expectancy, and effort expectancy decide the intention of continued use of e-learning system. Moreover, the examination likewise uncovered that with more grounded Internet experience, the impact of performance expectancy increases, and the influence of effort expectancy decreases. In the mean time, the impact of social influence on intention of continued use is seems to be more grounded for ladies than for men.

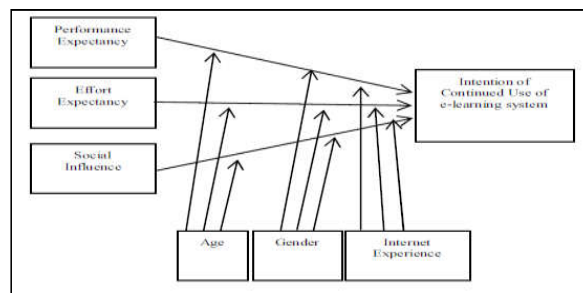


Figure 5. Research Framework [15]

4. Related Works

This section summarizes about the theory on frameworks details used in prior research works. From previous studies (see Table I), there are several theories were used such as TAM, UTAUT, CFS, ELRS SS and MSLQ. From the review, it was found that the numerous investigations were based on TAM and UTAUT. TAM appears to be heavily applied in technology acceptance research attributed to its simplicity and understandability [19] and credited to its power of explanatory for key factors which have significant effects on the acceptance of user and information system and technology adoption.

From Table 1, four out of ten research papers used the UTAUT model. The research of Zawaideh [3] focusing on some factors which are performance expectancy, social factor of cultural conditions that affect students to implement the ease of use E-Learning for education. According to Bellaaj et al. [15], the result shows that the critical factor is the effort expectancy and performance expectancy that determines the continued used of e-learning. The factor toward the social environment in e-learning implementation is stressing on performance expectancy [12]. For Ibrahim et al. [5], the study focuses that self-efficacy, perceived ease of use and intention use of e-learning is the critical factors that affect students' continuance of using e-learning for their education.

There are some common factors in continued used of E-learning that influence students. The most found to be key determinant factors are effort expectancy, social, performance expectancy [3, 8, 12, 15, 18], self-efficacy [2, 5, 8, 20], behavioural intention [12, 18, 20] and perceived usefulness [5, 8, 20]. In other word, these factors have significant positive effect towards student to use E-learning.

In this study, ten academic articles comprising of journal articles and conference proceeding articles were obtained from research databases related to this field, to assess the research thoroughly for the most influential factors on students' continuance of using e-Learning system. The result of such review led to a classification of identified variables about influential factors as illustrated in Table 2.

According to prior studies, Table 2 shows the most frequently referred influential factors that affect continued use. The most frequently introduced variables are performance expectancy [3, 12, 15, 18], social [3 12, 15, 18], self-efficacy [2, 5, 8, 20], effort expectancy [3, 12, 15, 18], perceived usefulness [5, 8, 20], behavioural intention [12, 18, 20, 22], perceived ease of use [5, 20], characteristics [5, 6] and motivation [2, 21].

Table 1. Related Work by Prior Research

No.	Author	Aim	Theory	Factors
1.	Alhabeeb & Rowley [6]	To compare the different of students and academic staff perspectives.	CSFs	Ease of access, characteristics, support and training, technology infrastructure and experience of the system
2.	Zawaideh [3]	To identify factors in interpreting e-learning environments among students in higher education.	UTAUT	Cultural, social, performance expectancy, effort expectancy and facilitating conditions.
3.	Ibrahim et al. [5]	To investigate the acceptance of e-learning among university students.	TAM	Characteristics, perceived usefulness, self-efficacy, perceived ease of use, course design and intention to use.
4.	Yilmaz [2]	To examine how far the level of students' readiness will impact students' motivation and satisfaction in using E-learning.	ELRS SS MSLQ	Motivation, learner control, self-direct learning and self-efficacy.
5.	Noesgaard & Omgreen [21]	To investigate the capabilities of E-learning by using an integrative review	Integrative Review	Interaction, motivation, experience and practice.
6.	Decman [12]	To evaluate and assess the appropriateness of UTAUT model	UTAUT	Social influence, performance expectancy, effort expectancy and behavioural intention.
7.	Bellaaj et al. [15]	To focus on virtual learning system for student continued use	UTAUT	Social influence, effort expectancy, performance expectancy and intention of continued use.
8.	Al-rahmi et al. [8]	To find the influential determinants that affecting E-learning in evaluating the effectiveness of E-learning.	TAM	Perceived usefulness, intention to use e-learning, satisfaction, effectiveness, self-efficacy, learner interface and learning community.
9.	Findik & Ozkan [20]	To understand higher education of behavioral intentions instructors towards Learning Management Systems (LMS)	TAM	Subjective norm, perceived usefulness, technological complexity, perceived ease of use, self-efficacy and behavioural intention
10.	Lin et al. [18]	To investigates explanatory models for adopting technologies	UTAUT	Behavioural intention, effort expectancy, performance expectancy, social influence and behavioural use.

Table 2. Summary of Most Frequently Referred Variables

Factors	Alhabeeb & Rowley [6]	Zawaideh [3]	Ibrahim et al. [5]	Yilmaz [2]	Noesgaard & Omgreen [21]	Decman [12]	Bellaaj et al. [15]	Al-rahmi et al. [8]	Findik & Ozkan [20]	Lin et al. [18]
Characteristic (CH)	√		√							
Ease of access (EOA)	√									
Support and training (ST)	√									
Technology infrastructure (TI)	√									
Experience of system (EOS)	√									
Performance expectancy (PE)		√				√	√			√
Social (SC)		√				√	√			√
Self-efficacy (SE)			√	√				√	√	
Facilitating Conditions (FC)		√								
Effort expectancy (EE)		√				√	√			√
Course Design (CD)			√							
Intention to use (IU)			√							
Perceived usefulness (PU)			√					√	√	
Perceived ease of use (PEOU)			√						√	
Self direct learning (SDL)				√						
Learner control (LC)				√						
Motivation (M)				√	√					
Interaction (IN)					√					
Experience (EX)					√					
Practice (PR)					√					
Behavioural Intention (BI)						√			√	√
Technological complexity (TC)									√	
Subjective Norm (SN)									√	

Factors	Alhabeeb & Rowley [6]	Zawaideh [3]	Ibrahim et al. [5]	Yilmaz [2]	Noesgaard & Orngreen [21]	Dečman [12]	Bellaaj et al. [15]	Al-rahmi et al. [8]	Findik & Özkan [20]	Lin et al. [18]
Behavioural use (BU)										✓
Learner interface (LI)								✓		
Learning community (LCM)								✓		
Satisfaction (S)								✓		
Effectiveness (E)								✓		

5. Conclusion and Future Work

This paper critically examines the factors that influence students' continued use E-learning system by presenting the results on review of ten related articles retrieved from relevant databases between from 2013 until 2019. From the review, our results reveal that the most frequently referred influential factors that affect students' continuance of using E-learning system are performance expectancy, social, self-efficacy, effort expectancy, behavioural intention and perceived usefulness. Notwithstanding these limitations, it is suggested to have future exploration from other sources in investigating and identifying other factors. It is suggested, more research is needed to consider the use of theoretical and methodological approaches such as structural equation modeling in order to examine the students' continuance intention is investigated in future studies.

6. Acknowledgement

This research was fully funded by Universiti Malaysia Pahang, grant number RDU1803147.

References

- [1] M Samir, A El-Seoud, I A T F Taj-Eddin, N Seddiek, M M El-Khouly, A Nosseir 2009 E-Learning and students' motivation: A research study on the effect of E-learning on higher education 20–26
- [2] R Yilmaz 2017 Exploring the role of e-learning readiness on student satisfaction and motivation in flipped classroom *Computers in Human Behavior* **70** 251–260
- [3] F H Zawaideh 2018 Acceptance Model for e-Learning Services: A Case Study at Al-Madinah International University in Malaysia *International Journal of Academic Research in Accounting, Finance and Management Sciences* **7** 14–20
- [4] R Cheung, D Vogel 2013 Predicting user acceptance of collaborative technologies: An extension of the technology acceptance model for e-learning *Computers & Education* **53** 160-175
- [5] R Ibrahim, N S Leng, R C M Yusoff, G N Samy, S Masrom, Z I Rizman 2017 E-Learning acceptance based on Technology Acceptance Model (TAM) *Journal of Fundamental and Applied Sciences* **9** 871-889
- [6] A Alhabeeb, J Rowley 2018 E-learning critical success factors: Comparing perspectives from academic staff and students *Computers and Education* **127** 1–12
- [7] S R Harandi 2015 Effects of e-learning on Students' Motivation *Procedia - Social and Behavioral Sciences* **181** 423–430
- [8] W M Al-rahmi, M S Othman, L M Yusuf 2015 The Effectiveness of Using E-Learning in Malaysian Higher Education: A Case Study Universiti Teknologi Malaysia *Mediterranean Journal of Social Sciences* **6** 625–637
- [9] W M Al-Rahmi, A A Saged, O Alfarraj, M S Othman, A I Alzahrani, N Alias, N S A Rahman 2018 Use of E-Learning by University Students in Malaysian Higher Educational Institutions: A Case in Universiti Teknologi Malaysia *IEEE Access* **6** 14268–14276
- [10] M A Embi 2011 E-Learning in Malaysian Institutions of Higher Learning: Status, Trends and Challenges Mohamed Amin Embi Universiti Kebangsaan Malaysia (November) 14–15

- [11] V Venkatesh, M G Morris, G B Davis, F D Davis 2003 User Acceptance of Information Technology: Toward a Unified View *MIS Quarterly* **27** 425-478
- [12] M Decman 2015 Modeling the acceptance of e-learning in mandatory environments of higher education: The influence of previous education and gender *Computers in Human Behavior* **49** 272–281
- [13] S Pahnla, M Siponen, X Zheng 2011 Integrating habit into UTAUT: The Chinese eBay case *Pacific Asia Journal of the Association for Information Systems* **3** 2
- [14] V Venkatesh, J Y Thong, X Xu 2012 Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology *MIS quarterly* **36** 157-178
- [15] M Bellaaj, I Zekri, M Albugami 2015 The continued use of e-learning system: An empirical investigation using UTAUT model at the University of Tabuk *Journal of Theoretical and Applied Information Technology* **72** 464–474
- [16] R P Bagozzi 2007 The legacy of the technology acceptance model and a proposal for a paradigm shift *Journal of the Association for Information Systems* **8** 4
- [17] B Sumak, G Polancic, M Hericko 2010 An empirical study of virtual learning environment adoption using UTAUT *Second International Conference on Mobile, Hybrid, and On-Line Learning* 17-22
- [18] P C Lin, H K Lu, S C Liu 2013 Towards an education behavioral intention model for e-learning systems: An extension of UTAUT *Journal of Theoretical and Applied Information Technology* **47** 1200–1207
- [19] P Legris, J Ingham, P Collette 2003 Why do people use information technology? A critical review of the technology acceptance model *Information & Management* **40** 191–204
- [20] C D Findik, S Ozkan 2013 A model for instructors' adoption of learning management systems: Empirical Validation in higher education context *Turkish Online Journal of Educational Technology* **12** 13–25
- [21] S S Noesgaard, R Orngreen 2015 The effectiveness of e-learning: An explorative and integrative review of the definitions, methodologies and factors that promote e-Learning effectiveness *Electronic Journal of E-Learning* **13** 278–290
- [22] M A Al-Shara, M E Mufadhal, N A Sahabudin, R A Arshah 2019 Acceptance of online social networks as technology-based education tools among higher institution students: Structural equation modeling approach *Scientia Iranica* **26** 136-144