Exploratory Study of Effects of eLearning System Acceptance on Learning Outcomes

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Abstract

End-user learning is an important element of Information Systems (IS) projects. End-user learning of software applications can constitute roughly 5% to 50% of project budgets. To lower costs and make learning more convenient for the end-users, organizations are largely utilizing online systems for the electronic delivery of such learning programs, referred to as Technology Mediated Learning (TML). In this learning format, before the end-users are able to immerse themselves in the actual learning program, they are first required to adopt and use an online learning system. Currently published IS research has two mature streams of publications: one stream focused on models of technology acceptance and usage that is based on the TAM (Technology Acceptance Model) model and a second stream based on the TML framework consisting of learning content, structures and outcomes. This research study aims to build and validate an empirical model extended from the TML framework with constructs from TAM. This extended model is validated and relationships are tested using survey data collected from an e-learning system used for teaching spreadsheet and database management software applications. The results indicate that the acceptance and usage of the e-learning system and the learning outcomes of mastering office productivity applications is related to individual characteristics and facilitating conditions that boost perceived ease of use and performance expectancy. The results of this study have implications for both the TAM and TML research streams and also the design and use of e-learning for software applications by IS practitioners.

Keywords: Technology Mediated Learning; Learning Outcomes and Technology Acceptance Model.

1. INTRODUCTION

End-User learning is one of the most pervasive methods for developing human resources within modern organizations. Majority of end-user learning deals with teaching end-users how to use computer applications and gain tool operational knowledge to do their assigned jobs in the organization. There are three targeted goals of most end-user learning programs (Gupta, et.al., 2010): (1) skill-based goals (tool procedural) that target the user's ability to use the system, (2) cognitive goals (tool conceptual or business procedural) that focus on the use of the system to solve business problems and (3) meta-cognitive goals that focus on building the individual's belief regarding their own abilities with the computer applications. To lower costs and make learning more convenient and schedule friendly for employees, the use of online learning systems for the electronic delivery of end-user learning has become popular (ASTD, 2013). Recent reports suggest that upwards of 40-50% of end-user learning is conducted through technology mediated learning (TML) systems (ASTD, 2013). Technology-mediated learning environments (TML environments) are environments "in which the learner's interactions with the learning content (readings, assignments, exercises), peers, and the program instructions are mediated through advanced information technology" (Alavi and Leidner, 2001, p.2). In addition to commercial organizations, many universities also leverage technology based learning systems to teach students popular software and commercial systems such as enterprise resource planning systems (e.g. SAP) and office productivity software, such as spreadsheet software and personal database management software.

However, there is continuing frustration with technology mediated learning as the success of these e-learning programs is highly dependent on the student�even's acceptance and correct use of the system to manage their learning process. As the variety of e-learning systems grow, identifying the critical factors related to users' perceptions and acceptance of e-learning technology continues to be an important issue (Mun and Hwang, 2003). To this end, studies of user perceptions of these learning systems and understanding factors supporting effective use of these systems (Mun and Hwang, 2003) have become increasingly essential to improve awareness of acceptance and utilization (Lau and Woods, 2008). The current published research has primarily focused on finding answers to the adoption problem by investigating individuals' decisions on whether or not to adopt e-learning systems that appear to promise substantial benefits (McFarland and Hamilton, 2006; Venkatesh, et.al., 2003).

Some studies have applied the Technology Acceptance Model (TAM) to understand effects of the pedagogical design of such e-learning systems. The focus has been on understanding the impact of learning system features such as learning activities, security, information and service quality, interactivity and responsiveness, learner control and the ability to self-organize their learning on the user's acceptance of those systems (Selim, 2003; Pituch and Lee, 2006; Roca and Gagne, 2008; Sun, et.al., 2008).
However, the ultimate effectiveness of any e-learning system is not its utilization, but the learning outcomes it produces. Although e-learning research has attracted much attention over the last decade, suitable frameworks to assess e-learning program outcomes have yet to emerge despite a variety of models and variables characterized in these studies (McGill & Klobas, 2009). This research gap calls for more innovative and comprehensive approaches to fully understand the factors affecting e-learning program acceptance and program outcomes and the need for validated measurement models of the learning outcomes of e-learning systems.

Research Goals

The focus of this research study is to answer the question "Does the level of acceptance and use of features and capabilities of an online learning system impact learning outcomes?" To answer this question, the paper extends the TML framework with constructs from the TAM model – perceived ease of use and perceived usefulness and measures their impacts on learning appropriation and outcomes.
The goals of this study are:

1. To develop and empirically validate an extended TML research model that also includes the users' learning system usage behavior and the facilitating conditions supporting such usage.
2. To measure the impacts of the usage behavior and facilitating conditions on the users' learning outcomes.

2.BACKGROUND THEORY

With the popularity of TML adoption and an increase in cloud based courseware, there is vast diversity in these online learning systems, which employ various platforms and software architectures that pose a variety of challenges (Bensch and Rager, 2012). Information technology deployed in typical learning programs is used as a primary structural element in the learning process (e.g. simulations or exercises that are part of the learning process) or as a secondary tool in the learning process (e.g. computer based tests and quizzes). However, the actual use of the features and capabilities of an online learning system have been found to differ across groups of users (Bekkering and Hutchison, 2009). Individual differences play a role in what features of these systems are used and how the systems can impact each end-users' learning process and outcome (Gupta, Bostrom and Anson, 2010). The current research stream of IS end-user learning has studied the impact of the above learning structures on different learning outcomes along with various confounding factors such as the individual's learning style, their motivation to participate and their interest in the learning content (Bostrom, et.al., 1990; Nogura and Watson, 2004).

A comprehensive TML research framework is elaborated in Gupta and Bostrom (2009). In the TML framework, the learning structures (or scaffolds) support the delivery of the learning content, such as the rules, resources and methods, the level of detail in the instructions given to participants, the guidance provided by the facilitator and the nature of the facilities and equipment used in the learning session. While the TML model incorporates technology as a structural element of learning delivery, it does not take into account the usage behavior of the specific capabilities of the learning platform by the individual users. Individual differences can impact learning outcomes by generating a different mental response to the learning content and influencing their interactions with the learning delivery structures (Bekkering and Hutchison, 2009). Learning style of the user plays an important role in the user's conformance to the learning tasks embedded in the online learning system (Bohlen and Ferratt, 1997). For example, abstract learners perform better than users with concrete learning styles in online technology based learning. The user's motivation and attitudes also have been found to influence learning performance in the TML context (Szajna, B. and Mackay, J.M., 1995; Yi and Davis, 2003). Such results support the need to merge additional constructs into the TML framework to represent the user's technology acceptance and usage behavior.

The technology acceptance model (TAM) is one of the most widely used models used in Information systems research to study the adoption and usage intensions of users of systems. TAM's roots are from the theory of planned behavior and the theory of reasoned action (Ajzen, 1988; Ajzen, 1991). TAM was developed by Davis (1989) to explain the determinants of the intention to use computer systems. Two key components were used in the original model were – perceived usefulness and the perceived ease of use of any technology. Perceived usefulness is referred to as the "degree to which a person believes that using a particular system will enhance their performance" (in a job or activity). The perceived ease of use defines the "degree to which a person believes that using a particular system would be free of effort". It is posited in the original TAM that actual intention to use a system will positively depend on both of these constructs. TAM has been validated over a wide category of information systems and user domains and proven to give reliable and valid results (Venkatesh, et. al., 2003). The simplicity and compactness of TAM provides the necessary constructs for this research study to extend the TML framework and develop a model to build a measure of learning outcomes.

Prior studies have applied TAM to examine the acceptance and effectiveness of e-learning system use (eg, Lau and Woods, 2008). In spite of its popularity and considerable empirical support, e-Learning researchers have also extended TAM with other socio-technical constructs, such as computer self-efficacy, enjoyment and modeled their impact on intention to use through the TAM variables (Agarwal and Karahanna, 2000; Davis, 1993).

Researchers have extended TAM with other socio-technical constructs, such as computer self-efficacy, enjoyment and modeled their impact on intention to use through the TAM variables (Agarwal and Karahanna, 2000; Davis, 1993). Researchers have introduced subjective norm (SN), such as social influence into the Technology Acceptance Model (TAM) for its application to real world organizations (Madon, 2000; Malhotra and Galletta, 1999). The construct of social influence is operationalized in terms of certain processes (internalization, identification and compliance) and field data provided evidence of the reliability and validity of the proposed constructs, factor structures and measures. Musa, Meso and Mbarika (2005) added external variables of Accessibility and Exposure to Technologies (AET) and Perceptions of Socio-economic Environment (PSEE) to extended TAM in a study of technology adoption in Sub Saharan Africa.

The original TAM model (Davis, 1989) provides a suitable and parsimonious framework for this research study to extended and develop a model to incorporate measures of the perceived usefulness and ease of use and usage of the eLearning System features and their impact on the constructs from the TML model.

3. RESEARCH MODEL

The research constructs are defined in the following subsections. The dependent variable in the model is Learning Outcomes (LO). The independent variables are the TML system (modeled as a formative second order construct consisting of learning system features, content and structures. The Individual characteristics (IC) and Facilitating Conditions (FC) are derived from the TML framework and are also independent variables in the model. The perceived ease of use, the perceived usefulness and the usage are constructs adopted from the TAM model and used in this research.

The research model is displayed in Figure 1.

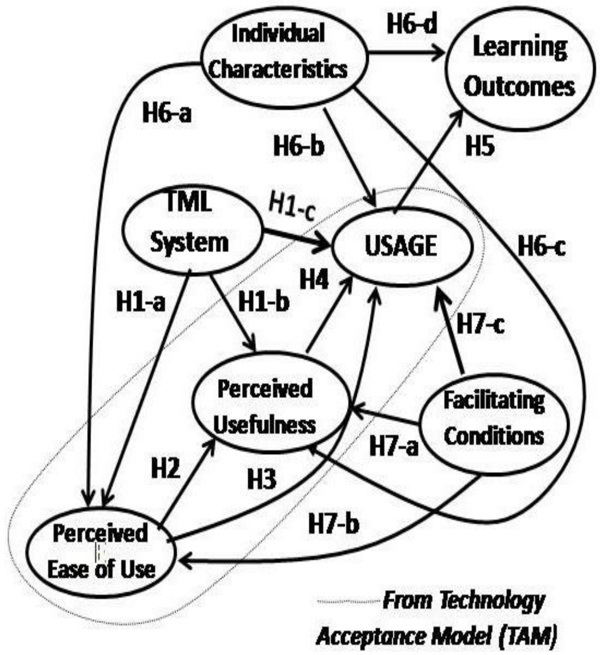

Figure 1. Research Model extended from TML framework

Learning Outcomes
Learning outcomes (LO) focus on the mental awareness and judgment of the end-user and the levels of application of acquired knowledge towards operating business functions (Gupta, et.al, 2010). The learning outcomes is a formative construct that consists of three types of outcomes – skill based, cognitive and meta-cognitive. There are three targeted goals of most learning programs: (1) skill-based goals (tool procedural) that target the user's ability to use the software, (2) cognitive goals (tool conceptual or business procedural) that focus on the use of the system to solve business problems that are outside of the learning program and (3) meta-cognitive goals that focus on building the individual's belief regarding their own abilities with the system (Gupta, et.al, 2010). Skill based goals of learning focus on collecting procedural know how or the nuts and bolts of using the system, such as spreadsheet or database management software (Gupta, et.al., 2010). These include creating a new sheet, building formulae and utilizing various features of the application. Cognitive training goals focus on the metal awareness and judgment of the user to transfer the learning to new situations, such as applying the software application to solve a new problem different from what was used in the learning. Finally, meta-cognitive goals focus on enhancing the learner's ability to understand his/her own learning and information processing procedure and confidence (Gupta and Bostrom, 2010).

TML System
As the use of TML in learning programs intensifies, the need to list the features of such applications as a component of the overall learning system is more important. System features mentioned in the research stream refer to responsiveness and quality (Lee, Yoon & Lee, 2009), feedback and facilitation of communications about assigned instructional work (Putuch & Lee, 2006), flexibility, autonomy and user control of the learning process and steps (Piccoli, Ahmad and Ives, 2001).

The TML system is characterized by the user features that establish learning structures to support the delivery of learning content. Learning content (LC) refers to instructional methods that encourage students to accomplish learning goals. These allow end-users to fill gaps in their understanding and builds skills (skill focus) and knowledge about how they can use the system to improve their productivity (cognitive focus). "Soft skills" are also developed that allow members to learn collective beliefs and norms that help them develop confidence and knowledge in solving future business problems. Learning structures (LS) refer to the scaffolds that support the delivery of the learning content. Also referred to as appropriation support (Gupta, et.al, 2010), they include the rules, resources and methods that support the elements of the collaborative learning session. For this research study, the learning structures include level of detail in the instructions given to participants, the guidance provided by the facilitator and the nature of the facilities and equipment used in the learning session.

Individual Characteristics
People prefer learning methods based on their specific learning styles (Nogura and Watson, 2004). Individual differences influence the formation of mental models, which effects the learning process. "States" are general influences on performance that vary over time and include temporal factors such as motivation level and interest level (Bostrom, et.al., 1990). "Traits" are static aspects of information processing affecting a broad range of outcomes. Cognitive traits refer to learning styles such as a preference for procedural or abstract knowledge and an exploratory or reflective approach to instructional content delivery format (Bostrom,

et.al., 1990; Nogura and Watson, 2004). For this research study, the Individual characteristics (IC) variable is measured using motivation and interest as states and individual learning style as traits. Both intrinsic motivation and extrinsic motivation influences the learner's state and is measured in the survey.

Facilitating Conditions

Facilitating conditions are environmental factors that refer to the users' perceptions of resources and support to use the technology (Venkatesh, et. al., 2008). Such factors support the individual's belief that an organizational and technical infrastructure exists to support use of the system. In the context of a learning system, facilitating conditions include resources, accessibility, compatibility with other systems, infrastructure quality and support (McGill and Klobas, 2009; Venkatesh, et.al., 2008).

Perceived Usefulness & Ease of Use

Two key components were used in the original TAM model – perceived usefulness and the perceived ease of use of any technology innovation. The UTAUT model includes two components – Performance Expectancy and Effort Expectancy (Venkatesh, Thong and Xu, 2012). Performance Expectancy (PE) is referred to as the "degree to which a person believes that using a particular system will enhance their performance" (in a job or activity). Effort Expectancy (EE) defines the "degree to which a person believes that using a particular system would be free of effort". It is posited that actual usage of a system will positively depend on both of these constructs (Venkatesh, et. al., 2003).

Usage

Actual usage behavior is captured in the research model as Usage. Both behavioural intentions and actual usage behavior to use the technology are part of the original TAM and the UTAUT models (Venkatesh, et. al., 2003). While behavioral intentions imply the plans and intentions to use the system, actual usage behavior refers to the duration, frequency and intensity of the use of the system (Venkatesh, et.al., 2008).

4. RESEARCH HYPOTHESES

The research hypotheses are listed below. Given the exploratory nature of this study, rather than be parsimonious, the emphasis is to model and test various possible relationships across constructs in the TML and TAM models.

TML System Features Support Usage

Based on the review of previous research studies, we find that e-learning system features such as quality, information quality, interface presentation style influence the perceived usefulness of the system to the student (Seddon, 1997). The perceived usefulness of an e-Learning system is related to the users' perceptions regarding the potential benefits of the system in delivering the learning content and teaching the application and whether the learning structures imposed by the system fit the learners' preferences. Likewise, the perceived ease of use of a system refers to the users' belief that using the system will be free of effort (Venkatesh, et.al., 2003). In the context of e-learning, ease of use includes the notion that the system will not require a great deal of extra effort to operate or impose any additional cognitive burden during the learning process (Lin, 2009).

The features of the e-learning system can help reduce the cognitive burden on a student by making the learning content more accessible and providing reminders and quicker feedback to pace the student learning activities. The e-learning systems support the student's learning in several ways such as by providing reminders about assignments that are due, providing feedback on submitted assignments, displaying performance summaries and providing hints and demonstrations. Certain features of the e-learning system such as those that enable the student to exercise control over the learning pace, sequence and content delivery can help lower a student's resistance towards using the e-learning system (Picolli, et.al., 2001).

H1-a: TML system features have a positive effect on perceived usefulness. That is greater the perceived TML system feature value, the higher the perceived usefulness.

System features that have high ease of use encourage greater usage, which sustains a higher sense of system usefulness.

H1-b: TML system features have an inverse effect on perceived ease of use. That is greater the perceived TML system feature value, the higher the perceived ease of use.

Using an e-learning system proves to be effective if it increases the students' efficiency by reducing their time and cost of learning and/or improving their performance/score. The greater the perceived value of the e-Learning system features, the greater the usage of the system. Therefore we have:

H1-c: TML system features have a positive effect on System Usage. That is greater the perceived TML system feature value, the higher the system usage.

H5: The higher the Usage of the e-learning System the higher the Learning Outcomes.

TAM Framework

These three hypotheses come directly from the TAM model (Davis, 1989) and can be stated as below. These three hypotheses are also included in this study and will be tested in the context of e-Learning in this study.

H2: Perceived ease of use of the TML system have a positive effect on the perceived usefulness of the TML system.

H3: Perceived ease of use of the TML system have a positive effect on the usage of the TML system.

H4: Perceived usefulness of the TML system have a positive effect on the usage of the TML system.

IC Supports Usage & Outcomes

Individual characteristics (IC) represent the cognitive aspects of human activities that are often referred to as "learning ability" and influence learning outcomes directly through the formation of mental models or indirectly through interactions with the e-learning system (Olfman et al. 2000). Motivation theory suggests that individual behavior is determined by two fundamental types of motivation: extrinsic (utilitarian) motivation and intrinsic (hedonistic) motivation (Ryan and Deci, 2000). Motivation theory has been used often to understand individuals' e-learning use and learning behavior Igbaria, et.al., 1996; Tharenou, 2001). The results of their empirical study suggested that computer-based training is more effective than lecture-based training except for assimilators, who appear to learn equally well under either method (Sein et al., 1989).

H6-a: Individual Characteristics have a positive effect on perceived ease of use.

H6-b: Individual Characteristics have a positive effect on e-learning system usage.

H6-c: Individual Characteristics have a positive effect on perceived usefulness.

Individual differences influence the formation of mental models, which represent the outcomes of the training process (Gupta, et.al., 2010). "States" are general influences on performance that vary over time and include temporal factors such as motivation level and interest level while "traits" are static aspects of information processing affecting a broad range of outcomes over time (Bostrom, et.al., 1990). Therefore, we have

H6-d: Individual Characteristics have a positive effect on Learning Outcomes.

Facilitating Conditions Support Usage

Facilitating conditions include objective factors in the environment that help to make the act of using the e-learning system easier to do (Venkatesh, et.al., 2003). An important influence on the user's usage of the e-learning system is the support provided (Gupta, et.al., 2010). These include technical support, instructor guidance, specialized computer resources and ready to use labs and assistance with system usage. The focus of support is to influence the interaction of the learners with the learning content and methods structures. In fact, the effect of facilitating conditions increases with experience as experienced users of technology find multiple avenues for help and support and certain groups of users attach more importance to receiving help and assistance (Venkatesh, et.al., 2003). The need for support may gradually fade as learners become more independent, confident and competent with the e-learning system.

H7-a: Facilitating conditions have a positive effect on perceived usefulness. That is higher the perception of the facilitating conditions, higher the perceived usefulness.

H7-b: Facilitating conditions have an positive effect on perceived ease of use. That is higher the perception of facilitating conditions, higher the perceived ease of use.

H7-c: Facilitating Conditions have a positive effect on TML system usage.

5. METHODOLOGY

A survey has been developed to measure the research constructs. The survey consists of multiple items for each construct and uses a 5 point Liekert scale (1 being strongly disagree and 5 being strongly agree) to measure user responses to each item. The survey is included in the Appendix. Two of the seven constructs – Learning System Features (TML System) and Individual Characteristics (IC) are formative constructs. The data collection approach consisted of surveying business school students, who used an online e-learning system, “MyITLab” (www.myitlab.com) to learn to use spreadsheet and database software applications.

MyITLab is a feature rich learning application that allows users to complete a variety of simulated tutorial exercises and case studies with Microsoft excel and access software packages. The system is accessed through a web browser and has no client installation requirements. While some parts of the system can be cumbersome and requires extensive scaffolding, such as initial registration, login and a properly configured browser for accessibility, yet the major benefits of using the system are quick feedback on assignments, interactive help on various procedural aspects of Excel and Access software and organization of the learning process.

There were 10 chapters of assignments (5 chapters of Excel and 5 chapters of Access) that covered features of Excel and Access software. Each week’s assignment consisted of tutorial exercises that were executed inside a simulated environment representing the particular application features of interest for that week. The tutorials typically consisted of 20-30 activities each week and each activity was individually executed and submitted for grading. Hints for help was available for each activity in three forms – as a voice only clip describing the step by step instructions, as text-based instructions that appeared on a status text box and a computer animation showing exactly how the activity was to be performed. Thus the tutorials supported the tool-procedural skill based learning. Each week a case study was assigned that required the students to prepare an Excel or Access document to solve a business problem and upload the document into MyITLab for auto grading and feedback. This was the applied portion of the learning, which addressed business procedural outcomes.

A pilot survey was conducted to ascertain the content validity and clarity of the survey items. The final survey was completed with 200 users of MyITLab and reliability and validity of the survey instruments has been calculated (Table 2). A total of 139 completed surveys were collected for a response rate of 70%. The demographics of the respondents are presented in Table 1. The students were mostly in their 2nd or 3rd year of college and had had some prior experience with using Excel (3.17 years on average), but minimal experience with Access (1.14 years on average). The students used the MyITLab system on average for 3.57 hours a week for the 10 weeks of the semester. Most favored learning styles identified by the students were learning by doing and least favored style was learning by feeling. Note that some users selected multiple preferred learning styles.

Table 1: Demographic Variables (n = 139)

Variable	Min	Max	Mean	S.D.
Years of College Edu (years)	2	6	2.56	1.12
Prior Excel Use (years)	0	8	3.17	1.95
Prior Access Use (years)	0	6	1.14	2.25
MyITLab Usage (Hours /wk)	1	16	3.57	2.12
Gender	Male: 88		Female: 51	
Preferred Learning Styles	Learn by Doing (86); Learn by Thinking (57), Learn by watching (34); Learn by Feeling (8)			

6. RESULTS

The 139 completed surveys collected from the study were analyzed with Smart PLS and results are presented in Tables 2 and 3.

Table 2: Construct AVE, Composite Reliability, R-square, Cronbach Alpha

Construct	AVE	Composite Rel	R-sqr	Cronbach Alpha
Perceived Ease of Use	0.7077	0.9061	0.5068	0.8623
Facilitating Conditions	0.6662	0.8870	0.6213	0.8283
Individual Characters	n/a	n/a	0.5702	n/a
Learning Outcomes	0.6810	0.8949	0.7401	0.8431
Perceived Usefulness	0.8012	0.9416	0.5008	0.9176
System Features	n/a	n/a	0.6203	n/a
Usage	0.6329	0.8726	0.6516	0.8030

The seven constructs have measurement validity as seen from Table 2 with high AVE and R-square values. The reliability measures for the constructs are represented by Composite reliability and Cronbach's Alpha and the high scores on these measures indicate adequate reliability. Compared with coefficient alpha, which provides a lower bound estimate of internal consistency, the composite reliability is a more rigorous estimate of the reliability. The recommended levels for establishing a tolerable reliability are above the 0.70 threshold and above 0.80 for strong reliability. Consequently, evidence for internal consistency and construct reliability are supported by these results.

After the measurement model was validated, Smart PLS was used to test the paths between constructs and determine the support for the study hypotheses. Table 3 lists the results of the hypotheses testing. The greater the acceptance of the TML system features results in a higher perceived ease of use, higher perceived usefulness and system usage (H1a-c supported). The greater the Perceived ease of use, the higher the perceived usefulness of the system (H2 supported), but not the usage of the system (H3 not supported). Higher perceived usefulness did increase system usage (H4 supported). Individual characteristics was found to affect the level of perceived ease of use (H6a), the level of system usage (H6b), the level of perceived usefulness (H6c) and the level of learning outcomes (H6d). The level of facilitating conditions was found to support the level of perceived ease of use (H7b supported). But facilitating conditions did not support the level of perceived usefulness (H7a not supported), nor the level of usage of the system (H7c not supported). The greater the level of system use, the higher learning outcomes (H5 supported).

Table 3: Hypothesis Testing and T-values

Hypothesis	**Path Coeff**	**T-Val**	**Support**
H1-a: TML -> PEU	0.3224	2.2584	YES
H1-b: TML -> PU	0.5487	3.1829	YES
H1-c: TML -> USE	0.4234	2.5073	YES
H2: PEU -> PU	0.1433	1.9729	YES
H3: PEU-> USE	*0.1367*	*1.2229*	*NO*
H4: PU -> USE	0.2845	2.7436	YES
H5: USE -> OUT	0.2824	2.3550	YES
H6-a: INDV -> PEU	0.2216	2.8847	YES
H6-b: INDV -> USE	0.5032	4.2795	YES
H6-c: INDV -> PU	0.3593	2.7311	YES
H6-d: INDV -> OUT	0.6240	5.7402	YES
H7-a: FC -> PU	*0.0416*	*0.2355*	*NO*
H7-b: FC -> PEU	0.3732	3.7731	YES
H7-c: FC -> USE	*0.1623*	*1.2577*	*NO*

7. DISCUSSION

The goals of this study were two fold: to develop and empirically validate an extended TML research model that also includes the users' learning system usage behavior and the facilitating conditions supporting such usage. Secondly to use that model to measure the impacts of those constructs on the usage behavior and facilitating conditions on the users' learning outcomes.

The study found that the features of the e-learning system are significantly related to the perceived usefulness and ease of use of the system and also its usage. Perceived usefulness of the e-learning system drives greater usage of the system. Moreover the lack of perceived ease of use by the users does not inhibit system usage, as the ease of use and usage do not show a significant relationship. Facilitating conditions like technical support, computing resources and instructions about e-learning system increase the perceived ease of use for the users. But such conditions do not impact the perceived usefulness of the e-learning system nor the ultimate usage of the system. Individual characteristics is the most important factor that has the strongest supported relationship in determining usage of the e-learning system and impacting learning outcomes of the user.

The results of the study suggest that more support needs to be provided to users during the initial adoption phase of the e-learning system. Users can be engaged by things like group workshops, proactive technical support and one on one sit down help to get started. All these reduce the cognitive load on the users and increases the perception of the e-learning system as being easy to use. After the initial adoption, the usage and learning outcomes are strongly impacted by individual characteristics. The usage intensity and learning outcomes are governed by the set of features that appeals to each individuals learning style and habits. This calls for a future follow on study to evaluate which features of the e-learning system are favored by what types of learners. Moreover, can adequate personalization of the e-learning system, that can support individual learning habits and preferences, be achieved that can impact learning outcomes?

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Appendix –Survey Questionnaire

Construct & ***Sources***	**Survey Items**
TML System *Gupta, et.al. (2010); Gupta (2009);*	1. The output from MYITLab was presented in a useful format. 2. The information about Excel and Access from MyITLab is accurate. 3. MyITlab graded my assignments in a fair manner. 4. I am satisfied with the management of assignments in MyITLab. 5. I am satisfied with the way MyITLab gave feedback on assignments. 6. I am satisfied with the way MyITLab accepted my assignments online.
Perceived Usefulness *Venkatesh, et.al. (2003); Venkatesh, et.al. (2008); Davis (1989)*	1. Using MyITLab enhanced my effectiveness in learning. 2. Using MyITLab increased my productivity in the course 3. I found MyITLab to be very useful in the learning process 4. MYITLab fit my study habits and practices.
Perceived Ease of Use *Venkatesh, et.al.2003); Venkatesh, et.al.2008); Davis (1989)*	1. It was very easy for me to learn to use MyITLab. 2. It was easy to find information about MyITLab 3. I found MyITLab to be very easy to use. 4. It was easy for me to become skillful at using MyITLab.
Individual Characteristics *Nogura and Watson (2006); Ryan & Deci (2000); Bostrom (1990)*	1. I was motivated to learn as much as I can from this class. 2. I was very interested to take this class. 3. I was excited about learning the skills that were covered 4. I worked hard on this project only to get a better grade
Facilitating Conditions *Venkatesh, et.al. (2003); Venkatesh, et.al. (2008)*	1. I had the resources necessary to use MyITLab 2. I had all the support necessary to use MyITLab 3. I am satisfied with the documentation of MyITLab 4. I am satisfied with the facilities and equipment that were available for my use in the learning process.
Usage *Venkatesh, et.al. (2003); Venkatesh, et.al. (2008); Davis (1989)*	1. I believe that I used MyITlab quite extensively. 2. I used MyITLab more frequently compare to other learning systems. 3. I relied on MyITlab to successfully complete this course 4. Once I started working with MYITlab, I found it hard to stop.
Learning Outcomes *Gupta, et.al. (2010); Gupta (2009); Pituch and Lee (2006)*	1. MyITlab helped me to improve my proficiency of Excel and Access. 2. My ITLab allowed me to grow my knowledge of the applications. 3. MyITLab challenged me to develop new knowledge beyond my existing knowledge of features of Excel and Access to solve problems 4. I am now confident that I can finish an assigned task with Excel and Access. 5. I now understand how I can navigate Excel and Access