

The Effectiveness of Using E-Learning in Malaysian Higher Education: A Case Study Universiti Teknologi Malaysia

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Abstract

E-Learning is a fairly recent word used to define a form of learning that can be performed via websites online learning. The impact of contingent factors on the relationship between six predictors and e-learning effectiveness was investigated. The development and implementation of e-learning today has become an important phases in university. This study is centered on evaluating the e-learning effectiveness in UTM. And in this study, the critical factors affecting e-learning effectiveness were investigated through a survey conducted on students as participants. A total of 268 Universiti Teknologi Malaysia (UTM) (undergraduate students) students were used in the survey. Several factors have been found to correlate with e-learning effectiveness which includes self-efficacy, interface, community, usefulness, students' satisfaction and intention to use e-learning. The results show that e-learning use positively and significantly related to students' satisfaction, usefulness that is impact intention to use in turn affect e-learning effectiveness.

Keywords: E-Learning, E-learning Effectiveness, Higher Education.

1. Introduction

Electronic learning or e-learning is a term used to describe the action of acquiring knowledge through computer network based environments. In the last decade, the development and implementation of e-learning have become a requirement for academic institution. That is because of the advantages eLearning brings to universities. As outlined by (Rudy, 2007), some of these advantages are lack of dependence on the time constraints, ability to ask questions without shyness and access of materials from anywhere. In the last decade, universities have allocated tremendous resources for the development and implementation of online learning (Rudy, 2007). Additionally, it is crucial to support such implementation with an analysis of usage and satisfaction studies from perspective of students the ultimate client of learning management system (Lonn, 2009). In literature, several factors have been found to correlate with student's satisfaction with learning management system (LMS). Some of these factors are course content (Hassan, 2007), perceived usefulness (Sun, et al,2008), communication quality and knowledge transmission (Lonn, 2009), as well as student self-efficacy, previous achievements and computer literacy (Shu-Sheng,2008). Nevertheless, evaluating students' satisfaction toward e-learning required multidisciplinary approach to address the personal attitudes with respect to LMS (Wang,2003). Wang,(2003), proposed to utilize e-learning interface, content, community feedback, personalization functions to assess students satisfaction. And (Shu-Sheng, 2008) proposed to used Perceived usefulness and Self-efficacy. Universiti Teknologi Malaysia (UTM) provides its students an online learning environment powered by Moodle (Wang, 2003). Lecturers have the ability to add lecture notes, assignments, are projects. As for students, they are provided the tools to download submit assignments and communicate with lecturers and other students.

However, it is not clear whether students are satisfied with current system functionalities and content or not. Besides that, is not clear what function makes student satisfied. Generally, student satisfaction in e-Learning environment is influenced by several things. They can be divided into six categories: student, teacher, course, technology, system design, and environmental category. It can be also viewed as the use of information technology in the area communication to acquire new learning skills or to improve one's knowledge (Tsai and Tsai 2003). In other words, it is viewed as on-line information sharing between users. However, some researchers use the word to refer to the

convergence of electronic content and others to technical communications. It is sometimes perceived as only online-study while some understand it to be a real-time learning and cooperation technique (Rosenberg, 2001). In the context of Universiti Teknologi Malaysia (UTM), assessed students satisfaction with communication tool of the system (Wang, 2003). However, this study aims to measurement Effectiveness of Using E-Learning through students' satisfaction with intention to use e-learning at UTM.

2. Trends on E-Learning Implementation in Malaysian

In this research we look for trends on e-learning implementation in Malaysian from five trends as following: E-learning policy, E-learning governance, learning management system (LMS), E-learning training and E-learning integration into teaching and learning.

2.1 E-Learning Policy

Information demonstrates that all IHLs (90%) which as of now had e-Learning approaches have their own implementation plans. Out of all the IHLs which had e-Learning approaches, 70% make the utilization of e-Learning obligatory among their teachers and learner. Almost half of the IHLs (40%) had actualized their e-Learning strategies in over three years or between one to three years, while just two IHLs (20%) had implemented their e-Learning approaches in under a year (Amin, 2011).

2.2 E-learning Governance

As far as the adequacy of existing administration, just a large portion of the example of executives included in this investigation of e-Learning in Malaysian Institutions of Higher Learning (50%) accepts that their organization has a viable administration structure. Furthermore, just half of the e-Learning administrators (57.7%) surmise that their organizations have satisfactory offices for the implementation of effective e-Learning. Notwithstanding, most e-learning overseers (65.4%) accept that agents at the faculty/school/department levels are assuming a compelling part in encouraging the utilization of e-Learning in IHLs (Amin, 2011).

2.3 Learning Management System (LMS)

As indicated by the e-Learning directors included in this study the e-Learning in Malaysian Institutions of Higher Learning, as far as the viability of the LMS, on a normal, a large portion of the elements, for example accessibility (61.5%), reliability(57.7%), ease of use (57.7%), security (57.7%), flexibility(53.8%), and scalability (53.8%) are performing great. In any case, the incorporation of LMS with different system is at a moderate level (42.3%). The majority of the scholarly staff and learner included in this study also agreed that their LMS are performing admirably as far as adequacy. There are a couple of LMS patterns acquired from the 1,635 teachers and 6,301 students who took an interest in this study. Information demonstrates that most of the instructors (77. %) are utilizing the LMS gave by their separate organizations (Amin, 2011).

2.4 E-Learning Training

As far as e-Learning preparing given to scholastic staff, the study on e-Learning in Malaysian Institutions of Higher Learning demonstrated that more than a half of the IHLs included in this study have conveyed e-learning preparing for their respective scholarly staff. Nonetheless, five IHLs demonstrated that just 11% – 35% of their scholastic staff have been prepared, five IHLs additionally showed under 10%, while most of the IHLs showed that 36%–50% of their scholarly staff have taken after a preparation project identified with e-Learning. Just 57.7% or fifteen IHLs offer subsequent program after the e-Learning instructional courses, while 30.8% or eight IHLs make participation to e-Learning preparing piece of the yearly evaluation for scholarly staff. From the 1,635 teacher test who took part in this study, just about 66% (65.7%) had experienced e-Learning preparing in the most recent two years in their separate establishments (Amin, 2011).

2.5 E-Learning Integration into Teaching and Learning

Information indicates in e-Learning in Malaysian Institutions of Higher Learning that the rate of mixed courses offered by instructors is between 1–80%, while the rate of online courses taken by students is 81–100% (27.3%). At the point when asked whether there was an increment in e-Learning exercises in the previous two years, the dominant part of teachers (73.5%) concurred. Information likewise demonstrates that most learners get to the online courses that they are taking once per week (37.7%), trailed by the individuals who access it once day by day (29.6%), and the individuals who access it a few times each day (17.6%). The number of students who don't get to their online courses at all is practically nothing, just 2.1%. Most students get to their online courses from the campus (71.4%), trailed by the individuals who access it the PC lab (50.2%), and the individuals who access it from home (46.9%). The majority of them get to online courses utilizing their own laptops (94.2%), and 63.7% of them utilize the campus wireless network as the fundamental of access to the online courses (Amin, 2011).

3. E-learning Use in UTM

Investigation and development of e-learning at UTM has begun since the 1980s. This transformation is supposed to produce students and human resource which are excellent in academic and increase UTM level to the international level (Koharuddin et al., 2003). According to (Hassan et al., 2007) the success of e-learning is dependent on qualitative two-way communication between students and teachers, and amongst students themselves. Online technologies can also be leveraged to provide a faster collaborative and interactive engagement. According to students' views on e-learning available on UTM e-learning main webpage, e-learning is a virtual place for uploading materials, slides, assignments, and also an interactive environment for sharing knowledge and discussions. In Universiti Teknologi Malaysia (UTM), there have been some studies that assess the acceptance of eLearning (Masrom, 2007) or address user satisfaction with some functions (Razak, 2010) (Masrom, 2007) tested the Technology Acceptance Model in a sample of UTM students, and found the technology acceptance model TAM is not descriptive but can serve a method to assess the acceptance of the eLearning. Also, most studies in focusing on improve the e-learning in term of communication (Norliza, 2010), studying strategies for e-learning implementation (Yahya, 2009), and studying the effectiveness of e-learning implementation at UTM (Rizka, 2009). As for user satisfaction, (Razak, 2010) found that users are not satisfied with communication tools provided by current learning management system. However, there has not been a study that focuses in user satisfaction with the overall system using the established theoretical model. There are many evaluation factors to be measured for student satisfaction in UTM, which are, based on Wang model (Wang, 2003) use learner interface, learning community, content, and personalization. And (Liwa, 2008) use perceived usefulness and Self-efficacy, these evaluation factors should be measured in the context of UTM students.



Figure 1: Main interface of UTM E-learning

3.1 E-learning development phases in UTM

The e-learning project is one of the applications that were built under the UTM Cyber Campus project, which has been

developed by the Educational Ministry in 1997. At that time, the e-learning system was called virtual learning (Foong et al. 2008). The purpose of this project is to facilitate student's access to information about their subject, to increase student interest and understanding about their subject, to make it easier to access information and also make it easier to study with an unlimited concept. To succeed in attaining these purposes, some application model prototypes were developed. For example: electronic library, examination system, electronic lecture, and also the cyber café (Hassan, et al. 2007). The e-learning development can be divided into four main phases.

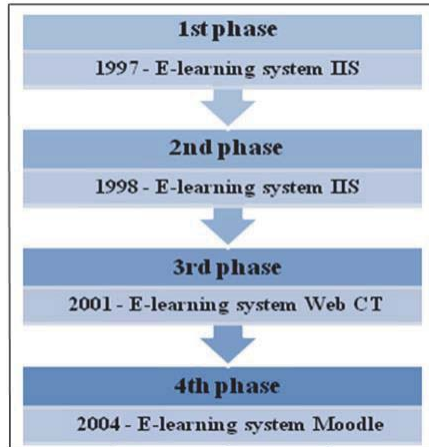


Figure 2: Developmental phases of using e-learning at UTM

3.1.1 First Phase (1997)

In this phase, general information about the subject has been provided and can be accessed by students through the internet at any time. The information that can be accessed includes information about the lecturer (including room number, telephone number, and e-mail address), meeting time, pre-requisite, subject objective, subject synopsis, weekly schedule, policy, marks arrangement, book content, and reference.

3.1.2 Second Phase (1998)

The general information in first phase can be used to follow topics that will be discussed in class. Each table contents topics given away with many detailed and assignment lists or activity to achieve objectives targeted.

3.1.3 Third Phase (2001)

Subject notes complete with exercises and assignments for these subjects are provided on web pages. This notes characterized by information sourced from the worldwide web also prepared to enable students find information and additional material given during the lecture. From here, a discussion facility is prepared. Students could ask the question electronically to a lecturer or discuss their opinion on the topic with other students.

3.1.4 Fourth phase (2004)

At is stage all subject materials can be obtained online. There is no formal lecture and as such students fully use the computer to follow all course materials, take quiz, test and others. This level is especially directed to distance learning students who do not attend a formal lecture. Undergraduate students were already introduced to e-learning by 2001 and the second session of 2001/2002. The SPP that was used at that time was Web CT. The implementation started with course material preparation by a lecturer and faculty committee (Hassan et al., 2007).

4. The Research Model and Hypotheses

The current study integrates the relevant factors into a study framework that can be tested and validated. Such factors integration in one framework have never been done before in literature specifically, the factors are self-efficacy (SE), learner interface (LI), learning community (LC), students' satisfaction (SS), perceived usefulness (PU), intention to use e-learning (IU) and e-learning effectiveness (EE). Based on the factors and the thorough and systematic literature review, the following hypotheses are developed and tested:

- H1: There is a significant relationship between self-efficacy and students' satisfaction.
- H2: There is a significant relationship between self-efficacy and perceived usefulness.
- H3: There is a significant relationship between learner interface and students' satisfaction.
- H4: There is a significant relationship between learner interface and e-learning effectiveness.
- H5: There is a significant relationship between learner interface and perceived usefulness.
- H6: There is a significant relationship between learning community and students' satisfaction.
- H7: There is a significant relationship between learning community and perceived usefulness.
- H8: There is a significant relationship between learning community and e-learning effectiveness.
- H9: There is a significant relationship between students' satisfaction and intention to use e-learning.
- H10: There is a significant relationship between perceived usefulness and intention to use e-learning.
- H11: There is a significant relationship between intention to use e-learning and e-learning effectiveness.

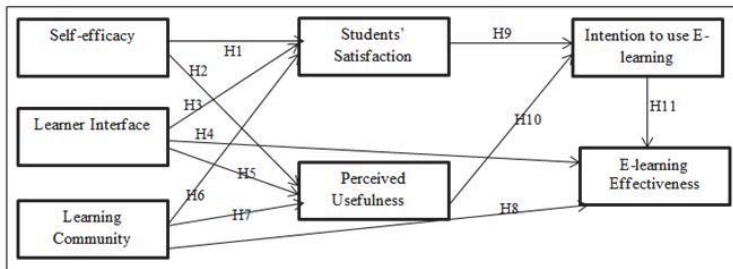


Figure 3: Research Model

4.1 Self-efficacy of E-learning

Evaluation on the effects, and possible chance of achievement before handling a task given (Johnson et al., 2008). Students with better self-efficacy are more certain in accomplishing activities in e-learning and improving satisfaction. Bong and Choi (2000) revealed that self-efficacy is a matter of concern when determining the effects of searching in network-based learning. Self-efficacy concept portrays a unique view and similarities with other motivational constructs, for instance effort-performance expectancy, the aims toward Self-efficacy and control. They provide thorough discussion on similarities and difference between self-efficacy and other motivational constructs. Schunk (1984) at times, verbal persuasion is the medium in delivering self-efficacy information. For example, when a student's accepts a compliments from their teacher or fellow friends, this will promotes support and improves the student self confidence in developing e-learning. Other than that, student may also gain self-efficacy through physiological. Symptoms such as sweaty palms or trembling indicate the students are not doing so well. Whereas if the symptoms are not seen, it shows that the student portray a high level of self-confidence.

4.2 Learner Interface of E-learning

Chiu et al., (2005) state both the quality of the educational software and interfaces are related. However, interface such as pop-up window and web framed-base are able to improve student learning rate that have little experienced in e-learning than with browser scroll interface (Chen, 2005). Results shows that by integrating different interface can result in different learning pattern with respect to factual learning and skill involved problem-solving which considered as high-order learning. (Moneta and Moneta 2002). With a proper design of modules in e-learning will also encourage in problem solving skills. For learning a simpler task, an interface with an interactive approach such as touch screen is both effective

and efficient (Liaw 2008; Chen 2005). The user will communicate with the system via medium which is the learner interface of the information system. The construction of the interface will greatly effect on how the user sees and fully grasp of the system functionality that it will be part of the system that promotes user to interact with basic technologies, thus this will bring great impact on the functionality (People and Scane, 2003).

4.3 *Learning Community of E-learning*

Unfortunately, Learning Community has a lot more to learn compared to Perceived Usefulness and Previous Online Learning Experiences. If the system is user-friendly, it is seen more use full thus they will have stronger intentions to use online learning. Nonaka and Nishiguichi (2001) the student improve communication and sharing of information by interacting with others in the online learning community. Knowledge is made by never ending process of knowledge sharing. Liaw et al., (2007) If the student are prepared to improve the interaction with peers or instructors, they are also improving their knowledge and with better chances to get to know one another. These interactions are able to give impact on behavioral intention to use e-learning.

4.4 *Students' Satisfaction of E-learning*

As per Brownson and Harriman, (2000) contended that learners in e- learning show improvement classroom learners. Furthermore, Johnson et al. (2000) made a relative studies think about and did not locate any huge distinction in the viability of e- learning versus up face-face course learning for students. Moreover, remove instruction gives free, students focused and mentor guided engagement that encourages connections with teachers and students which may not generally be conceivable inside of the customary classroom setting (Al-rahmi et al.,2015; Michailidou and Economides, 2003). Astin, (1993) characterized students satisfaction in term of students recognition towards his/her school or college experience, and perceived significance of the training that got from an organization. Hong (2003) deduced in his study, which was directed with students going to e-learning courses, that students satisfaction with e-learning is an essential element to measure the effectiveness of e-learning.

4.5 *Perceived Usefulness of E-learning*

Last but not least is spotting out the causes that originate from the causal relationship and study the implications. Major determinant that influence perceived usefulness greatly are e-learning design. When the student gain fulfillment in using online courses, they are more confident on the Perceived Usefulness. This was confirmed through other researchers (Rovai, 2004). However, perceived ease of use influenced learner's satisfaction. The user's perception on ease of use is of importance to understand users satisfaction (Davis et al., 1989) mention if the task given can be accomplished with less effort, the system is user-friendly. By making the e-learning system easy for all level of user to use, it will make them more attracted towards learning the content rather than wasting their time on learning the tools. To conclude, a better satisfaction in learning will exist. Other than that, Levy (2009) recognizes 5 elements that add to learners perceived value; a) collaboration, social and detached learning abilities. b) Formal communication exercises. c) Formal learning activities. d) Logistic activities and e) printing activities.

4.6 *Intention to Use E-learning*

The emotional and subjective level examines how full of feeling and psychological segments impact individual behavioral intentions. What's more, the behavioral intention level is to see how the 3-TUM can anticipate individual behavioral expectation to utilize innovation for a specific reason (Al-rahmi et al., 2015; Liaw et a., 2007). As per Rosland et al., (2008), PC uneasiness has a negative impact on understudies' intention to utilize an internet learning system the learners 'tension can diminish their inclination to utilize web learning system .Lee (2010) found that perceived usefulness has an immediate constructive outcome to the intention to utilize e-learning while perceived ease of use and perceived enjoyment have a constructive outcome to intention to use e-learning.

4.7 *E-learning Effectiveness*

As represented by Thurmond et al. (2002), when differentiated assessment techniques exist to evaluate effectiveness of e-Learning, students activity may be remedied or enhanced through various criticisms to accomplish better performance.

Ozkan and Koseler (2009) found that system quality expanded the effectiveness of learning system while content quality made worth and learner satisfaction .the adequacy of learners utilization of interaction e-learning as a variable advancing the nature of the studies by utilizing pedagogical perceptions as a part of e-learning environment instigating and finding students' practical experience (Morgan, 2007).

5. Research Method

The data collection technique for this study is dependent on questionnaires administered on researcher at Universiti Teknologi Malaysia. Therefore, the data collection of this research will be carried out by quantitative methodology, which are reliable and accepted and can give more reliable information obtained from the researchers within Universiti Teknologi Malaysia that helping to achieve the study objective. Researchers were instructed in the questionnaires to offer information about their experiences and impact of using E-learning. This study aims to answer the question, "What is the relationship between intention to use e-learning and e-learning effectiveness?" The following sections provide description on the methods used to answer the above question. The data for the analysis is gathered through a survey questionnaire distributed to 340 postgraduate in the 2011/2012 academic session, the survey to offer information about their experiences and impact of using e-learning. The respondents were required to offer information of their experiences with using e-learning. From the distributed questionnaires in two months duration, 268 valid responses are obtained from the Universiti Teknologi Malaysia. IBM SPSS (Version-20) and Smart PLS (Version-3) were used to analyze the data.

6. Result and Discussion

Table 1: summary on using e-learning and e-learning contents

Demographic Variables Category	Research Sample (n=268)		Demographic Variables Category	Research Sample(n=268)	
	Frequency	Percent		Frequency	Percent
Entry to university			Motivation of use		
Diploma	37	13.8	Save time	18	7.0
Matriculation	201	75.0	Faculty request	90	33.0
STPM	30	11.2	get materials	83	31.0
Learn			I like use	50	19.0
Course	58	22.0	Easy to use	27	10.0
Lecturer	118	44.0			
Web	36	13.0	Previous use		
Friends	56	21.0	Yes	196	73.0
Place of use			No	72	27.0
Class	57	21.0	Rate		
Lab	117	44.0	Excellent	73	27.0
library	27	10.0	Intermediate	174	65.0
Hostel	67	25.0	low	21	8.0

From table 1 found the number of respondents on the basis of their UTM entry is displayed in and specifically, respondents who enrolled to diploma constituted 13.8% of the total respondents, those who are in Sijil Tinggi Persekolahan Malaysia (STPM) Malaysian Higher School Certificate constituted 11.2% and those in matriculation constituted 75%. Furthermore, present the e-learning usage based on daily and weekly use and the length of use of e-learning by the respondents. The tables' contents are based on the results of the questionnaires. Also presents the prior use of the e-learning services, the answer to which is Yes or No the participants who replied in a positive way constituted 73% while those who replied negatively constituted 27%. As for their introduction to the e-learning system and 21% of the respondents were made aware of the system from friends, 22% learned about it from the course and 13% learned about it from the website. Lastly, 44% learned about e-learning system from the lectures. With regards to e-learning access, 25% of the respondents accessed it in their hostels, 10% in the library, 21% in class and 44% in the labs. As for the motivation of e-learning use, 7% of the respondents stated their reason as time saving, 33% of them stated that it is a faculty requirement, 31% stated that they are motivated to use it as having the teaching material makes their work easy, and 19% cited their inclination towards learning through technology. Lastly, 10% of the respondents cited easy access to information as their motivation of e-learning use. Moving on to the e-learning content rate where the respondents had an option to rate it as excellent, intermediate or low, 8% of the respondents rate e-learning system as low, 27% rated it as

excellent and 65% rated the system as intermediate.

6.1 Measurement and Instrumentation

The starting stage in the affirmation of the validity and reliability of the model is the utilization of the Partial Least Square Structural Equations Modeling (PLS-SEM), Smart PLS 3.0. Prior to the hypotheses were tested, two stages were utilized to confirm the model's goodness of fit. In like manner, construct validity that covers elements loadings; composite reliability, Cronbach's alpha, and convergence validity was ascertained. The suggestion gave by Fornell and Larcker (1981) in light of making utilization of the standard test to confirm discriminant validity was utilized.

6.1.1 Construct Validity of the Measurements

Construct validity is depicted as the level to which the items used to measure a factors can suitably measure the concept they were mean to measure (Hair et al., 2010). The whole items utilized to measure a construct ought to load significantly to their individual constructs as opposed to other constructs. This was ensured by conducting a systematic review of literature in the quest to produce items that have already been established and tested by prior authors. On the basis of the element analysis, it was confirmed that items were suitably appointed to their constructs as they indicated high loadings on them contrasted with different constructs (See Table 2). All the items significantly loaded on the constructs they are intended to gauge (Chow and Chan, 2008).

Table 2: Loading and cross-loadings of the items

No	Variables	Code	SE	LI	LC	SS	PU	IU	EE
1	Self-Efficacy	SE1	0.889	0.190	0.232	0.373	0.316	0.277	0.328
2		SE2	0.844	0.212	0.349	0.330	0.257	0.265	0.276
3	Learner Interface	LI1	0.205	0.876	0.212	0.164	0.092	0.122	0.287
4		LI2	0.201	0.937	0.269	0.225	0.153	0.150	0.329
5		LI3	0.222	0.915	0.288	0.271	0.217	0.194	0.334
6	Learning Community	LC1	0.318	0.236	0.779	0.404	0.434	0.169	0.365
7		LC2	0.244	0.179	0.806	0.260	0.370	0.233	0.345
8		LC3	0.336	0.251	0.754	0.244	0.358	0.252	0.375
9	Students' Satisfaction	SS1	0.358	0.264	0.318	0.845	0.323	0.273	0.307
10		SS2	0.327	0.154	0.352	0.842	0.218	0.301	0.333
11	Perceived Usefulness	PU1	0.232	0.165	0.326	0.289	0.763	0.303	0.323
12		PU2	0.315	0.149	0.451	0.264	0.862	0.269	0.364
13		PU3	0.255	0.119	0.430	0.232	0.802	0.293	0.372
14	Intention to use E-learning	IU1	0.238	0.115	0.231	0.274	0.313	0.802	0.283
15		IU2	0.276	0.216	0.192	0.271	0.283	0.804	0.234
16		IU3	0.259	0.081	0.229	0.259	0.237	0.756	0.249
17	E-learning Effectiveness	EE1	0.251	0.254	0.348	0.289	0.246	0.116	0.625
18		EE2	0.238	0.231	0.343	0.259	0.402	0.266	0.794
19		EE3	0.305	0.309	0.371	0.317	0.343	0.336	0.846

6.1.2 Convergent Validity of the Measurements

The composite reliability values differed from 0.802 to 0.935 and they are all over the recommended cut-off value of 0.70, with Cronbach values differing from 0.593 to 0.897, over the recommended cut-off value of 0.60. Moreover, the average variance extracted (AVE) values differed from 0.579 to 0.827 (all exceeded the cut-off value of 0.5), with significant factor loadings exceeding 0.50. These values all went over the recommended value by Fornell and Larcker (1981) and Hair et al. (2010). Table 3 presents the CFA results of the measurement model

Table 3: Convergent validity

No	Variables	Code	Factors Loading	Cronbach's Alpha	Composite Reliability	AVE
1		SE1	0.889			

2	Self-Efficacy	SE2	0.844	0.671	0.858	0.751
3	Learner Interface	LI1	0.876	0.897	0.935	0.827
4		LI2	0.937			
5		LI3	0.915			
6	Learning Community	LC1	0.779	0.680	0.823	0.608
7		LC2	0.806			
8		LC3	0.754			
9	Students' satisfaction	SS1	0.845	0.593	0.831	0.711
10		SS2	0.842			
11	Perceived Usefulness	PU1	0.763	0.737	0.851	0.656
12		PU2	0.862			
13		PU3	0.802			
14	Intention to use e-learning	IU1	0.802	0.695	0.831	0.620
15		IU2	0.804			
16		IU3	0.756			
17	E-learning Effectiveness	EE1	0.625	0.627	0.802	0.579
18		EE2	0.794			
19		EE3	0.846			

6.1.3 Discriminant Validity of Measures

The level to which a concept and its indicators deviate from another concept and its indicators is assessed by discriminant validity (Bagozzi et al., 1991). The AVE value is well above 0.50 and is significant at $p=0.001$ and this indicates that discriminant validity is supported for the entire constructs (Fornell and Larcker, 1981). In this regard, Hair et al. (2010) explained that the correlations between items in two constructs should not exceed the square root of the average variance shared by a single construct's items (See Table 4).

Table 4: Discriminant Validity

	EE	IU	LI	LC	PU	SE	SS
EE	0.761						
IU	0.326	0.788					
LI	0.350	0.175	0.910				
LC	0.465	0.276	0.286	0.780			
PU	0.437	0.354	0.176	0.501	0.810		
SE	0.350	0.312	0.230	0.386	0.332	0.867	
SS	0.380	0.340	0.248	0.397	0.321	0.406	0.843

6.2 Analysis of the Structural Model

Following the determination of the goodness of the measurement model, the next step entailed the testing of the hypothesized relationships among constructs. The researcher employed the SmartPLS 3.0 where the model was examined by conducting the PLS algorithm. The path coefficients were then produced as depicted in Figure 3. Figures 4 and 5 illustrate the hypotheses on table 5.

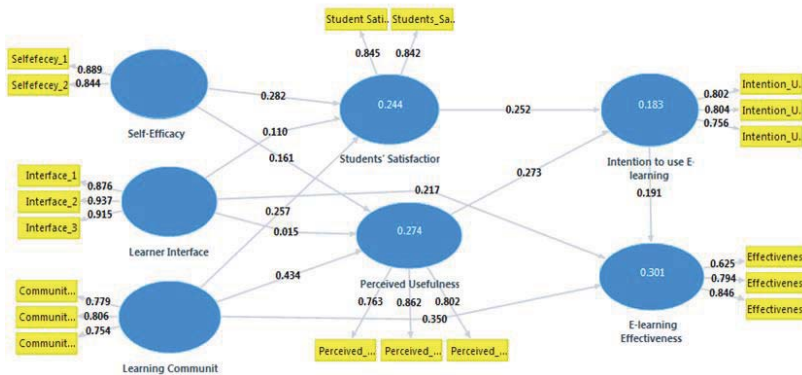


Figure 4: Path Coefficients Results

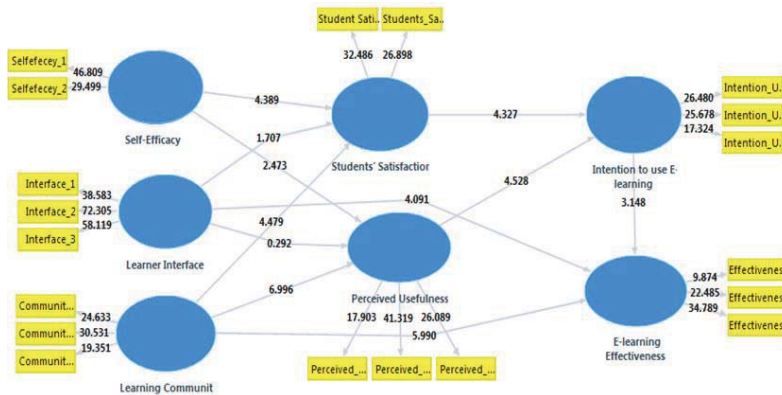


Figure 5: Path Coefficients T Values

This study has eleven hypotheses, nine hypotheses proposed were supported, and two hypotheses were unsupported. Specifically, the results show that self-efficacy positively and significantly influenced the students' satisfaction at ($\beta=0.282$, $t=4.389$, $p < 0.001$) and therefore, the first hypothesis is supported. Added to this, the results also show that self-efficacy positively and significantly influenced the perceived usefulness at ($\beta=0.161$, $t=2.473$, $p < 0.001$) and therefore, the second hypothesis is supported. The results also indicate that learner interface positively and significantly impacted the e-learning effectiveness at ($\beta=0.217$, $t=4.091$, $p < 0.001$) indicating support for the fourth hypothesis. also, the results show that learning community positively and significantly related with students satisfaction at ($\beta=0.257$, $t=4.479$, $p < 0.001$), showing support for the sixth hypothesis. Moreover, the results show that learning community positively and significantly related with perceived usefulness at ($\beta=0.434$, $t=6.996$, $p < 0.001$), showing support for the seventh hypothesis, similarly the results show that learning community positively and significantly with e-learning effectiveness at ($\beta=0.350$, $t=5.990$, $p < 0.001$), showing support for the eight hypothesis,

Additionally, the results show that students' satisfaction positively and significantly with intention to use e-learning at ($\beta=0.252$, $t=4.327$, $p < 0.001$), showing support for the number nine hypothesis, also the results show that perceived usefulness positively and significantly with intention to use e-learning at ($\beta=0.273$, $t=4.528$, $p < 0.001$), showing support for the ten hypothesis, and the results show that intention to use e-learning positively and significantly with e-learning effectiveness at ($\beta=0.191$, $t=3.148$, $p < 0.001$), showing support for the eleven hypothesis. Nevertheless the hypotheses was unsupported the results show that learner interface negative with students' satisfaction at ($\beta=0.110$, $t=1.707$, $p < 0.001$), showing unsupported for the third hypothesis, also lastly, the results show that learner interface has negative with

perceived usefulness at ($\beta=0.015$, $t=0.292$, $p < 0.001$), showing unsupported for the fourth hypothesis see table 5.

Table 5: Hypotheses testing

H	Independent	Relationship	Dependent	Path coefficient	Standard Error	T Value	P Value	Result
H1	SE	→	SS	0.282	0.064	4.389	0.000	Supported
H2	SE	→	PU	0.161	0.065	2.473	0.014	Supported
H3	LI	→	SS	0.110	0.064	1.707	0.088	Unsupported
H4	LI	→	EE	0.217	0.053	4.091	0.000	Supported
H5	LI	→	PU	0.015	0.052	0.292	0.771	Unsupported
H6	LC	→	SS	0.257	0.057	4.479	0.000	Supported
H7	LC	→	PU	0.434	0.062	6.996	0.000	Supported
H8	LC	→	EE	0.350	0.058	5.990	0.000	Supported
H9	SS	→	IU	0.252	0.058	4.327	0.000	Supported
H10	PU	→	IU	0.273	0.060	4.528	0.000	Supported
H11	IU	→	EE	0.191	0.061	3.148	0.002	Supported

6.3 Discussion

Self-efficacy of e-learning; this study, a multidimensional measure of e-learning results was produced and tested. Cooperation assumes a balance part in the companion support. Positive attitudes toward intention to utilize e-learning may reinforce students' to bolster and make them feel more satisfaction. Thus, it underpins the learning and trust in mastering the e-learning. In addition, learner interface of e-learning has a decent learner-interface can increase the learner's inspiration to learn by providing them with controls, showcases and data components that keep them intrigued, help them find out where they are, and ultimately aid them in the intricate procedure of taking data out and integrating it into their own conceptual information base.

Moreover, learning group of e-learning they improvement of data correspondence innovation, e-learning is turning into an inexorably imperative learning pattern. A developing number of e-learning system and online courses are being connected by educators in order to encourage students to expand their learning after class. We have found that, lately, various studies on training have utilized technology accept model to examine learners' willingness to accept e-learning systems.

Furthermore, perceived usefulness of e-learning the numerous variables that may impact e-learning utilization, past research propose two determinants that are particularly critical.

First, students have a tendency to utilize or not utilize an application to the degree they trust it will help them perform their study better; allude to this first variable as perceived usefulness. Second, regardless of the fact that potential students accept that a given application is helpful, they might, in the meantime, accept that the e-learning is too difficult to utilize and that the execution advantages of utilization are exceeded by the exertion of utilizing the application. Moreover, students' satisfaction of e-learning was generally accepted by the respondent as a device that improved their instructive experience and its application was successful; portrays the level of students' satisfaction of the e-learning therefore, the intention to utilize e-learning influence e-learning viability. Also, Findings demonstrate that there is a change on students' observation on measures of e-learning & student's satisfaction to e-learning effectiveness. During theoretical review, many researchers are prone towards measuring information system success, identifying students behavior towards e-learning, students satisfaction, e-learning effectiveness, e-learning participation, etc. nevertheless, there were no discoveries in identifying the factors that causes the students satisfaction to last a quiet period of time in e-learning. Thus, this study only highlights on the factors that contribute to e-learning effectiveness with students' satisfaction e-learning in UTM.

6.4 Conclusion and Future Work

In conclusion, the intended objective of this research is successfully achieved. The overview of the research was identified for using e-learning in Malaysian higher education also more specific using e-learning at Universiti Teknologi Malaysia, and this study proposed model the UTM e-learning. The findings showed that e-learning facilitates academic experience of the participants and students satisfied, also the students have intention to use e-learning. Future work study on how research students can utilize e-learning as the learning service. Also, study the effectiveness of e-learning

on knowledge sharing through interactivity among students.

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