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Malaysian Undergraduates' Behavioural Intention to Use LMS for Online English Learning: An Extended Self-Directed Learning Technology Acceptance Model (SDLTAM)

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The usage of Learning Management System (LMS) conducted in Blended Learning style is believed to increase students' academic performance and their self-directed learning. Nonetheless, the success of students' behavioural intention to use these e-learning platforms still remains unclear due to factors like self-directed learning, computer self-efficacy, satisfaction and perceived enjoyment and ESL. This preliminary study aims to incorporate factors that impact students' self-directed learning of English language in achieving behavioural intention to use LMS with an extended model namely, SDLTAM, generalised for the Malaysian educational institutions. The original Technology Acceptance Model 1 by Davis (1989) was used as a theoretical framework of this study. However, the last variable Actual Use was excluded in this study. A sample of 338 respondents from both private and public universities in Malaysia took part in the 48-items survey. The data were analysed through Structural Equation Modelling through SPSS AMOS 24. The SEM AMOS revealed that the factors were found to moderately fit into the proposed model. This could be misspecification within the model and some items within a factor were more correlated to each other than others.

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Penggunaan 'Learning Management System' (LMS) yang dilakukan dalam 'blended learning' diyakini dapat meningkatkan kemampuan akademik siswa dan 'self-directed learning' mereka. Namun keberhasilan siswa dalam menggunakan platform 'e-learning' masih belum jelas karena berbagai factor seperti self-directed learning, computer self-efficacy, kepuasan dan persepsi. Penelitian ini bertujuan menggabungkan factor-faktor yang mempengaruhi self-directed learning siswa untuk mencapai perilaku yang diharapkan dalam penggunaam LMS dengan model perluasan, yaitu SDLTAM, yang secara umum digunakan pada institusi pendidikan di Malaysia. 'Technology Acceptance Model 1' dari Davis (1989) digunakan sebagai kerangka teori penelitian ini, tetapi variabel akhir 'Actual Use' dikeluarkan dari penelitian ini. Sebanyak 338 responden dari universitas negeri dan swasta di Malaysia berpartisipasi dalam penelitian yang menjawab survey yang terdiri dari 48 item. Data dianalisa menggunakan 'Structural Equation Modelling SPSS AMOS 24.' Hasilnya menunjukan bahwa factor-faktor yang ditemukan cocok dengan model yang ditawarkan.

INTRODUCTION

The dynamism in today's world highlights the impact of technology in many aspects especially in the education systems to provide rich opportunities in the teaching and learning of English. Online learning which has long been implemented involves the delivery of learning by electronic means typically through the internet. One example is blended learning (BL), a type of hybrid approach to teaching and learning of English language which was introduced in the education curriculum in universities. This instructional model helps widen access to education, improves the quality of teaching and learning, and enables greater personalisation of students' learning. A way of realising the objectives of BL is through online learning platform known as learning management systems (LMS). According to Islam (2011), LMS is a typical e-learning system which is used to deliver, track and manage online education and training. The advantages of LMS are aplenty. LMS is a tool to provide support and enhance after-class online interactions, assessment and posting teaching and learning materials.

Two prominent theories that are in favour of e-learning are Bandura's Socio Cognitive Theory (SCT) (1986) and Davis (1978) Technology Acceptance Model (TAM). The first theory by Bandura (1986) known as social cognitive theory serves as an initial foundation in this study in exploring what determines students' self-directed learning in online learning management platforms.

The second theory is Technology Acceptance Model (TAM). Davis, Bagozzi and Warshaw (1989) referred TAM as an adaptation of Theory of Reasoned Action (TRA) which is tailored to model user acceptance information systems. TAM is famous as it has the potential to explain and predict user behaviour of computer technology (Park, 2009).

This study employed an extended self-directed learning Technology Acceptance Model (SDLTAM) as a theoretical basis. The extension of the roles of self-directed learning (SDL), computer self-efficacy and system characteristics were explored to identify the factors that affect users' technology acceptance and user behavioural intention. Furthermore, the mediating roles of Perceived Usefulness (PU), Perceived Ease of Use (PEU) Perceived Enjoyment (PEN) and Satisfaction (SAT) were examined in the relationship between external variables, attitudes (ATT) and behavioural intention (BI) of LMS usage.

Problem Statement

The significance of technology and pedagogy has been prevalent and proven in many studies over the past decades. Technology usage is also believed to encourage students' self-directed learning. Garrison (1997) identifies SDL as plays pivotal role in adult education.

For decades, students have been exposed to teacher-dependent teaching method which is seen as a foundation to all teaching and learning paradigm. Developing SDL in language learning has been challenging to both instructors and language learners. In high school, students were constantly spoon-fed, and thus bring in similar conceptions during university. These undergraduates seem to exhibit lack of readiness to embrace SDL. The point of increasing self-directedness has always been emphasised; however, self-directed learning as an instructional strategy has rarely been a focus in the research of ESL students (Grover, Miller, Swearingen, & Wood, 2014). Thus, there is still a need to closely examine students' self-direction in language learning.

Empirical studies on LMS report that BL and the use of LMS contribute to academic success, students' autonomy and self-directed behaviour. Despite considerable efforts in funding, training in enhancing its education system, the usage of contemporary technological tools in helping students' learning, failure rate in utilising these tools remain high (Khairuddin & Hamid, 2015). To fully comprehend the idea of SDL and LMS use in English language learning, technology acceptance model (TAM) is used to better understand students' behavioural intention to use LMS.

Tselios, Altanopoulou and Katsanos (2011), critique that TAM fail to reach 40% of variance in students' behavioural intentions in educational contexts. Hsia (2007) mentions that perceived usefulness and perceived ease of use cannot fully explain a students' motivation to use e-learning system. Rigopoulou, Chaniotakis, and Kehagias (2017) critique that the traditional TAM has the tendency to "reach its limits" in explaining behavioural intentions, and the expansion of other constructs can further enrich and enhance its predictive ability. Thus, further expansion of TAM is required to improve its explanatory and predictive power.

Considering the above challenges, this research extended beyond the current conceptualisation of existing TAM model to an enhanced SDLTAM in Malaysia which aims to investigate the capability other significant, established constructs which were yet to be investigated and the uniqueness of self-directed learning in a non-western setting. There are still limited studies that utilises TAM in ESL context in Malaysia, namely Yih and Nah (2009) who observed students' perceptions in using weblog in ESL writing and Md. Yunus (2007) researched Malaysian ESL teachers' use of ICT in the classrooms. Therefore, the applicability of these findings towards the Malaysian students remain questionable as culture can impact the research outcome. Furthermore, there is an urgency to understand the socio-cultural aspect of self-directed learning in the, and at the same time possess self-efficacy which serves as a medium to develop SDL ability (Annuar & Shaari,2014). Socio Cognitive Theory (Bandura, 1986) supports that self-efficacy can affect individual's behaviour. Hutasuhut, Adruce and Bujang (2018) note that self-efficacy is a driving factor of SDL.

With these objectives in mind, the researcher hopes to address issues regarding LMS usage and discovers the advantages of the complex learning model of SDLTAM and other features which was previously unaddressed in the literature of ESL, LMS and TAM. This research also aims to provide insights to encourage language faculties in Malaysia to adopt &

increase sustainability of LMS, improve quality of teaching and learning, predict students' behavioural intention to use LMS in language learning, and provide pedagogical impact on the students and their motivation.

Significance of the research

This research adds the body of literature by identifying the factors affecting students' behavioural intention to use LMS in learning English (Mohammadi, 2015). Previous studies also reveal better students' achievement when LMS tools are used in their learning. Examining the relationships between variables will enhance more effective LMS utilisation and at the same time increase students' motivation to fully adopt it.

Students' preference for online learning could be attributed through their computer self-efficacy, as their confidence level of using technology, they will deem its ease of use. The LMS characteristics should also enhance students' perceived usefulness of the system. Besides, if the LMS platform is advantageous to them, they would also perceive its enjoyment and simultaneously their satisfaction would increase. When students develop positive attitude in using the system, their behavioural intention to continuously use it in the future is enhanced. The attributes could impact factors in a language user's LMS as well as their self-direction. Technology Acceptance Model (Davis, 1989) was used as an anchor theory of this study.

Literature Review

Learning Management System

The LMS is popularly known as a typical software that assists in document, track, report, and delivers e-learning courses (Zaharias & Pappas, 2016). Literature portrays numerous studies that emphasise the intention to use LMS in the higher education settings (Sanchez and Hueros, 2010, Damnjanovic et al., 2015). Other studies on the other hand demonstrate the significance of LMS and their academic performance (Ifinedo, Pyke, & Anwar, 2018).

Kaur and Sidhu's (2010) pilot study investigated learner autonomy through a distance learning programme using LMS in a local university in Malaysia. The initial findings indicated that freshmen lacked the confidence needed to learn autonomously. Although they showed some confidence in planning, findings indicated they needed assistance in organising, monitoring and evaluating their learning.

Trayek, Gombak and Hassan (2013) looked at 70 full-time and 50 distance learners 'attitude towards using LMS among university students. Some interesting discovery was mentioned. In the findings, the significance of PEU and PU aid as determinants of students' attitudes. However, no significance was found between full-time and distance learners' attitude towards LMS usage.

A study in Indonesia by Mantoro, Utami, Dewanti, & Yudhi, (2017) observed on how students became active learners by applying LMS more frequently in their learning in using it in the class and how often they use ICT in learning process. This study utilised a revised expectancy value theory called the Technology Implementation Questionnaire (TIQ). The questionnaire was distributed to 22 college students in five universities in South Jakarta. The findings revealed that mostly graduated students do not have any prior knowledge in LMS that could help them understand a subject easily. Overall, most students had good proficiency in

using ICT tools and using ICT in learning process, although their universities still did not provide an LMS that can make student more active in the learning.

Self-directed Learning

A study by Idros, Mohamed, Esa, Samsudin, & Daud (2010) incorporated a Self-Directed Learning (SDL) as a personal attribute and a learning process besides adding the learning context to indicate the impact of environmental factors on SDL. This study, which took place at Universiti Sains Malaysia, uses e-SOLMS (e-Student-Oriented Learning Management System) to raise students' awareness of their own roles in being self-directed learners. The study also used an experimental and control group method to identify students' pre and post diagnostic test. The result showed high percentage of participants from the experimental group with 'top' scores in SDLR with 69.2% compared to 'above moderate' (12.8%) and 'moderate' (15.4%). This suggests that the learning system managed to provide a better perspective and enthusiasm in learning that was previously absent. The study concluded that the online learning platform e-SOLMS played important roles in igniting students' enthusiasm and helped students to increase their self-directed behaviour.

Lai's (2013) study observed self-directed use of language learning. The target of this study was self-regulation and selecting effective use of technology for language learning. The research concluded that support from teachers and peers in technology use impacted them positively in terms of their knowledge and skills.

Lai, Li and Wang's (2017) research conducted using pre and post survey analyses focused on language learners' self-direction and technology use. The finding proved the importance of learners' positivism towards technology, other people's beliefs about technology use in English learning.

Socio Cognitive Theory (SCT)

Research that utilises Socio Cognitive Theory (SCT) looked at how it contributed in the body of literature of technology acceptance (Venkatesh & Davis, 2000; Losh, 2004) as cited in Samaradiwakara and Gunawardena (2014). Tsai (2014) suggested that the combination of SCT and TAM could provide in-depth understanding of environmental and social elements of technology affect individual's behavioural intention. Mc Cormick et al. (as cited in Chang, 2004 and Hajiyev, 2017), the prevalence of SCT principle is that individuals can influence their action. SCT, thus, can be seen as a robust theoretical framework to comprehend human behaviour.

Theoretical Bases, Enhanced Self-Directed Learning Technology Acceptance Model (SDLTAM)

The theoretical underpinning of this study is the technology acceptance model (TAM). Davis (1989) first established the Technology Acceptance Model which was adapted from Theory of Reasoned Action (TRA), proposed by Fishbein & Ajzen (1975). The theory is concerned with how an individual intention to perform or engage in certain behaviours is performed. TRA posits that individual behavioural intention is influenced by attitudinal and socio-related factors (Ifinedo, Pyke & Anwar, 2018). TAM posits that the behavioural intention to use information

system (IS) is influenced by two beliefs: perceived usefulness (PU) and perceived ease of use (PEU).

TAM was initially designed for new IS adoption. Literature showed that TAM was widely used and extended with various constructs and contexts. The popularity of TAM was due to its robust predicting power as confirmed in many studies.

As aforementioned, the solid parsimony of TAM motivated this study. In this study, the researcher proposed first tier namely learners' characteristics, the exogenous variables namely system characteristics (SC), self-directed learning (SDL) and computer self-efficacy (CSE) all categorised under learner characteristics. In the second tier (affective factors), two belief constructs perceived usefulness (PU) and perceived ease of use (PEU), perceived enjoyment (PEN) and satisfaction (SAT) of which function as mediating variables. The final tier 3 lied two behavioural variables – attitude (ATT) and behavioural intention (BI).

Learners' Characteristics

In this study, the exogenous variables are the learners' characteristics. Passerini and Granger (2000) mention that learners' characteristics include learner's self-efficacy, learner's autonomy and their self-directedness. Based on the TAM theoretical model by Liaw (2008), this study hypothesised that system characteristics, computer self-efficacy and self-directed learning as external factors. For this study, learners' characteristics are the exogenous variables namely, system characteristics, computer self-efficacy and self-directed learning.

System Characteristics (SC)

Chih-Horng, Huey-Min and Yuan-Chi (2012) observed how system characteristics influence the two most salient constructs PU and PEU of a web-based classroom response system (CRS). As discussed in the results, the effect of user characteristic on perceived usefulness was more than that of system characteristic, while the effect of system characteristic on perceived ease of use was more than that of user characteristic.

Ramayah and Lee (2012) focused on the relationship between system quality, information quality and user satisfaction and the extended model of (DeLone & McLean, 2002, 2003) which incorporated PU to measure of user satisfaction (Delone & McLean, 1992) and PEU, PU and information quality as determinants of user satisfaction were used to investigate IS usage and success. Data was analysed with AMOS version 16. The results of the structural equation model indicated that service quality ($\beta = 0.20$, $p < 0.01$), information quality ($\beta = 0.37$, $p < 0.01$) and system quality ($\beta = 0.20$, $p < 0.01$) were positively related to user satisfaction explaining a total of 45% variance. For these, the researcher hypothesises that:

H2a: System characteristics have a significant positive influence on perceived usefulness (PU)
H2b: System characteristics has a significant positive influence on perceived ease of use (PEU)

Computer Self-Efficacy

Bandura (1986) defines self-efficacy as people's judgments of their capabilities to organise and execute courses of action required to attain designated types of performances. In Bandura's

(1994) social motivational theory, the higher self-efficacy results in a more active learning process.

Revythi and Tselios (2017) found that self-efficacy had significant impact on perceived ease of use and behavioural intention and that self-efficacy impacted behavioural intention the most. This finding also echoed in Park (2009) and the original TAM by Davis and Venkatesh (2000).

Since this study fully emphasized on technology acceptance, it would be significant to look at learner's computer efficacy rather than learner's self-efficacy. Scherer and Siddiq (2015) state that learners' computer self-efficacy of LMS technology can contribute to their intention to be engaged in e-learning and impact their perception of LMS.

Venkatesh and Davis (1996) proved the significance of computer self-efficacy (CSE) and perceived ease of use (PEU). Perceived ease of use scale measuring two systems at a different time was discovered to have a high reliability of beyond 0.9. CSE was measured twice where the reliability coefficients were found to be 0.84 and 0.86 and 0.92 and 0.93 for PEU of a computer. Factor analyses and inter-correlations were found to support the discriminant validity between CSE and PEU of systems measured after each treatment intervention. CSE measured after each of the treatment interventions correlated very highly (0.87 and 0.89).

Lopez and Manson (1997) studied early indicators of utilisation of an information system recognised as Empowered Desktop, at Pacific Bell. 58 respondents participated in a survey at a corporate environment in Alhambra, California Network Engineering Center. The study findings provided substantial support for the proposed research model. Perceived usefulness was identified as the principal determinant of system use. Computer Self-efficacy was found to be a significant but less substantive influence on usage directly and indirectly through perceived usefulness. Other two environmental variables, social pressure was found to be the most significant.

Ariff, Yeow, Zakuan, Jusoh and Bahari (2012) analysed the effects of Computer Self-Efficacy (CSE) and TAM on Behavioural Intention (BI) in Internet Banking Systems. This study specifically attempted to examine the effects of CSE and extended Technology Acceptance Model (TAM) on the Behavioural Intention to use the internet banking systems among younger generations. Data was obtained from 222 undergraduate marketing students in one public university in Malaysia. The findings showed that Perceived Usefulness (PU), Perceived Ease of use (PE) and Perceived Credibility (PC) of extended TAM had a significant relationship with BI. It was also found that PC had stronger influence than PU and PE on respondents' BI to use the internet banking systems. Fascinatingly, this study manages to capture the critical role of CSE in predicting users' responses to information technology systems. The finding also unveiled that indirect relationship existed between CSE and BI through PU, PE and PC of TAM.

In the study of the same year, Tsia, Chang and Tseng (2012) studied the effects of individuals' locus of control and computer self-efficacy on their e-learning acceptance in high-tech companies in Taiwan locus of control, computer self-efficacy were used in their proposed extended TAM model to clarify employees' acceptance of e-learning systems. 223 employees at five high-tech companies located in Taiwan took part in their survey. The analysis indicated that locus of control had significant direct effects on perceived usefulness and perceived ease of use. Computer self-efficacy had significant direct effects on perceived ease of use and

behavioural intention to use. In brief, their study provides strong support for using the extended TAM to explain user acceptance of e-learning systems.

All in all, this research fully support the hypothesis that CSE functions as determinants of PEU both pre and post usage. For this, the researcher hypothesises:

H1a: Computer self-efficacy has significant influence on perceived usefulness (PU)
H1b: Computer self-efficacy has significant influence on perceived ease of use (PEU)

Self-Directed Learning

The direct relationship of self-directed learning and perceived usefulness was confirmed in the research of Yu and Huang (2011), where self-directed learning was used as an exogenous variable in this study. The focus of this research was a cohort of Taiwan's telecommunication company's staff acceptance of e-learning technology. The tested the hypothesis of H1 "Self-directed learning had a significant positive effect on perceived usefulness of e-learning which gained the result of (Beta-0.61, $p<0.01$) and was confirmed. Their findings also revealed that the staff' perceived usefulness of e-learning had a positive effect on behavioural intention to use e-learning system.

Lai (2015) observed teachers' influence on learners' self-directed use of technology for language learning outside the classroom. A conceptual model of three types of teacher support (affection support, capacity support and behaviour support) that were reported to influence students' self-directed technology use for learning outside the classroom was generated based on interviews with 15 undergraduate foreign language learners. 160 undergraduate foreign language learners were then surveyed to test the conceptual model. The path analysis of the survey data suggested that affection support influenced learner self-directed technology, and capacity support and behaviour support influenced learner self-directed technology use through enhanced facilitating conditions and computer self-efficacy. The participants were found to hold positive perceptions of the usefulness of technological resources for language learning ($M = 4.47$, $SD = 0.57$) and were quite confident about their abilities to use technology for language learning ($M = 4.49$, $SD =$ language learning purposes outside their language classroom. In this study, computer self-efficacy was used as a determinant for computer self-efficacy, where the direct effect was .24*** where ***$p < .001$ and indirect effect of .09** $p < .01$. The model fit indices for the conceptual model were found to be at satisfactory level: chi-square was 9.36 and CMIN/DF was 1.04, $p = .41$. RMSEA was 0.02 (lower 90% = 0.00; higher 90% =0.09). CFI was 1.00 and TLI was 1.00. Altogether, the fit indices indicated that the model fit the data well. The final model had a chi-square value of 10.38, CMIN/DF value of 0.94 ($p = .50$), RMSEA value of 0.00 (0.00, 0.08), CFI value of 1.00 and TLI value of 1.00, which all indicated a good fit to the data. The whole model explained 22% of the variation in learners' self-directed use of technology for language learning outside the classroom.

In a similar study of Yu and Huang (2011), the authors also confirmed the relationship between self-directed learning and perceived ease of use. The confirmed hypothesis H4 "Self-directed learning had a significant positive effect on perceived ease of use had gained the result of (Beta- 0.47 $p<0.0001$). External variables influenced both perceived usefulness and perceived ease of use of TAM. Due to the abovementioned, the researcher hypothesises:

H3a: Self-directed learning (SDL) has a significant positive influence on Perceived Usefulness (PU)
H3b: Self-directed learning (SDL) has a positive significant influence on Perceived Ease of Use (PEU)

Perceived Usefulness (PU)

Perceived Usefulness (PU) refers to "the degree to which a person believes that using a newly introduced system would enhance his or her performance" (Davis, 1989). The intention to use technology is significantly determined by user's acceptance, perceived ease of use (PEU) and perceived usefulness (PU) of the technology (Venkatesh & Davis, 2000).

Md Yunus' (2007) study on Malaysian ESL teachers' use of ICT in their classroom, expectations and realities also adopted TAM. Data was collected using questionnaire survey and semi structured interview of Malaysian ESL technical school teachers. The analysis revealed factors associated with the use of ICT in teaching and learning language. One factor is related to perceived usefulness whereby positive attitude was discovered among the majority of the teachers using ICT in their language teaching. 91% of them agreed that using ICT in language teaching helps students to understand better while 93% perceived that ICT motivates students' language learning.

Perceived Ease of Use

Any potential individual who thinks that a given application is useful may at the same time perceive that the system is too hard to use and that the performance benefits of usage are outweighed by the effort of using the application. Besides usefulness, usage is theoretician to be influenced by perceived ease of use (Davis, 1989).

PEU is the degree to which a person believes that using a particular system would be free from the effort (Davis, 1989). PEU and PU were believed to have some influences towards the attitude and behavioural intention to use Blended learning. According to Shroff, Deneen and Ng (2011), PEU had a significant influence on both attitudes towards usage and perceived usefulness which will lead to the effect on the acceptance. Ab Manan, Alias and Pandian (2012), Lee, Cheung and Chen (2005) found that PEU influenced student intention to use Internet-based learning indirectly through PU and Perceived Enjoyment. Gong, Xu and Yu (2004) found that PEU has a significant effect on students' attitudes and PU simultaneously. The effect of PEU on PU is as postulated by TAM. Tan (as cited in Tan, 2015) stated that English E-learning websites help learners increase their performance and are easy to use there is an increase in their intention to use them.

Perceived Enjoyment (PEN)

Perceived enjoyment (PEN) is defined as ''the extent to which the activity of using a specific system is perceived to be enjoyable in its right, aside from any performance consequences resulting from system use" (Venkatesh, 2000). Igbaria et al., (1994) and Davis et al., (1992) used enjoyment and fun separately as a belief variable, however, for this study, perceived enjoyment will be maintained as an affective variable.

Saadé, Tan and Nebebe (2008) used the enjoyment construct to conceptualise students' intrinsic motivation to use web-based learning. His results showed that Perceived Usefulness and enjoyment have a significant impact on student intention to use web-based learning systems.

Satisfaction

Satisfaction is defined as the individual's perceptions of the extent to which their needs, goals and desires have been fully met (Sánchez & Hueros, 2010). In defining satisfaction of blended learning modes. Earlier study of Bhattacherjee (2001) found relationship of satisfaction as a variable in information system continuance model. This model posits that users' satisfaction would further enhance usage. Cheng (2014) showed that perceived usefulness and satisfaction have positive effects on nursing students' continuance in LMS usage of a blended learning context.

Diep et al., (2016) showed students' perceived achievement goals and satisfaction are key factors to students' satisfaction. Satisfaction has also been found to have significant positive effect on intention towards use of e-learning services in some studies. Liaw (2008) studied learners' satisfaction, behavioural intentions and effectiveness of using Blackboard. The findings revealed a significant correlation between perceived self-efficacy that affect learners' satisfaction and learners' satisfaction and effectiveness was affected by behavioural intention towards the use of e-learning (The results revealed that three independent variables (perceived self-efficacy, multimedia instruction, and e-learning system quality) were predictors of learners' perceived satisfaction $F(3,420) = 263.86$, $p= 0.000$,$R2 = 0.651$) with perceived self-efficacy was the biggest contributor (50.5%).

Ramayah and Lee (2012) researched an e-learning environment in Malaysia and its impact of information quality on intention to use was found to be fully mediated by user satisfaction. Roca, Chiu and Martínez (2006) researched on e-learning in determining user satisfaction and user's continuance intention. Its results revealed that user's continuance intention is determined by satisfaction and influenced by perceived usefulness, information quality, service quality, system quality and perceived ease of use. In another study, Saadé, Nebebe and Tan (2007) used TAM among multimedia students in Canada. It was discovered that PU has a significant impact on ATT to use multimedia learning system. There was also a negative relationship between PU of the system and BI but mediated by PEU and ATT.

Another study in Taiwan at a senior high school conducted by Hsu, Hwang and Chang (2013) adopted the TAM model making use of three variables perceived satisfaction, perceived usefulness and perceived ease of use. Their research was about mobile learning system focusing on EFL reading skills. They discovered that students in the experimental groups who adopted the usage of mobile learning system achieved significantly better reading comprehension compared to those in the controlled group who did not use the system. Besides, the highest percentage 88.6% of the students of the experimental group (Group 1) were satisfied with the mobile language learning system while 90% of the students perceived the usefulness of the system while 84 % of the students of the experimental group (Group 2 perceived its usefulness. However, 79% of the control group perceived the usefulness of the mobile learning system without the reading material recommendations. Moreover, the students

from the experimental groups were shown to have better learning attitudes towards using the personalized mobile learning system with reading material recommendation.

Attitude

Attitude is defined as an individual's positive or negative feeling about performing the target behaviour (e.g., using a system) (Al-Adwan & Smedley, 2013). Attitude (ATT) refers to ''the degree of a person's favourable or unfavourable evaluation or appraisal of the behaviour'' (as cited in Schepers & Wetzels, 2007).

A recent research by Ozkan and Koseler (2009) identified the effect of learner attitudes on perceived learner's satisfaction from LMS. Statistical results proved that there is a positive statistically significant relationship between learner's attitudes and overall learner satisfaction. This is in parallel with the literature which stated that learner's attitudes towards technology and blended learning may have significant effects on the success of the LMS.

Behavioral Intention (BI)

Theory of Reasoned Action (TRA) model states that behavioural intention (BI) is the cognitive representation of a person's readiness to perform a given behaviour, and it is considered to be the immediate antecedent of behaviour (Ajzen & Fishbein, 1977). A significant body of literature confirmed that users' intention to use a system is affected by their PU and PEU (Dasagupta, Granger & Mcgarry, 2002).

There are several factors such as Perceived Enjoyment, Perceived Usefulness (Davis, 1989), that are positively associated with behavioural intention - intention to use a technology (as cited in Punnoose, 2012). From the abovementioned literature, the researcher hypothesised that:

H4a: Perceived usefulness (PU) has a significant influence on behavioural intention to use LMS mediated by perceived enjoyment (PEN) and Attitude (ATT).

H4a: Perceived usefulness (PU) has a significant influence on behavioural intention to use LMS mediated by perceived enjoyment (PEN) and Attitude (ATT).

The research results confirmed the applicability of the developed model to explain the Saudi students' acceptance of LMSs. The developed model explained high variance among the dependent variables outperforming the excising models. The research improved the explanatory power of the TAM model through the identified variables. Furthermore, the research results showed that the extrinsic variables were stronger predictors of students' perceived usefulness, perceived ease of use and behavioural intention. In addition, the results showed that males and females perception towards the LMS was significantly different. The male students' acceptance towards LMSs was higher than females. Moreover, enjoyment was the stronger determinant of females' behavioural intention.

H4b: Perceived ease of use (PEU) has a significant influence on behavioural intention to use LMS mediated by user satisfaction (SAT) and attitude (ATT).

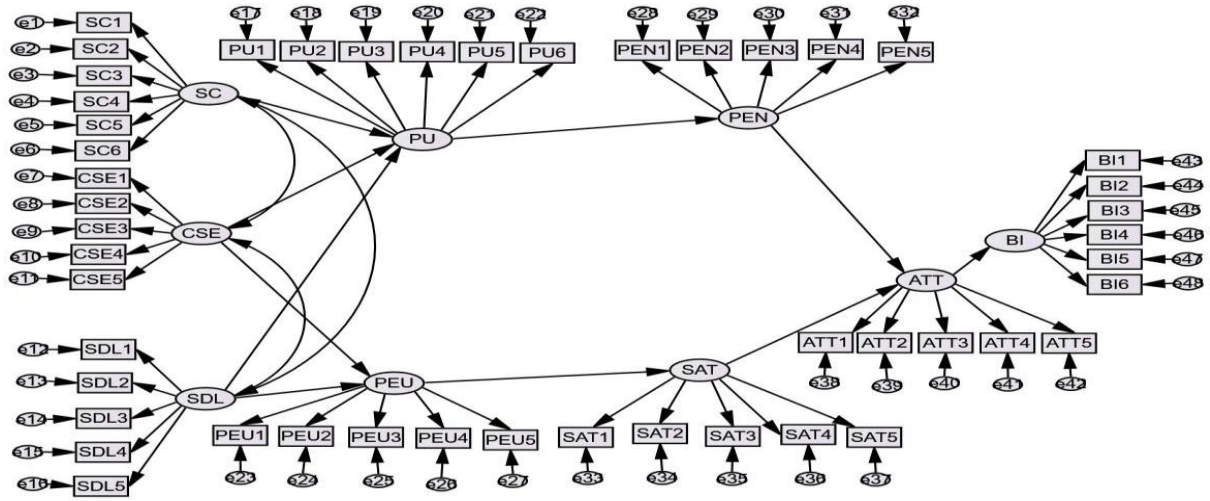
In the study of Ofori, Larbi-Siaw, Fianu, Gladjah and Boateng (2016), which examined the roles of privacy concerns in users' continuation of Mobile Social Media. Factors like Perceived Ease of Use (PEOU), Perceived Usefulness (PU) and Perceived Risk (PR) and Perceived Enjoyment (ENJ) on Satisfaction (SAT) and Continuance intention (INT) were also investigated. The analysis depicted that PU, PR and PE, were strong predictors of SAT. SAT (β= 0.611, P = 0.000) was also found to be a strong predictor of CI. Moreover, PEU was indirectly affecting SAT, slightly an indirect effect on satisfaction through the mediating role of PU.

Cidem and Ozturk (2016) studied 155 post-military secondary school students in Turkey on the factors affecting their behavioural intention to use LMS. The results exhibited that multimedia instruction had a direct influence on perceived usefulness and perceived ease of use, while interactivity had a direct influence only on perceived satisfaction. Perceived satisfaction was also affected by perceived usefulness and perceived ease of use. Perceived ease of use exerted a direct influence on perceived usefulness, as well. Moreover, perceived usefulness had a great influence on behavioural intention to use LMSs. As suggested by these scholars, an increase in the multimedia features and interactivity of the system could lead to higher perceived usefulness and ease of use among learners, and both factors add to learners' perceived satisfaction which in turn increases their engagement. An analysis was performed to examine the predictors of the learners' behavioural intention to use the LMS, and the constructs of perceived ease of use, perceived usefulness, and perceived satisfaction were tested. The result was significant, R^2 =.489, F (3,151) = 48.124, p <.001. Perceived usefulness of the system seemed to have a significant effect on the learners' behavioural intention to use the system. The result of the hypotheses above would provide a better insight on university students' behavioural intention to use Learning Management Systems in ESL contexts as well as the contribution in literature.

Theoretical Framework

This section provides insights to the design of this study and SDLTAM model. The original TAM 1 which include external variables, perceived usefulness, perceived ease of use, attitude, behavioural intention and actual use (Davis, Bagozzi & Warshaw, 1989). Compared to SDLTAM, TAM 1 did not have the nine factors present. Additional constructs added into SDLTAM (as shown in Figure 1) were system characteristics, computer-self efficacy, self-directed learning which were exogenous variables, perceived usefulness, perceived ease of use, satisfaction and perceived enjoyment as mediating variables and behavioural intention as endogenous variable. This complex model will provide more accurate prediction of students' behavioural intention to use technology and better explanation of the relationship between variables.

Figure 1- SDLTAM extended from Liaw (2008)



METHOD

A survey was used for the purpose of this study. The questionnaires were chosen as a tool for data collection. Questionnaires are also regarded as efficient data collection methods to examine and measure the excellent result of the researcher's requirement and interest align with objective of the research (Sekaran & Bougie, 2010). Furthermore, questionnaires also have the advantages of increasing the standardization and generality of the data and making the respondents more confident in providing truthful answer (Aaker & Day, 1995). Thus, the proposed research design was best suited to be aligned with the objective of the research of this study. Online survey was preferred as it appeared to have the possibility to gather large amounts of data efficiently within relatively short time frame and enables easy access to large and geographically distributed populations. Besides, it was convenient, easily accessed by the respondents, allowed consistent data management and facilitates data transfer into a database (e.g. excel or SPSS) for further analysis and at the same time assure respondents' privacy and confidentiality.

Research Instrument Development

The measurement items of this study were adapted from Pituch and Lee (2006), Yu and Ya (2011), Venkatesh and Davis (1996), Roca, Chiu and Martinez (2006), Al-Aulamie (2013) and validated by prior researchers. The questions were modified to suit the language learning contexts. The survey was divided into two sections. The initial section required respondents' information of the demography while the later section comprised of 48 items adapted and confirmed by prior studies.

Sample description

The study targeted at collecting 300 responses from institutions of higher learning Malaysia. The sample size had a direct impact on the statistical power of any statistical method. Generally, a researcher requires a relatively large sample size to identify difference when the

distribution of dependent variables is skewed, and the effect size is small. Hoelter (1983) recommends testing a model with a sample size of about 200. Hair et al. (as cited in Song, 2010) states that, in the case of SEM, there are four elements that affect the sample size requirements: model misspecification, model size, departures from normality, and estimation procedures. When the model includes all relevant constructs and indicators to the theory, the impact of the sample size on the ability of the model to be correctly estimated to identify specification error can be minimal.

As model complexity increases, so do the sample size requirements. When the data meets the assumption of multivariate normality, the conservative ratio of 10 cases per parameter is considered most appropriate (Hair et al., 1998). For maximum likelihood estimation (MLE), the acceptable minimum sample size to ensure appropriate use of MLE is 100 to 150 (Ding, Velicer, & Harlow, 1995).

A total of 338 undergraduates from universities in Malaysia took part in their study. The online survey was disseminated to the respondents using a link to Google forms. Table 1 below depict the outcome of this research.

Table 1: Demographic of the respondents

Item	Characteristics	Percentage (%)
Sex	Male (123)	36.4
	Female (215)	63.6
Age	17-20 (171)	50.6
	21-25 (153)	45.3
	Above 25 (14)	4.1
Experience with the LMS	0.5 years (175)	51.8
	1 year (56)	16.6
	2 years (41)	12.1
	Above 2 years (66)	19.5

(Source: developed by the researcher n=338)

Corresponding to Table 5.1, the finding unveiled that female respondents were slightly more compared to male, representing 63.6% (215 respondents) from 338 respondents while male respondents made up of 36.4 %, (123) respondents. These respondents were from five institutions across Malaysia. The age of the respondents ranges from 17 to above 25 years old of which 50.6% were respondents categorised as 17-20 years old, 45.3% belonging to the 21-25 age group while only 4.1% respondents were above 25 years old. The table also showed that majority of the respondents only had 0.5 years of LMS experience and could be categorised as freshmen in these institutions. A total of 56 respondents (16.6%) had 1-year LMS experience while 41 respondents had more than a year experience in using the LMS. Lastly, 66 (19.5%) respondents had more than two years LMS knowledge.

FINDINGS AND DISCUSSION

Data Analysis

SPSS Amos version 24 was used to analyse the theoretical model. Amos is widely used to test the psychometric properties of both measurement and structural model buy also evaluate the relationship among the variables (Fornell & Larker, 1981). SPSS version 24 was also used to analyse the data.

Table 2-Descriptive statistics of the study

Measures	Items	KMO	Barlett's Test of Sphericity	Eigen Value	Cronbach's Alpha
Sys. Characteristics	6	.87	657.8	3.6	.86
ComputerSelf-efficacy	5	.84	550.1	3.0	.82
Self-Directed Learning	5	.85	562.2	3.0	.82
Perceived usefulness	6	.89	896.5	3.7	.87
Perceived Ease of use	5	.82	578.8	2.9	.82
Perceived Enjoyment	5	.86	648.0	3.1	.85
Satisfaction	5	.86	750.8	3.2	.86
Attitude	5	.87	754.1	3.3	.87

The above Table 2 illustrates the outcome results of the validity and reliability analysis test for each of the measurement tool or variable of the preliminary study for measuring purposes. Consequently, the validity as well as the reliability of the data collected are revealed by the application of Statistical Package for Social Sciences (SPSS) software version 24.0.

With the purpose of checking any definite deviation from normality, one method which can be used univariate normality through skewness and kurtosis. Skewness and kurtosis are used to determine if the distribution of the study is normal or abnormal regarding the instrument or measurement tool applied in the interval and ration data level. A precarious data occurs when the variables are having the absolute skew values greater than 3.0, alongside with the kurtosis value greater than 10.0, which also reflect that it is abnormal while values greater than 20.0 may be critical.

Regarding the validity test, Kaiser-Meyer-Olkin (KMO) value of each variable of the present dissertation ranges from .82 to .89. Therefore, the requirement to eliminate any items from the variables was unnecessary.

Measurement Model Analysis

A measurement model estimates the variables and the items. The characteristics of the measurement model of the nine constructs, reliability, validity tests were conducted to identify the internal consistency through Cronbach's alpha.

Discriminant Validity of Constructs

Discriminant validity is identified when the measurement model is free from redundant items as suggested by AMOS which is reported in Modification Indices (MI). Discriminant validity was assessed by comparing the square root of the AVE extracted for each of the construct with the correlation between other constructs. Fornel and Larcker (1981) suggested that the square root of the AVE between constructs should not be smaller than the correlation coefficient.

A multicollinearity assumption was tested in order to the existence of multicollinearity among the variables in the analyses. This happened when a high level of correlation of (r>.90) between two or more variables (Cigdem and Ozturk, 2016). Table 3 shows the results for all variables fitted in the suggested criteria with the correlation values ranging from .79 to .90 therefore, discriminant validity was achieved at the item and variable level.

Table 3. Discriminant validity of constructs

Constructs	SC	CSE	SDL	PU	PEU	PEN	SAT	ATT	BI
SC	1								
CSE	.85**	1							
SDL	.86**	.79**	1						
PU	.90	.81**	.83**	1					
PEU	.87**	.85**	.84	.86**	1				
PEN	.86**	.82**	.83	.86**	.86**	1			
SAT	.87**	.80**	.83	.86**	.84**	.87**	1		
ATT	.89**	.83**	.85	.88**	.86**	.87**	.88**	1	
BI	.86**	.83**	.85	.83**	.84**	.83**	.83**	.88**	1

n=338 Correlation is significant at 0.01 level (2-tailed)

Discriminant validity: results from the correlations between the variables as shown in the following table (Table 2), according to Fornell-Larcker criterion.

Goodness of Fit

To examine construct validity, it involves discriminant and convergent validity. Construct validity was conducted through Confirmatory Factor Analysis (CFA) in order to test the items and match the variables of the study. To determine the fit of a model, there is some goodness of fit indices to determine the fit model. Many published research used between four to six

indices to assess how well the data fits the structure. Hair (1998) argues the usage of at least three fit indices such as absolute fit indices, incremental fit indices and parsimonious fit indices.

Absolute fit indices measure how well the model accounts for observed covariance in the data (Hu & Bentler, 1995). These comprise of chi-square (x^2), the goodness of fit (GFI), root mean score error (RMSEA). On the other hand, the incremental indices pertain comparative fit index (CFI) and normed fit index (NFI). The function of incremental indices is to compare how well the proposed model fits in the data related to the baseline model. Finally, parsimonious fit indices look as normed chi-square (x^2/df). Refer to the following brief table for the goodness of fit indices summary in the Table 4.

The structural equation analysis was conducted by AMOS 24 to analyse the model fit of the structural model. In this preliminary finding, the significance of the variable's path coefficient and validity of the proposed hypothesis would not be provided. The fit indices considered in assessing the model fit in SEM were recommended by some highly cited authors from the literature such as Hu and Bentler (1999) and Hair et al., (1998). Table 5 below summarised the findings of this preliminary study.

Table 4. Model fit summary of the proposed structural model

Fit index	Current study	Suggested values	References
df	1029	-	
x^2	3080.36	-	Im and Grover (2004)
Chi-square or x^2/df	2.99	≤3.00	Byrne (2001)
GFI	.69	≥0.90	Hair et al. (1998), Shumacker and Lomax (2010)
AGFI	.66	≥0.80	Chau and Hu (2001)
CFI	.83	≥0.95	Hu and Bentler (1999)
RMSEA	077	≤0.06	Hu and Bentler (1998), Hair et al., (2010)
NNFI (TLI)	.83	≥0.95	Hu and Bentler (1999), Shumacker and Lomax (2010)
SRMR	0.63	<0.08	Hair et al. (1998), Bryne (2010)

Note: x^2: chi-square, df: degrees of freedom; GFI: goodness of fit; AGFI: Adjusted goodness of fit; TLI: Tucker-Lewis Index; CFI: comparative fit index; RMSEA: root mean squared error approximation; SRMSR: Standardised root mean squared residual.

CONCLUSION AND RECOMMENDATION

The objective of this study was to identify students' behavioural intention to use LMS in achieving self-directed learning of English in among undergraduates in Malaysia. For this purpose, an extended TAM was used. The factors included were learner characteristics: system

characteristics, computer self-efficacy, self-directed learning), affective factors: perceived usefulness, perceived ease of use, perceived enjoyment and satisfaction, last but not least attitude and behavioural intention. The online based survey comprised of 338 respondents who answered a 48 items questionnaire measured by a 5-point Likert scale ranging from Strongly agree (5) to Strongly disagree (1) The data analysis revealed some interesting findings of this study. However, the goodness of fit results showed a moderate model fit which may mean that which showed that items of the analysed factors were correlated to each other than the others. Therefore, it is recommended that more samples are to be collected for the actual study in order to obtain an excellent model fit. Thus, it is essential to look into all constructs which would impact university students' behavioural intention, and also provide educators a more accurate prediction of students to use technology and self-directed learning of English language.

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