

Croatian Journal of Education
Vol.17; No.3/2015, pages: 835-863
Original research paper
Paper submitted: 3rd October 2013
Paper accepted: 2nd May 2014
doi: 10.15516/cje.v17i3.1085

Does Intention Really Lead to Actual Use of Technology? A Study of an E-learning System among University Students in Malaysia

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Abstract

This paper intends to investigate the long debated notion of whether intention really leads to actual behavior in the e-learning environment. A model based on the Technology Acceptance Model (TAM) was tested using data gathered through a structured questionnaire with participation of undergraduate students from a number of universities in Malaysia. Using the variance based structural equation modeling analysis of Partial Least Square (PLS) the model obtained a GoF value of 0.602 which exceeded the 0.36 cut-off value for large effect sizes of R^2 , thus providing adequate support to validate the PLS model globally. All the hypotheses developed were corroborated with strong support for the Intention related to the Actual use, thus confirming the validity of the TAM in e-learning and within a context of a developing country. Implications for developers and administrators are further elaborated.

Key words: e-learning; intention and use; perceived ease of use; perceived usefulness; university students.

Introduction

The exponential growth of information and the challenge of increasing users' needs have stimulated the invention of technology and strategies toward the management and use of information. As far as the importance of acceptance of technology affecting human behavior is concerned, it has been a topic of concern for the last two decades. A vast body of research on technology acceptance was conducted in business settings.

Nonetheless, more researchers are interested in examining factors which influence technology acceptance in education systems (Clausen, 2007; Smarkola, 2007; Teo & Lee, 2010). It is noticeable that lesson delivery and educational services in a conventional way can no longer fulfill the needs of education as the emergence of the Internet has changed the way of life in our society and this is also reflected in our educational method.

The emergence of new technology has not only facilitated conventional physical on-site educational method, but has also introduced distance learning programs at the global stage (Toni Mohr, Holtbrügge, & Berg, 2012). Furthermore, information and communication technology (ICT) provides an innovative way of teaching and learning for university students (Orton-Johnson, 2009) and as a result of this innovation, many universities have realized the benefits of employing ICT in their educational methods (Arenas-Márquez, Machuca, & Medina-López, 2012). The manifestation of ICT has taken the world by storm and has resulted in the new generation which spends a substantial amount of time on computers and similar devices. This has helped to facilitate the evolution of children's thinking to recognize new technology and has led to a conclusion that the young generation is ready for different types of learning, which enables them to be independent and life-long learners (Sánchez, Hueros, & Ordaz, 2013).

The introduction of ICT in higher education has provided a platform for distributing course information, for communication and assessment of class assignments, as well as for enhancing the learning processes that facilitate cooperative education (Augustsson, 2010; Maloney, 2007; Nelson, Christopher, & Mims, 2009). There are various terminologies that describe the teaching and learning via technology, such as distance learning, web-based education, e-learning and e-education.

E-learning refers to the electronic systems of information for the administrative and teaching support for the process of learning in institutions of higher education or in the setting of vocational institutions. Its objective is providing students with adequate resources in completing assignments in a systematic manner (Bhuasiri et al., 2012; Fry, Ketteridge, & Marshall, 2009; Strohmeier, 2008; Šumak, Heričko, & Pušnik, 2011; Weller, 2007). It provides many advantages and has become widely used in education programs and with the information revolution and an increasing impact of ICT it has undoubtedly modernized the process of teaching, learning and research in most universities (Kumar & Kaur, 2005). The reason that many universities are offering online courses is the innovative nature, convenience and functional resource of ICT that has a strong potential to meet today's learners' requirements (Vrieling, 2006) and is able to increase users' satisfaction and retention (Al-hawari & Mouakket, 2010).

Essentially, e-learning is based on Internet technology environment whereby instructors and students meet up synchronously (Gümüs, 2010). For e-learning to be effective, users must be willing to migrate from a less efficient system to a more improved system with better innovations (Ndubisi, 2006). Instruments in

e-learning such as computer-based learning and teaching, online course discussion and educational-material sharing portal are becoming fundamental in university educational programs throughout the world (Toni Mohr et al., 2012).

Previous researchers have acknowledged that the integration of technology is one of the key determinants of the enhancement of teaching and learning activities in education systems (Teo & Lee, 2010). In addition to that, tertiary education systems all over the world are becoming more inclined to the use of ICT as it provides more flexible teaching and learning approaches (Nwezeh, 2010). In Malaysia, the government is placing great emphasis on ICT to supplement the traditional teaching methods in universities. However, limited research has been conducted to investigate students' intention to use technology as an alternative learning method. The use of ICT in education is a part of Malaysia's endeavor in promoting technology use in education for students to be equipped with new skills and to obtain the necessary capabilities for Malaysia to become a high-income economy (Tenth Malaysia Plan, 2010). Therefore, there are compelling reasons for research on the effectiveness of technology to complement existing teaching methods in the university setting.

The purpose of this study is to examine if the intention to use new technology leads to the actual use of that technology in e-learning environment by undergraduate students in Malaysian universities. The acceptance of technology has already been widely researched in order to investigate more in depth reasons that motivate the adoption of new technologies (Bonera, 2011). This study is based on Technology acceptance model (TAM) (Davis, 1989), based on Ajzen and Fishbein (1980), by examining behavioral factors of these students. The findings of this study will assist institutions of higher learning in Malaysia to design and improve an e-learning model that will be effective and encourage students to be involved.

Conceptual Underpinning and Hipotheses Development

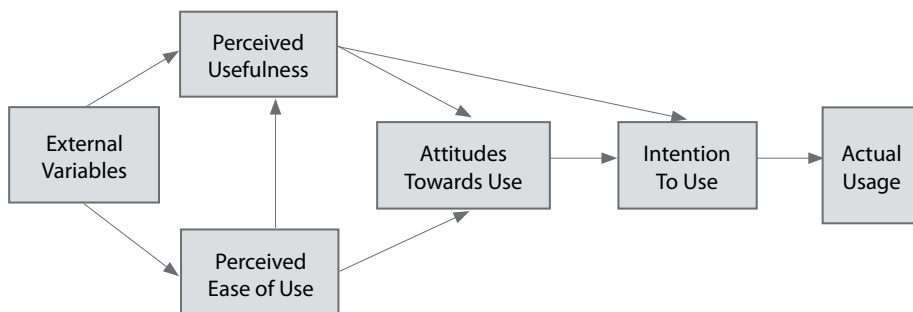


Figure 1. Technology Acceptance Model (Source: Davis, 1989)

Previous literature has been paying great attention to identifying the crucial factors that affect the adoption and use of technology. Hence, several models have been developed to predict the technology acceptance such as Technology Acceptance

Model (TAM) and Theory of Planned Behavior (TPB). Extensive body of research has been using TAM to investigate and predict the acceptance of various information technology (IT) innovations but it is rather limited as far as educational innovations are concerned (Ngai, Poon, & Chan, 2007; Saade Nebebe, & Tan, 2007). On another note, TPB was pioneered by Ajzen (1991) where it is an extension of TRA and it has been widely used by researchers in predicting the users' intentions and behavior. TAM is based on the principle that acceptance of informatics innovations consists of the perceived usefulness and the perceived ease of use.

In fact, TAM has been generally used by researchers in technology studies for predicting, acceptance, adoption and use of information systems (Halawi & McCarthy, 2007). In essence, TAM is based on the fundamental principle that the use of informatics innovation is encouraged by behavioral intention. TAM, which suggests the belief-attitude-intention behavior causal relationship, has been used in explaining and predicting the technology acceptance among the users (Chen, Gillenson, & Sherrell, 2002).

Perceived Usefulness

The perceived usefulness (PU) of a system has been widely illustrated in the past as the extent to which users believe that the use of new technology will assist in their task performance. Substantial evidence has been found to show that PU is the most authoritative predictor of users' intention to use and adopt technology (Venkatesh, Morris, Davis, & Davis, 2003). Various empirical studies have confirmed that PU is the main antecedent of information technology use (Davis, 1989; Davis et al., 1992; Gefen, 2003; Gefen & Straub, 1997, 2000; Hsu & Lu, 2004; Igbaria et al., 1997; Ong et al. 2004; Venkatesh, 2000; Venkatesh & Davis, 2000). Previous studies (Bhattacharjee & Sanford, 2006; Shih, 2004) have shown that PU has a direct impact on attitude and Venkatesh et al., (2003) claimed that there are other studies that are similar to PU in different settings, mentioning Davis, Bagozzi, and Warshaw's (1992) extrinsic motivation, Moore and Benbasat's (1991) relative advantage, Thompson, Higgins and Howell's (1991) job-fit and outcome expectations by Compeau and Higgins (1995) and Compeau, Higgins and Huff (1999). Based on these definitions and on other studies, it is apparent that PU is related to the perceived values of users on how information system is capable in enhancing job performance of users (Yeh & Teng, 2012). In this study, however, the perceived usefulness refers to how the students perceive the system to be; that is, whether the system is easy to use and whether it assists in providing students with positive attitude towards embracing e-learning (Saadé & Kira, 2009).

Perceived Ease of Use

The perceived ease of use (PEOU) of a system is described as a degree to which the user believes that the use of particular technology will be free of effort. This means that user-friendly technologies are more likely to be adopted by individuals (Moon & Kim, 2001) and users are also more likely to embrace new technology if there is minimum effort required in the interaction (Agarwal, 2000). The study on PEOU differs from

context to context, ranging from results that show insignificant values, such as the study on medical profession (Chau & Hu, 2002) and accountancy occupation (Bedard, Jackson, Ettredge, & Johnstone, 2003; Pennington, Kelton, & DeVries, 2006), whereas a study by Vella, Caruana and Pitt (2013) found that organizational commitment is a significant antecedent to it. Researchers have already illustrated that PEOU positively correlates with BI, both directly (Davis, 1989; Gefen, 2003; Gefen & Straub, 1997, 2000; Venkatesh, 2000; Venkatesh & Davis, 2000) and indirectly via PU (Davis, 1989, 1992; Igbaria et al., 1995, 1997; Venkatesh, 2000; Venkatesh & Davis, 2000). From e-learning perspective, PEOU is defined as a degree to which a student trusts that the use of ELS is hassle free and easy. Previous literature demonstrates that PEOU has both direct and indirect impact on attitude (Barkhi & Wallace, 2007; Shih, 2004).

Attitude and Intention to Use Technology (INT)

TAM acknowledges that the use of technology is influenced by behavioral intention, in this case the attitude towards technology. In addition to that, Ajzen (1991) stated that behavioral intentions will determine the users' actions and that the attitude toward behavior plays an important role in it. Attitude is a learned inclination to an object in a consistently favorable or unfavorable manner (Kaplan, 1972). Previous researchers defined attitude as willingness to respond favorably to a person, object, institution or event while the intention to use technology measures the level of innovation acceptance (Jan & Contreras, 2010). The theory of reasoned action and the theory of planned behavior assert that attitudes can influence users' behavioral intention (Ajzen, 1991) and to what extent the users are willing to try to perform a certain type of behavior (Armitage & Conner, 2001). Previous researchers have found that the intention to use technology is influenced by users' attitude towards technology (Moon & Kim, 2001; Szajna, 1996) and the attitude could be composed of positive or negative feelings towards performing a certain type of behavior (Teo & Lee, 2010). The feelings are influenced by how the users perceive the usefulness of technology in the learning environment.

Based upon the discussion above, the following hypotheses are proposed:

- H1: The perceived ease of use of technology is positively related to perceived usefulness.
- H2: The perceived ease of use of technology is positively related to the intention to use technology.
- H3: The perceived usefulness is positively related to the intention to use technology.
- H4: The intention to use technology is positively related to the actual use.

Methodology

The data were collected among undergraduate students who are users of e-learning systems in the major public universities in Malaysia. A total of 268 responses were

received, although 500 questionnaires had previously been distributed since it had been mentioned that participation was voluntary. A total of 13 questionnaires were discarded because of incomplete responses, while some had no experience of using an e-learning system. Thus, the effective response rate is 51%, which is acceptable. To collect data a structured questionnaire with items that were gleaned from the literature was used. The items and sources of measurement are presented in Table 1. To measure the perceived ease of use of technology, the perceived usefulness and intention, a 7-point scale was used, where the items meant: 1 = Strongly Disagree; 2 = Disagree; 3 = Almost Disagree; 4 = Neutral; 5 = Almost Agree; 6 = Agree; 7 = Strongly Agree. To measure the actual use of technology on a daily basis, a 6-point scale was used, the items being: 1 = Almost never; 2 = Less than 0.5 an hour; 3 = from 0.5 an hour to 1 hour; 4 = 1 – 2 hours; 5 = 2 – 3 hours; and 6 = More than 3 hours, whereas for Frequency of Use a 6-point scale was used, with the following items: 1 = Never/ almost never; 2 = Less than once a month; 3 = A few times a month; 4 = A few times a week; 5 = about once a day; and 6 = Several times a day.

Table 1
Variables and measures

Construct/Source		Measure (Operationalization)
Perceived Usefulness (Martinez-Torres et al., 2008)	PU1	I feel that using e-Learning system has improved my performance.
	PU2	
	PU3	Using the e-Learning system has improved my productivity
	PU4	Using the e-Learning system has enhanced my effectiveness in learning I find the e-Learning system useful for learning
Perceived Ease of Use (Martinez-Torres et al., 2008)	PEU1	Learning to use the e-Learning system has been easy
	PEU2	I feel using the e-Learning system makes it easy to do whatever I like to do
	PEU3	My interaction with the e-Learning system is clear and understandable I feel the e-Learning system is easy to use
	PEU4	
Intention to use (Pavlou, 2003)	INT1	I intend to use the e-Learning system in my study program
	INT2	I expect to use the e-Learning system in my study program
	INT3	If I have access to e-Learning system, I will use it as much as possible
Actual Use (Teo, 2001; (Martinez-Torres et al., 2008)	Daily	On average, how much time do you spend using the e-Learning system?
	Frequency	On average, how frequently do you use the e-Learning system?

Results

Since the targeted respondents were undergraduates, most of them were aged between 18 and 23, with a few aged more than 23 including those who enrolled into the undergraduate program after repeating their university entrance exams. The

majority of them were females (more than 68%), while 32% of respondents were males. This is an interesting profile which is also a major recent phenomenon in the Malaysian university population where the populations of undergraduates consist of more than 70% females in most public universities in Malaysia. About 33% were Malays, with slightly over 56% Chinese, while the rest included Indians and others, making up the balance. The percentage was a quite balanced one in terms of field of education with 51% coming from the Arts field and 49% from the Science field (see Table 2).

Table 2
Profile of respondents

Variable	Description	Frequency	Percentage (%)
Age	18	12	4.5
	19	56	20.9
	20	52	19.4
	21	34	12.7
	22	40	14.9
	23	38	14.2
	24	24	8.9
	25	8	3.0
	26	4	1.5
Gender	Male	86	32.1
	Female	182	67.9
Ethnicity	Malay	89	33.2
	Chinese	151	56.3
	Indian	20	7.5
	Others	8	3.0
Field	Arts	137	51.1
	Science	131	48.9

Testing of Hypotheses

For the purpose of this study, SmartPLS M3 2.0 was used to assess the model (Ringle et al., 2005) to investigate the parameters in the outer and inner model. PLS path modeling was applied with a path-weighting scheme for the inside approximation (Chin, 1998; Tenenhaus et al., 2005; Wetzels et al., 2009). This was followed by the application of nonparametric bootstrapping (Chin, 1998; Tenenhaus et al., 2005; Wetzels et al., 2009) with 200 replications to obtain the standard errors of the estimates.

Assessment of the Measurement Model

The convergent validity was first tested to investigate if the multiple items to measure the same concept were in agreement. Hair et al. (2010) have recommended the use of factor loadings, composite reliability and average variance extracted to assess convergence validity. It was noticed that all items have loadings exceeding the recommended value of 0.6 (Chin et al., 1997). In addition to that, composite reliability values as shown in Table 3, ranged from 0.910 to 0.934, which exceeded the

recommended value of 0.7 (Hair et al., 2010). The average variance extracted was in the range between 0.725 and 0.838, which exceeded the recommended value of 0.5 and illustrated the overall amount of variance in the indicators accounted for by the latent construct (Hair et al., 2010).

Table 3

Result of the measurement model

Items	Loadings	CR ^b	AVE ^b	Cronbach α
PU1	0.899	0.934	0.778	0.905
PU2	0.897			
PU3	0.874			
PU4	0.857	0.913	0.725	0.873
PEU1	0.843			
PEU2	0.886			
PEU3	0.854			
PEU4	0.821			
INT1	0.915	0.940	0.838	0.904
INT2	0.914			
INT3	0.918			
USE1	0.904			
USE2	0.927	0.910	0.835	0.804

Note: ^aLoading, ^bCR = Composite reliability, AVE = Average Variance Extracted

Discriminant validity was used to investigate the extent to which the measures are not a reflection of some other variables and it is indicated by the low correlations between the measure of interest and the measures of other constructs (Cheung & Lee, 2010). Comparisons can be made on the squared correlations between constructs and the average variance extracted for a construct in order to examine the discriminant validity (Fornell & Larcker, 1991). As shown in Table 4, the squared correlations for each construct were found to be less than the average variance extracted by the indicators measuring that construct and indicating adequate discriminant validity. Hence, the measurement model posited adequate convergent validity and discriminant validity.

Table 4

Discriminant validity of constructs

Constructs	1	2	3	4
1. Actual Use	0.835			
2. Intention	0.482	0.838		
3. Perceived Usefulness	0.327	0.337	0.778	
4. Perceived Ease of Use	0.421	0.339	0.492	0.725

Note: Diagonals represent the AVE while the off-diagonals are the squared correlations

Assessment of the Structural Model

As shown in Figure 2 and Table 5, the direct effect of ease of use of technology on usefulness was significant ($\beta=0.702, p< 0.01$) and it also significantly correlated with

intention ($\beta=0.344, p < 0.01$). The perceived usefulness was also positively related to intention ($\beta=0.339, p < 0.01$). The perceived ease of use and usefulness collectively explained 39.7% of the variance in the intention to use e-learning. Thus H1, H2 and H3 of this study were supported. Next, H4, which claims that intention positively influences the actual use of technology, was tested. The beta value of 0.694, $p < 0.01$ indicates that intention really leads to the actual use of technology, explaining 48.2% of the variance. Thus H4 is also supported.

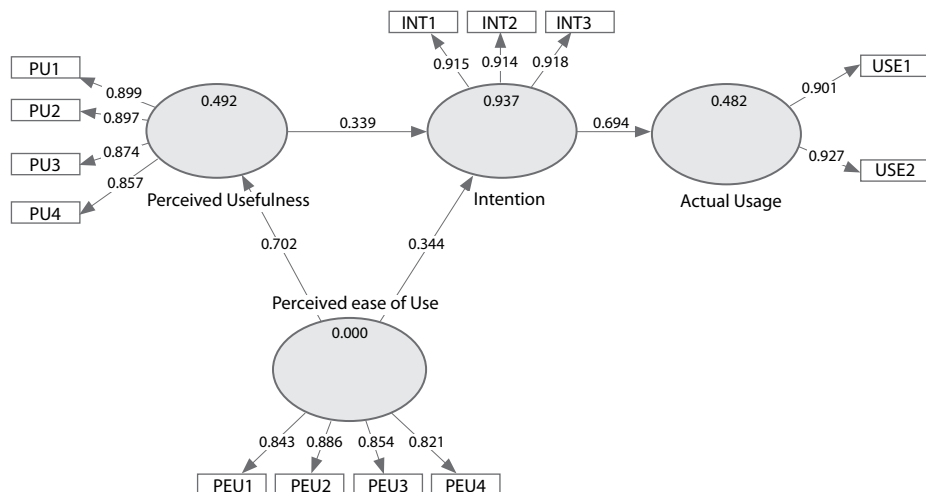


Figure 2. Structural Model

Table 5
Path coefficients and hypotheses testing

Hypothesis	Relationship	Coefficient	t-value	Supported
H1	PEU → PU	0.702	19.804**	YES
H2	PEU → INT	0.344	3.859**	YES
H3	PU → INT	0.339	3.618**	YES
H4	INT → USE	0.694	16.109**	YES

**p < 0.01

Assessment of Global Fit

To assess the fit of the PLS path modeling, a global fit measure (GoF), which is defined as the geometric mean of the average communality and average R^2 for endogenous constructs (Tennenhaus et al., 2005), can be calculated. Following the guidelines of Wetzels et al. (2009) as outlined in Akter et al. (2010), the GoF was calculated using the formula given below.

$$GOF = \sqrt{AVE \times R^2} = \sqrt{0.457 \times 0.794} = 0.602$$

The GoF value obtained in this study is 0.602 which exceeded the 0.36 cut-off value for large effect sizes of R^2 . This allows us to conclude that this model has a better

explanatory power when compared to the baseline values ($GoF_{small}=0.1$, $GoF_{medium}=0.25$, $GoF_{large}=0.36$). Thus it provides adequate support to validate the PLS model globally (Wetzels et al., 2009).

Discussion

This research explores if intention to use technology really leads to actual behavior in the e-learning environment. As stated by previous researchers (Jegede, 1990; Nwezeh, 2010), technology plays an important role and is a globally discussed issue in contemporary education policy. In exploring the intention to use technology among students, this will broaden the understanding of students' behavior regarding the actual use of technology in the university setting. This study has inevitably developed some guidelines for administrators of universities in a developing country such as Malaysia and for the implementation of technology in their teaching, learning and in their quest to educate students.

It was found that all dimensions of TAM, namely PEOU, PU, INT are significantly related to the actual use of technology. The findings of the study implied that the intention to use technology contributes to the actual use of technology in the university setting in Malaysia. The findings suggest that when a proper ICT is in place and properly utilized, it could foster and enhance teaching and learning and with that, the instructors or facilitators in the classrooms will have to change their teaching styles and be more technology savvy.

The findings indicated a strong association between the ease of use and the perceived usefulness in e-learning. This result is further supported by previous TAM research studies (Heijden, 2003; Sánchez, et al., 2013; Venkatesh & Davis, 2000) and hence demonstrated that e-learning systems must be user-friendly for learners in order to generate repeated use by the learners. This result is also in line with past studies whereby increased user experience has strong effect on the mastering of that technology (Venkatesh & Morris, 2000). Furthermore, Sánchez et al. (2013) proposed that in implementing e-learning it is crucial that, when there is an existence of predetermined mindset that employing an e-learning system is challenging, the students are more likely to accept this notion without even trying the system and that the advantages do not commensurate with the efforts needed to obtain them. For that reason, instructors are encouraged to devise a learning approach that would attract students by building their self-confidence to complete their assignments as students will abandon the system if they are faced with many difficulties in using a particular system. This explains that the ease of using a system is positively related to the system's usefulness. Thus, H1 was accepted.

PEOU was found to have significant relationship with users' intention to use technology. This is further supported by a study in e-learning context whereby students who perceive the system to be easy to use will have better attitudes and be more inclined to use the online education system (Saade & Kira, 2009). On a different note, this result is precisely consistent with past studies whereby when users

perceived the usefulness of a virtual learning environment, it has had positive impact on their future intention (Tong, 2010) and hence the perceived usefulness is the most important determinant of the use of new technology (Ha & Soel, 2009). One of the previous studies (Lim, Lee, & Nam, 2007) has elucidated that the perceived ease of use of technology and perceived usefulness are important factors that contribute to users' intention to use it while a study by Islam, Low and Hasan (2013) found that users will be fretful when using a system that they have no skills for. Similarly, Maditinos, Chatzoudes and Sarigiannidis (2013) also found that PU has a major influence on the intention to use technology. Therefore, the results point out that students' choice to use an e-learning system depends largely on the perceived advantages of using it, so the very usefulness of the system should not be disregarded as it has positive effect on student's perceptions. If the system is difficult to use, they will not consider it a valuable vehicle to complete their tasks. Islam et al., (2013) proposed that for a system to be accepted by users, companies, and in this case universities, may contemplate it has to be user-friendly in order to enhance the intention of users to use that system. In a similar vein, Thakur and Srivastava (2013) found that mobile service providers could promote the benefits of using mobile commerce as a convenience which would encourage its use. Hence, H2 and H3 were supported.

The statistical results have supported H4, which claims that there is a positive relationship between the intention to use technology and actual behavior. The result revealed is supported by and in line with studies carried out in the past (Jan & Contreras, 2010; Teo & Lee, 2010). As stated by Chiu, Sun, Sun, and Ju (2007), intrinsic and extrinsic values are important in predicting users' satisfaction and hence lead to learners' continuance intentions. In the study by Sun, Tsai, Finger, Chen and Yeh (2008), it was found that the design of e-learning itself should influence satisfaction of users by designing a suitable and relevant learning module that is in line with the learning objective of a specific course. Furthermore, Sawang, Newton and Jamieson (2013) believed that the content of e-learning ought to include applicable and practical factors that could assist in the acquisition of new knowledge.

The findings of this research confirmed those found in the existing literature and also confirmed that TAM model is fully supported in the e-learning settings among the students of public universities in Malaysia. Hence universities should emphasize and focus on the ease of use of technology and the perceived usefulness of the system in order to increase the university students' intention to use technology.

Implications

As this study revealed that intention to use technology leads to the actual use of technology, policy-makers or administrators are advised to create a positive setting for students to adopt the use of technology. Advantages of using technology in education should be underlined as to promote e-learning in universities and it is posited by Ndubisi (2006) that one of the advantages of e-learning perceived by students is its flexibility.

Furthermore, e-learning enhances the level of interactivity between the instructor and students as well as among students themselves, and the university administrators should focus on flexibility and interactivity of e-learning in promoting this aspect (Al-Harbi, 2011). In universities' quest to promote the need to adopt technology and ensure the success of e-learning, it is imperative to identify the objectives of students when utilizing ICT in their studies. Toni Mohr et al. (2012) proposed that students' learning outcomes in adopting e-learning can be achieved through a blended e-learning method, which consists of a combination of traditional form of learning and e-learning (Bielawski & Metcalf, 2003; Hughes, 2007). For e-learning to be successful, the software design has to be easy and has to support the content of the study in order to encourage the teaching and learning process. Apart from that, one of the key factors of e-learning success is the usability of the software interface as an interface that is easy to maneuver and that will lead to an increased use and that would result in a higher level of satisfaction among students (Arenas-Márquez et al., 2012). In the implementation of e-learning, it is also crucial for instructors to play a key role as they are in direct contact with students and are aware of the challenges that students face in using an e-learning system, so instructors would have to motivate students to use the systems (Sánchez et al., 2013).

It should be noted that the characteristics of users play a vital role in the outcome in a similar research (Maditinos et al., 2013). Venkatesh et al. (2003) found that users who are inexperienced with systems will more likely consider efforts to learn the system as important, whereas experienced users may feel that the effort to learn new systems is not so important. It is also proposed that for the use of technology the administrators at universities should provide training for students as well as highlight the importance and usefulness of technology in education (Jan & Contreras, 2010). It is imperative that training has to be constant as technology is continuously evolving, which will ensure a perennial use of technology among students. This study is useful for facilitators to collect more information and design a better e-learning system at the beginning of the education courses in order to plan and strategize a better learning system for the university students.

Conclusions

As ICT becomes integrated into education system, it is crucial to examine factors that will influence the use of technology. This study endeavors to investigate if intention to use e-learning technology leads to the actual use of technology among university students in Malaysia as a developing country. This study has an important role since it provides important knowledge for investigating and understanding the extent to which e-learning is adopted. The findings show that the actual use of e-learning is influenced by the intention to use technology and both the perceived ease of use of technology and the perceived usefulness contribute substantially to the intention to use technology. The findings from this study are believed to have provided

some guidance for administrators of higher education institutions in Malaysia to implement an e-learning model that is more appropriate for their students. This is also in accordance with the aspirations of the Government of Malaysia to become a high-income country by equipping students with the necessary ICT skills throughout public institutions of higher education.

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Vodi li namjera korištenja tehnologijom njezinoj stvarnoj upotrebi?

Istraživanje sustava e-učenja među studentima u Maleziji

Sažetak

Ovaj rad ima za cilj istražiti problem o kojemu se već dugo raspravlja – vodi li namjera korištenja tehnologijom takvom stvarnom ponašanju u okruženju za e-učenje. Testiran je model koji je utemeljen na modelu prihvaćanja tehnologije korištenjem podacima prikupljenim putem strukturiranog upitnika. Upitnike su ispunjavali studenti dodiplomskih studija s različitih sveučilišta u Maleziji. Korištenjem metode parcijalnih najmanjih kvadrata utemeljene na modelu varijance strukturne jednadžbe taj je model postigao vrijednost prikladnosti od 0,602, što nadilazi graničnu vrijednost od 0,36 za značajnu veličinu učinka R^2 . Stoga je dao dovoljno argumenata da bi se globalno potvrdila valjanost metode parcijalnih najmanjih kvadrata. Sve navedene hipoteze čvrsto su potvrđene što se tiče namjere koja vodi stvarnoj upotrebi tehnologije, a tako je potvrđena i valjanost modela prihvaćanja tehnologije u e-učenju i u kontekstu zemlje u razvoju. Dalje se navode implikacije za stručnjake koji se bave razvojem softvera i za rukovođeće strukture sveučilišta.

Ključne riječi: e-učenje; namjera i korištenje; percipirana korisnost; percipirana lakoća korištenja; studenti.

Uvod

Eksponencijalni rast informacija i izazov rastućih potreba korisnika dali su poticaj otkriću tehnologije i strategijama potrebnima za upravljanje i korištenje informacija. Što se tiče važnosti prihvaćanja tehnologije koja utječe na ljudsko ponašanje, ona je nepresušan izvor rasprave već barem dva desetljeća. U poslovnom okruženju provedena su mnogobrojna istraživanja o prihvaćanju tehnologije. Međutim, sve više istraživača iskazuje interes za ispitivanje faktora koji utječu na prihvaćanje tehnologije u obrazovnim sustavima (Clausen, 2007; Smarkola, 2007; Teo i Lee, 2010). Jasno se

može uočiti da izvođenje nastave i obrazovne usluge koje se izvode na tradicionalan način više ne mogu zadovoljiti potrebe obrazovanja, jer je pojava interneta promijenila način života u našem društvu, što se također odrazilo i na obrazovne metode.

Pojava novih tehnologija nije samo olakšala konvencionalne nastavne metode koje se koriste na samom mjestu izvođenja nastave nego je omogućila i uvođenje programa učenja na daljinu na svjetskoj razini (Toni Mohr, Holtbrügge i Berg, 2012). Nadalje, informacijska i komunikacijska tehnologija (IKT) sveučilišnim studentima pruža inovativan način poučavanja i učenja (Orton-Johnson, 2009), a kao rezultat te inovacije mnoga su sveučilišta otkrila prednosti korištenja informacijske i komunikacijske tehnologije u svojim nastavnim metodama (Arenas-Márquez, Machuca i Medina-López, 2012). Pojava informacijske i komunikacijske tehnologije preko noći je osvojila svijet i rezultirala novom generacijom koja provodi znatan dio vremena pred računalom i sličnim uređajima. Ta je činjenica olakšala evoluciju dječjeg načina razmišljanja u smjeru lakog prihvaćanja nove tehnologije, te je dovela do zaključka da je mlađa generacija spremna za drugačije načine učenja. To ih osposobljava za samostalno i cjeloživotno učenje (Sánchez, Hueros i Ordaz, 2013).

Uvođenje informacijske i komunikacijske tehnologije u visoko obrazovanje stvorilo je svojevrstu platformu koja omogućava širenje informacija o kolegijima, komunikaciju i ocjenjivanje zadataka s nastave, kao i poboljšanje procesa učenja, što sve olakšava suradničko obrazovanje (Augustsson, 2010; Maloney, 2007; Nelson, Christopher i Mims, 2009). Postoji različita terminologija koja opisuje poučavanje i učenje upotrebom tehnologije, kao što je učenje na daljinu, obrazovanje putem interneta, e-učenje i e-obrazovanje.

E-učenje odnosi se na elektroničke informacijske sustave kojima se pruža podrška rukovodstvu i nastavnicima u obrazovnom procesu u institucijama visokog obrazovanja ili u strukovnim institucijama. Cilj mu je pružiti adekvatne resurse studentima pri izvršavanju zadataka na sustavan način (Bhuasiri i sur., 2012; Fry, Ketteridge i Marshall, 2009; Strohmeier, 2008; Šumak, Heričko i Pušnik, 2011; Weller, 2007). Ono pruža mnoge prednosti i uvelike se koristi u obrazovnim programima. Uz informacijsku revoluciju i sve veći utjecaj informacijske i komunikacijske tehnologije e-učenje je bez sumnje moderniziralo proces poučavanja, učenja i istraživanja na većini sveučilišta (Kumar i Kaur, 2005). Razlog tome što mnoga sveučilišta organiziraju *online* tečajeve i kolegije jest inovativna priroda, pogodnosti i funkcionalni resursi informacijske i komunikacijske tehnologije koja ima velik potencijal udovoljavanja zahtjevima današnjih učenika (Vrielink, 2006) i koja može povećati zadovoljstvo korisnika i usvojenost znanja (Al-hawari i Mouakket, 2010).

U svojoj osnovi e-učenje temelji se na okruženju internetske tehnologije u kojoj se nastavnici i studenti sinkronizirano sastaju (Gümüs, 2010). Da bi e-učenje bilo učinkovito, korisnici moraju biti voljni napustiti manje učinkovit sustav i okrenuti se naprednijem sustavu s boljim inovacijama (Ndubisi, 2006). Instrumenti u e-učenju, poput učenja i poučavanja s pomoću računala, *online* razgovora o kolegijima i portala

za dijeljenje obrazovnih materijala postaju sastavni dio sveučilišnih obrazovnih programa diljem svijeta (Toni Mohr i sur., 2012).

Prijašnjim je istraživanjima utvrđeno da je integracija tehnologije jedna od ključnih odrednica za unapređenje aktivnosti poučavanja i učenja u obrazovnim sustavima (Teo i Lee, 2010). K tome, tercijarni obrazovni sustavi širom svijeta pokazuju tendenciju većem korištenju informacijske i komunikacijske tehnologije jer ona omogućava fleksibilnije pristupe poučavanju i učenju (Nwezeh, 2010). U Maleziji vlada stavlja veliki naglasak na informacijsku i komunikacijsku tehnologiju kojom bi se obogatile tradicionalne metode poučavanja na fakultetima. Međutim, proveden je relativno mali broj istraživanja kojima bi se ispitala namjere studenata da se koriste tehnologijom kao alternativnom metodom učenja. Upotreba informacijske i komunikacijske tehnologije u obrazovanju dio je strategije u Maleziji kojom se pokušava poticati korištenje tehnologijom u obrazovanju da bi se kod studenata razvile nove vještine, te da bi Malezija stekla nove mogućnosti da postane ekonomija s visokim prihodima (Tenth Malaysia Plan, 2010). Dakle, postoje uvjerljivi razlozi za provođenje istraživanja o učinkovitosti tehnologije kojom bi se u visokom obrazovanju unaprijedile postojeće metode poučavanja.

Namjera je ovog istraživanja ispitati vodi li namjera korištenja novom tehnologijom prema stvarnom korištenju te tehnologije u okruženju za e-učenje kod dodiplomskih studenata na malezijskim sveučilištima. Prihvaćanje tehnologije već je uvelike istraženo s ciljem ispitivanja detaljnijih razloga koji studente motiviraju za prihvaćanje novih tehnologija (Bonera, 2011). Ovo istraživanje utemeljeno je na modelu prihvaćanja tehnologije (Davis, 1989) koji su objasnili Ajzen i Fishbein (1980) tako što su ispitali biheviorističke faktore kod studenata. Rezultati istraživanja pomoći će institucijama visokog obrazovanja u Maleziji pri osmišljavanju i poboljšanju modela e-učenja koji će biti učinkovit i poticati studente na aktivno sudjelovanje.

Konceptualna podrška i razvoj hipoteza

Slika 1.

U postojećoj literaturi previše se pažnje poklanja identificiranju ključnih faktora koji utječu na prihvaćanje i upotrebu tehnologije. Stoga je razvijeno nekoliko modela koji predviđaju prihvaćanje tehnologije, kao što su model prihvaćanja tehnologije i teorija planiranog ponašanja. Opsežna istraživanja koristila su se modelom prihvaćanja tehnologije da bi ispitala i predvidjela prihvaćanje različitih inovacija u području informacijske tehnologije, no ona su prilično ograničena kada se radi o inovacijama u obrazovanju (Ngai, Poon i Chan, 2007; Saade Nebebe, i Tan, 2007). S druge pak strane, teoriju planiranog ponašanja prvi je objasnio Ajzen (1991), koji je smatrao da je ona samo nastavak teorije razumnog djelovanja i koja se u istraživanjima koristi za predviđanje namjera i ponašanja korisnika. Model prihvaćanja tehnologije temelji se na principu da se prihvaćanje inovacija u području informatike sastoji od percipirane korisnosti i percipirane lakoće korištenja.

Zapravo, model prihvaćanja tehnologije općenito se koristi u istraživanjima o tehnologiji za predviđanje, prihvaćanje, usvajanje i upotrebu informacijskih sustava (Halawi i McCarthy, 2007). U osnovi se model prihvaćanja tehnologije temelji na glavnom principu da upotrebu informatičkih inovacija potiče bihevioristička namjera. Model prihvaćanja tehnologije, koji ističe biheviorističku uzročno-posljedičnu vezu sastavljenu od uvjerenja, stava i namjere, koristi se u objašnjavanju i predviđanju stupnja prihvaćanja tehnologije od korisnika (Chen, Gillenson i Sherrell, 2002).

Percipirana korisnost

Percipirana korisnost sustava uglavnom se u prošlosti definirala kao mjera do koje korisnici vjeruju da će im upotreba nove tehnologije pomoći u izvršavanju zadataka. Pronađeno je dosta dokaza koji upućuju na to da je percipirana korisnost najpouzdaniji prediktor namjere korisnika da se koriste tehnologijom i prihvate je (Venkatesh, Morris, Davis i Davis, 2003). Razna empirijska istraživanja potvrdila su da je percipirana korisnost glavni prethodnik upotrebe informacijske tehnologije (Davis, 1989; Davis i sur., 1992; Gefen, 2003; Gefen i Straub, 1997, 2000; Hsu i Lu, 2004; Igarria i sur., 1997; Ong i sur., 2004; Venkatesh, 2000; Venkatesh i Davis, 2000). Prijašnja su istraživanja (Bhattacharjee i Sanford, 2006; Shih, 2004) pokazala da percipirana korisnost ima izravan utjecaj na stav, a Venkatesh i sur. (2003) utvrdili su da postoje i druge studije koje su slične percipiranoj korisnosti u drugačijem okruženju, te su spomenuli ekstrinzičnu motivaciju Davisa, Bagozzija i Warshawa (1992), relativnu prednost Moorea i Benbasata (1991), prikladnost poslu Thompsona, Higginsa i Howella (1991), te očekivanja ishoda Compeaua i Higginsa (1995) i Compeaua, Higginsa i Huffa (1999). Na temelju tih definicija i nekih drugih studija očito je da je percipirana korisnost povezana s percipiranim vrijednostima korisnika o tome koliko informacijski sustav može poboljšati način na koji korisnici rade svoj posao (Yeh i Teng, 2012). Međutim, u ovom istraživanju percipirana korisnost odnosi se na to kako studenti percipiraju sam sustav, tj. je li sustav lako koristiti i pomaže li on studentima kako bi izgradili pozitivne stavove prema prihvaćanju e-učenja (Saadé i Kira, 2009).

Percipirana lakoća korištenja

Percipirana lakoća korištenja sustava opisuje se kao mjera u kojoj korisnik smatra da se određena tehnologija može koristiti bez velikog napora. To znači da će korisnici u većoj mjeri prihvatiti tehnologije koje se mogu lako koristiti (Moon i Kim, 2001) i da postoje veći izgledi da će prihvatiti novu tehnologiju ako je za interakciju potreban minimalan napor (Agarwal, 2000). Istraživanja o percipiranoj lakoći korištenja razlikuju se od konteksta do konteksta, varirajući od rezultata koji pokazuju nebitne vrijednosti, kao što je istraživanje o medicinskom (Chau i Hu, 2002) i računovodstvenom zanimanju (Bedard, Jackson, Ettredge i Johnstone, 2003; Pennington, Kelton i DeVries, 2006), a istraživanje koje su proveli Vella, Caruana i Pitt (2013) pokazalo je da je predanost organizaciji važan prethodnik percipiranoj lakoći korištenja. Istraživači su već pokazali da je percipirana lakoća korištenja u pozitivnoj

korelaciji s biheviorističkom namjerom, i izravno (Davis, 1989; Gefen, 2003; Gefen i Straub, 1997, 2000; Venkatesh, 2000; Venkatesh i Davis, 2000) i neizravno putem percipirane korisnosti (Davis, 1989, 1992; Igarria i sur., 1995, 1997; Venkatesh, 2000; Venkatesh i Davis, 2000). Iz perspektive e-učenja percipirana lakoća učenja definira se kao mjera u kojoj student vjeruje da je upotreba elektroničkog sustava učenja glatka i lagana. Prije napisana literatura pokazuje da percipirana lakoća korištenja ima i izravan i neizravan utjecaj na stav (Barkhi i Wallace, 2007; Shih, 2004).

Stav i namjera korištenja tehnologijom

Prema modelu prihvaćanja tehnologije, na upotrebu tehnologije utječe bihevioristička namjera, a u ovom slučaju to je stav prema tehnologiji. Osim toga, Ajzen (1991) je naveo da će biheviorističke namjere odrediti djelovanje korisnika i da stav prema ponašanju ima pri tome važnu ulogu. Stav je naučena sklonost prema nekoj stvari, na pozitivan ili negativan način (Kaplan, 1972). U prošlosti su istraživači definirali stav kao spremnost pozitivnog reagiranja na osobu, stvar, instituciju ili događaj, a namjera korištenja tehnologijom mjeri stupanj prihvaćanja inovacije (Jan i Contreras, 2010). Prema teoriji razumnog djelovanja i teoriji planiranog ponašanja stavovi mogu utjecati na biheviorističku namjeru korisnika (Ajzen, 1991), kao i na to u kojoj su mjeri korisnici voljni pokušati izvesti određeni tip ponašanja (Armitage i Conner, 2001). Prijašnji su istraživači također otkrili da na namjeru korištenja tehnologijom utječe stav korisnika prema tehnologiji (Moon i Kim, 2001; Szajna, 1996), a stav se može sastojati od pozitivnih ili negativnih osjećaja prema određenom tipu ponašanja (Teo i Lee, 2010). Na osjećaje utječe to kako korisnici percipiraju korisnost tehnologije u okruženju za učenje.

Na temelju navedene rasprave predložene su sljedeće hipoteze:

- H1: Percipirana lakoća korištenja tehnologijom u pozitivnoj je vezi s percipiranom korisnošću.
- H2: Percipirana lakoća korištenja tehnologijom u pozitivnoj je vezi s namjerom korištenja tehnologijom.
- H3: Percipirana korisnost u pozitivnoj je vezi s namjerom korištenja tehnologijom.
- H4: Namjera korištenja tehnologijom u pozitivnoj je vezi sa stvarnom upotrebom.

Metodologija

Podaci su prikupljeni na uzorku koji se sastojao od studenata dodiplomskih studija, a koji koriste sustave e-učenja u glavnim državnim sveučilištima u Maleziji. Iako je prethodno bilo podijeljeno 500 upitnika, prikupljeno je ukupno 268 ispunjenih upitnika, budući da je spomenuto da je sudjelovanje u istraživanju dobrovoljno. Odbačeno je 13 upitnika jer su sadržavali nepotpune odgovore, a neki studenti nisu imali iskustva u korištenju sustavom e-učenja. Stoga je efektivna stopa odgovora 51%, što je prihvatljivo. Za prikupljanje podataka korišten je strukturirani upitnik s tvrdnjama koje su preuzete iz korištene literature. Tvrdnje i izvori mjerenja prikazani

su u Tablici 1. Da bi se izmjerila percipirana lakoća korištenja tehnologije, percipirana korisnost i namjera, korištena je skala od 7 tvrdnji, a tvrdnje su bile sljedeće: 1 = Uopće se ne slažem; 2 = Ne slažem se; 3 = Gotovo se ne slažem; 4 = Neutralno; 5 = Gotovo se slažem; 6 = Slažem se; 7 = Potpuno se slažem. Da bismo izmjerili stvarnu svakodnevnu upotrebu tehnologije, koristili smo se skalom od 6 tvrdnji, a one su bile: 1 = Gotovo nikada; 2 = Manje od pola sata; 3 = Od pola sata do sat vremena; 4 = 1 – 2 sata; 5 = 2 – 3 sata; 6 = Više od 3 sata. Za mjerenje frekvencije upotrebe korištena je skala od 6 tvrdnji: 1 = Nikada / gotovo nikada; 2 = Manje od jednom mjesečno; 3 = Nekoliko puta mjesečno; 4 = Nekoliko puta tjedno; 5 = Otprilike jednom dnevno; 6 = Nekoliko puta na dan.

Tablica 1.

Varijable i mjere.

Konstrukt/Izvor		Mjera (<i>Operacionalizacija</i>)
Percipirana korisnost (Martinez-Torres i sur., 2008)	PU1	Mislim da je korištenje sustava e-učenja poboljšalo moje rezultate .
	PU2	Korištenje sustava e-učenja popravilo je moju produktivnost.
	PU3	Korištenje sustava e-učenja povećalo je moju učinkovitost učenja.
	PU4	Smatram da je sustav e-učenja koristan za učenje.
Percipirana lakoća korištenja (Martinez-Torres i sur., 2008)	PEU1	Učiti koristiti sustav e-učenja bilo je lako.
	PEU2	Mislim da mi korištenje sustava e-učenja pomaže raditi što god poželim.
	PEU3	Moja interakcija sa sustavom e-učenja jasna je i razumljiva.
	PEU4	Mislim da je lako koristiti se sustavom e-učenja.
Namjera korištenja (Pavlou, 2003)	INT1	Namjeravam se koristiti sustavom e-učenja u svom studijskom programu.
	INT2	Očekujem da ću se koristiti sustavom e-učenja u svom studijskom programu.
	INT3	Ako budem imao pristup sustavu e-učenja, koristit ću se njime koliko je god moguće.
Stvarna upotreba (Teo, 2001; (Martinez-Torres i sur., 2008)	Dnevno	U prosjeku, koliko vremena provodiš koristeći se sustavom e-učenja?
	Frekvencija	U prosjeku, koliko se često koristiš sustavom e-učenja?

Rezultati

Budući da su ciljani ispitanici bili studenti dodiplomskih studija, većina njih bila je u dobi između 18 i 23 godina, a nekoliko njih imalo je više od 23 godine, uključujući one koji su se u dodiplomski studijski program upisali nakon ponovnog polaganja prijemnog ispita. Većina ispitanika bila je ženskog spola (više od 68%), a 32% ispitanika bilo je muškog spola. Ovo je zanimljiv profil ispitanika, a koji je ujedno i najvažniji fenomen u posljednje vrijeme koji se može primijetiti na malezijskoj studentskoj populaciji. Naime, studentska populacija sastoji se od više od 70% studentica na većini državnih sveučilišta u Maleziji. Oko 33% su Malezijci, nešto više od 56% Kinezi,

a preostali su Indijci i drugi. Postotak je prilično izbalansiran što se tiče područja obrazovanja. 51% studenata bavi se područjem umjetnosti, a 49% područjem znanosti (vidi Tablicu 2).

Tablica 2.

Testiranje hipoteza

Za potrebe ovog istraživanja korišten je SmartPLS M3 2.0 za procjenu modela (Ringe i sur., 2005) kojim će se ispitati parametri u vanjskom i unutarnjem modelu. Primijenjeno je modeliranje traga metodom parcijalnih najmanjih kvadrata (eng. *partial least square path modelling*) i ponderiranje traga sheme za unutarnju aproksimaciju (eng. *path-weighting scheme*) (Chin, 1998; Tenenhaus i sur., 2005; Wetzels i sur., 2009). Nakon ovoga primijenili smo neparametrijsku *bootstrap* metodu (Chin, 1998; Tenenhaus i sur., 2005; Wetzels i sur., 2009) s 200 replikacija da bismo dobili standardne pogreške procjene.

Procjena modela mjerenja

Prvo je bila testirana konvergentna valjanost da bi se ispitalo jesu li višestruke tvrdnje kojima se mjeri isti pojam usuglašene. Hair i sur. (2010) preporučili su korištenje faktorskog opterećenja, kompozitnu pouzdanost i prosječnu ekstrahiranu varijancu da bi se procijenila konvergentna valjanost. Primijetili smo da su sve tvrdnje imale opterećenja koja su prelazila preporučenu vrijednost od 0,6 (Chin i sur., 1997). K tome, vrijednosti kompozitne pouzdanosti, kako je prikazano u Tablici 3, bile su u rasponu od 0,910 do 0,934, što je nadilazilo preporučenu vrijednost od 0,7 (Hair i sur., 2010). Prosječna ekstrahirana varijanca bila je u rasponu između 0,725 i 0,838, što je nadilazilo preporučenu vrijednost od 0,5 i pokazalo ukupnu količinu varijance u indikatorima koje je objasnio latentni konstrukt (Hair i sur., 2010).

Tablica 3.

Diskriminantna valjanost korištena je da bi se ispitalo u kojoj mjeri dobivena mjerenja nisu odraz nekih drugih varijabli, a pokazuju je niske korelacije između mjerenja interesa i mjerenja drugih konstrukata (Cheung i Lee, 2010). Može se napraviti usporedba na temelju kvadriranih korelacija između konstrukata i prosječne ekstrahirane varijance za pojedini konstrukt da bi se ispitala diskriminantna valjanost (Fornell i Larcker, 1991). Kako je prikazano u Tablici 4, uočeno je da su kvadrirane korelacije za svaki konstrukt niže od prosječne ekstrahirane varijance, putem indikatora koji su mjerili taj konstrukt i naznačili adekvatnu diskriminantnu valjanost.

Tablica 4.

Procjena strukturiranog modela

Kako se može vidjeti na Slici 2 i u Tablici 5, izravan utjecaj lakoće korištenja tehnologije na korisnost bio je značajan ($\beta=0,702$, $p< 0,01$), a također je bio u

značajnoj korelaciji s namjerom ($\beta=0,344$, $p< 0,01$). Percipirana korisnost također je bila u pozitivnoj vezi s namjerom ($\beta =0,339$, $p< 0,01$). Percipirana lakoća korištenja i korisnost zajedno su objasnile 39,7% varijance kod namjere korištenja e-učenja. Tako su H1, H2 i H3 ovog istraživanja potvrđene. Zatim smo testirali H4 koja tvrdi da namjera pozitivno utječe na stvarnu upotrebu tehnologije. Beta vrijednost od 0,694, $p< 0,01$ pokazuje da namjera zaista vodi stvarnoj upotrebi tehnologije, tako objašnjavajući 48,2% varijance. Dakle, time je potvrđena i H4.

Slika 2.

Tablica 5.

Procjena opće prikladnosti

Da bi se procijenila prikladnost modeliranja traga metodom parcijalnih najmanjih kvadrata, mogu se izračunati i opća prikladnost, (engl. *global fit measure* - GoF), koja se definira kao zajednička geometrijska prosječna srednja vrijednost i prosječni R^2 za endogene konstrukte (Tenenhaus i sur., 2005). Vodeći se smjericama Wetzelsa i sur. (2009), kako su naveli Akter i sur. (2010), izračunali smo opću prikladnost koristeći se navedenom formulom:

$$GOF = \sqrt{AVE \times \bar{R}^2} = \sqrt{0.457 \times 0.794} = 0.602$$

GoF vrijednost dobivena u ovom istraživanju je 0,602, što nadilazi graničnu vrijednost od 0,36 za velike uzorke R^2 . To nam pomaže da dođemo do zaključka da ovaj model pruža bolju mogućnost objašnjavanja u usporedbi s vrijednostima bazne linije ($GoF_{\text{mali}} = 0,1$, $GoF_{\text{srednji}} = 0,25$, $GoF_{\text{veliki}} = 0,36$). Dakle, ona nam pruža adekvatnu podršku da bismo globalno potvrdili PLS model (Wetzels i sur., 2009).

Rasprava

Ovo istraživanje ispituje vodi li namjera korištenja tehnologije stvarnom takvom ponašanju u okruženju za e-učenje. Kako je već navedeno u prijašnjim istraživanjima (Jegede, 1990; Nwezeh, 2010), uloga tehnologije jako je važna i česta je tema globalnih rasprava u sklopu suvremene obrazovne politike. Ispitivanje namjere korištenja tehnologijom među studentima poboljšat će razumijevanje ponašanja studenata kada se radi o stvarnoj upotrebi tehnologije u sveučilišnom okruženju. Ovo je istraživanje nedvojbeno stvorilo neke smjernice za upravljačke strukture na sveučilištima u zemlji u razvoju kao što je Malezija, kao i za uvođenje tehnologije u nastavu, učenje i ostvarenje njihova cilja – obrazovanja studenata.

Saznali smo da su sve dimenzije modela prihvaćanja tehnologije, kao što su percipirana lakoća korištenja, percipirana korisnost i namjera korištenja, značajno povezane sa stvarnom upotrebom tehnologije. Rezultati istraživanja upućuju na to da namjera korištenja tehnologijom pridonosi stvarnoj upotrebi tehnologije na sveučilištima u Maleziji. Rezultati također impliciraju da kada postoji ispravna

informacijska i komunikacijska tehnologija, te kada se ona koristi na pravi način, da se onda može poboljšati proces poučavanja i učenja. Samim time bi nastavnici morali promijeniti svoj stil predavanja i poučavanja, i postati stručnjacima za tehnologiju.

Rezultati također upućuju i na jaku vezu između lakoće korištenja i percipirane korisnosti u e-učenju. Taj rezultat mogu potkrijepiti prijašnja istraživanja o modelu prihvaćanja tehnologije (Heijden, 2003; Sánchez i sur., 2013; Venkatesh i Davis, 2000), pa on tako pokazuje da sustavi e-učenja korisnicima moraju biti laki za korištenje da bi stvorili naviku redovite upotrebe tih sustava. Taj je rezultat također u skladu i s prijašnjim istraživanjima koja su pokazala da veće iskustvo korisnika ima velik utjecaj na ovladavanje tom tehnologijom (Venkatesh i Morris, 2000). Nadalje, Sánchez i sur. (2013) su istaknuli da je u provedbi e-učenja neophodno da, ako postoji unaprijed određeni način razmišljanja da korištenje sustava e-učenja predstavlja izazov, postoje veći izgledi da će studenti prihvatiti takav način razmišljanja i sami, bez pokušaja korištenja sustava, i da neće smatrati da su prednosti koje on donosi proporcionalne uloženom trudu. Zbog tog razloga nastavnike se potiče da osmisle pristup učenju koji bi privukao studente tako što bi u njima razvijao samopouzdanje da izvrše svoje zadatke. Studenti se inače prestaju koristiti sustavom ako se moraju suočiti s mnogim teškoćama pri njegovu korištenju. To objašnjava da je lakoća korištenja sustava u pozitivnoj vezi s korisnošću sustava. Tako je prihvaćena prva hipoteza.

Uočeno je da percipirana lakoća korištenja značajno utječe na namjeru korisnika da se koriste tehnologijom. To ima daljnju podršku u istraživanju provedenom u kontekstu e-učenja u kojem studenti koji smatraju da je sustav lako koristiti imaju bolje stavove i skloniji su koristiti *online* obrazovni sustav (Saade i Kira, 2009). Osim toga, rezultat je u potpunosti u skladu i s rezultatima prijašnjih istraživanja koja su pokazala da, kada su korisnici percipirali korisnost okruženja virtualnog učenja, da je ono imalo pozitivan utjecaj na njihove buduće namjere (Tong, 2010), pa je tako percipirana korisnost najvažnija odrednica upotrebe nove tehnologije (Ha i Soel, 2009). Jedno od prijašnjih istraživanja (Lim, Lee i Nam, 2007) objasnilo je da su percipirana lakoća korištenja tehnologije i percipirana korisnost važni faktori koji pridonose namjeri korisnika da upotrebljavaju tehnologiju, a istraživanje koje su proveli Islam, Low i Hasan (2013) pokazalo je da će korisnici biti frustrirani kada koriste sustav za čije korištenje nemaju potrebne vještine. Slično tome, Maditinos, Chatzodues i Sarigiannidis (2013) također su otkrili da percipirana korisnost ima glavni utjecaj na namjeru korištenja tehnologije. Dakle, rezultati pokazuju da izbor studenata da se koriste sustavom e-učenja uvelike ovisi o percipiranim prednostima korištenja tog sustava, tako da se ne bi trebala zanemariti sama korisnost sustava, jer ona ima pozitivan utjecaj na percepcije studenata. Ako se sustavom teško koristiti, studenti ga neće smatrati vrijednim sredstvom s pomoću kojega će izvršiti svoje zadatke. Islam i sur. (2013) su izjavili da, ako sustav bude prihvaćen od korisnika, kompanije, a u ovom slučaju sveučilišta, moraju smatrati da ga je lako koristiti da bi povećali namjere korisnika da ga koriste. Slično tome, Thakur i Srivastava (2013)

su otkrili da bi pružatelji mobilnih usluga mogli promicati dobrobiti korištenja mobilne trgovine kao pogodnost, što bi svakako potaknulo njezino korištenje. Tako su potvrđene i hipoteze 2 i 3.

Statistički rezultati idu u prilog hipotezi 4, koja tvrdi da postoji pozitivna veza između namjere korištenja tehnologije i stvarnog ponašanja. Dobiveni je rezultat potvrđen i u skladu s prije provedenim istraživanjima (Jan i Contreras, 2010; Teo i Lee, 2010). Kako su naveli Chiu, Sun, Sun i Ju (2007), intrinzične i ekstrinzične vrijednosti važne su za predviđanje zadovoljstva korisnika, te tako vode do namjere korisnika da se konstantno koriste sustavom. U istraživanju koje su proveli Sun, Tsai, Finger, Chen i Yeh (2008) došlo se do spoznaje da bi sam dizajn e-učenja trebao utjecati na zadovoljstvo korisnika tako što stvara pogodan i relevantan modul učenja koji je u skladu s ishodima učenja svakog pojedinog kolegija. Nadalje, Sawang, Newton i Jamieson (2013) smatraju da bi sadržaj e-učenja trebao uključiti primjenjive i praktične faktore koji bi mogli pomoći pri usvajanju novog znanja.

Rezultati do kojih se došlo ovim istraživanjem potvrdili su one u postojećoj literaturi i također su potvrdili da model prihvaćanja tehnologije ima jako uporište u okruženju za e-učenje među studentima malezijskih državnih sveučilišta. Stoga bi sveučilišta trebala naglasiti i usredotočiti se na lakoću korištenja tehnologijom i percipiranu korisnost sustava da bi povećala namjere studenata da se tehnologijom koriste.

Implikacije

Budući da je ovo istraživanje pokazalo da namjera korištenja tehnologije vodi stvarnom korištenju tehnologijom, kreatorima obrazovne politike i rukovoditeljima sveučilišta savjetuje se da stvore pozitivno ozračje u kojemu bi studenti prihvatili korištenje tehnologijom. Trebale bi se istaknuti prednosti korištenja tehnologijom u obrazovanju da bi se promicalo e-učenje na sveučilištima, a Ndubisi (2006) smatra da je jedna od percipiranih prednosti korištenja e-učenjem od studenata upravo njegova fleksibilnost.

Nadalje, e-učenje povećava stupanj interaktivnosti između nastavnika i studenata, kao i između studenata međusobno, pa bi se rukovodstvo sveučilišta trebalo usredotočiti na fleksibilnost i interaktivnost e-učenja u promicanju tog aspekta (Al-Harbi, 2011). U nastojanju sveučilišta da promiču potrebu usvajanja tehnologije i da osiguraju uspjeh e-učenja, neophodno je prepoznati ciljeve studenata kada se koriste informacijskom i komunikacijskom tehnologijom u svom učenju. Toni Mohr i sur. (2012) su sugerirali da bi se ishodi učenja u usvajanju e-učenja kod studenata mogli postići kroz spojenu metodu e-učenja koja se sastoji od kombinacije tradicionalnog oblika učenja i e-učenja (Bielawski i Metcalf 2003; Hughes 2007). Da bi e-učenje bilo uspješno, softver mora biti dizajniran tako da ga bude lako koristiti i mora pratiti sadržaj učenja da bi poticao proces poučavanja i učenja. Osim toga, jedan od ključnih čimbenika uspjeha e-učenja jest korištenje programskog sučelja kao sučelja kojim je lako upravljati, koje će dovesti do povećane upotrebe i koje će rezultirati višim

stupnjem zadovoljstva studenata (Arenas-Márquez i sur., 2012). U provedbi e-učenja također je vrlo bitno da nastavnici odigraju ključnu ulogu jer su oni u izravnom kontaktu sa studentima i svjesni su izazova s kojima se studenti susreću kada se koriste sustavom e-učenja. Zato bi upravo nastavnici trebali motivirati studente da se koriste takvim sustavom (Sánchez i sur., 2013).

Trebalo bi spomenuti da karakteristike korisnika imaju važnu ulogu u ishodima u jednom sličnom istraživanju (Madininos i sur., 2013). Venkatesh i sur. (2003) su došli do spoznaje da će korisnici koji nemaju iskustva u korištenju sustava u većoj mjeri smatrati da je trud koji ulažu u učenje o sustavu važan, a iskusni će korisnici vjerojatno smatrati da trud uložen u učenje o novim sustavima nije tako važan. Također se predlaže da bi rukovoditelji sveučilišta trebali organizirati edukaciju za studente o korištenju tehnologijom, te naglasiti važnosti i korisnost tehnologije u obrazovanju (Jan i Contreras, 2010). Neophodno je da edukacija bude trajna, budući da se tehnologija neprestano razvija, što bi osiguralo trajnu upotrebu tehnologije kod studenata. Ovo je istraživanje korisno i za nastavnike da bi prikupili više informacija i izradili bolji sustav e-učenja na početku nastave, kao i da bi mogli planirati i upravljati boljim sustavom učenja za studente.

Zaključci

Kako informacijska i komunikacijska tehnologija postaje integrirana u obrazovni sustav, od iznimne je važnosti ispitati čimbenike koji će utjecati na upotrebu tehnologije. Ovim istraživanjem pokušalo se ispitati vodi li korištenje tehnologijom e-učenja stvarnoj upotrebi tehnologije među studentima u Maleziji, kao zemlji u razvoju. Istraživanje ima važnu ulogu jer pruža važnu podlogu za ispitivanje stupnja u kojem je e-učenje prihvaćeno. Rezultati pokazuju da na stvarnu upotrebu e-učenja utječe namjera korištenja tehnologije, zatim da i percipirana lakoća korištenja tehnologijom i percipirana korisnost znatno doprinose namjeri korištenja tehnologijom. Smatramo da su rezultati istraživanja pružili neke smjernice rukovoditeljima institucija visokog obrazovanja u Maleziji za provođenje modela e-učenja koji je prikladniji za njihove studente. Rezultati su također u skladu s težnjama malezijske vlade da postane zemlja visokog dohotka tako što će studenti steći potrebne informacijske i komunikacijske vještine u svim državnim institucijama visokog obrazovanja.