UNDERSTANDING E-PORTFOLIO CONTINUANCE INTENTION AMONG STUDENTS: A SELF-DETERMINATION PERSPECTIVE

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Abstract

This paper proposed an extended information system continuance model (ISCM) in the context of e-Portfolio utilization among students, Based on self-determination theory (SDT). The purpose was to investigate the factors influencing students' continuance intention towards using e-Portfolio. The 370 usable data were collected and analysed further using partial least squares. In the proposed model, satisfaction, perceived usefulness, confirmation, perceived autonomy and perceived competence were found to be significant in explaining the students' continuance intention to use e-Portfolio. The results of this study show that applying SDT to e-Portfolio in higher education institution can be useful to predict the students' continuance intention.

Keywords: Electronic portfolio, E-Portfolio, Self-determination theory (SDT), IS continuance model (ISCM), Continuance intention.

1 INTRODUCTION

The development of Internet-based applications in higher educations, classroom learnings, student affairs, and career services is providing dynamic new opportunities for college student programs and services. All of these Internet applications are rapidly changing the processes and tools that college students use in their career development and job-seeking behaviors (Garis 2007). It means that internet has changed many educational methods to the electronic versions. Due to this reason, the importance of technologies in the higher education is increasing during the last decades. Nowadays, technology is an inseparable part of any universities in order to deliver more effective and efficient services to the students. One of these technologies are e-Portfolios, which have become an significant tools in learning environments (Huang et al. 2011). The literature shows the increase in the use of e-Portfolios in different employment and educational context (Baris & Tosun 2013; Chau & Cheng 2010; Fitcha et al. 2008; Lorenzo & Ittelson 2005; Shroff et al. 2011). E-Portfolios can help students make connections between their extracurricular activities and courses and enables them to reflect and presents their abilities, skills and information (Diller & Sue 2008). Moreover, it can be useful in the process of lifelong learning (Butler 2006; Dorninger & Schrack 2008 ; Hsieh et al. 2014). E-Portfolios can have different roles based on their purposes. However, they have six important functions, including planning for educational programs, documenting skills, knowledge and learning, tracking progress, finding a job, evaluating a course and monitoring their performance (Lorenzo & Ittelson 2005). In spite of various advantages of e-Portfolio provided for students and universities, there are still issues regarding the long-term usage of the system (Mobarhan & Abdul Rahman 2014; Mobarhan et al. 2014).

On the other hand, Information Technology (IT) Acceptance and use is an important issue and challenge that has received many attentions of researchers. Successful technology adoption can increase the productivity and efficiency, while any failure in implementation can lead to undesirable outcomes, such as financial loses and dissatisfaction of users (Venkatesh 2000). As e-Portfolio is a student-centered learning system, its effectiveness depends on the students' long-term use of the system (Hsieh et al. 2014). Therefore, we also claim that student tendency for utilizing the e-portfolio continuously rather than first time use is significant for its success.

The main aim of this research is to investigate if the self-determination theory is applicable to explain the student continuance intention to utilize e-Portfolio. Our focus is on the IS-continuance theory (ISCM) proposed by (Bhattacherjee 2001) integrating with self-determination theory (SDT) by (Deci & Ryan 1985). ISCM is the core theory of this research, as it is the main theory in the field of continuous use and is able to explain the students' continuance intention to use e-Portfolio. Furthermore, SDT is a motivation theory, which tries to fill up the e-Portfolio usage gap by considering the students' feeling of autonomy, competence and relatedness. The advantage of merging these two theories is that the new extended theory has the opportunity to answer this question: "How the fulfilment of the vital human need such as need for autonomy, competence and relatedness in utilizing the e-portfolio can affect the student willingness to continue using the system?"

This study contributes to the technology continuance usage literature by combining SDT and IS-Continuance model. The organization of the paper is as follow: section 2 presents the theoretical background of e-Portfolio, IS-continuance model and the self-determination theory. In Section 3, we develop our hypothesis and propose our conceptual research model. In section 4, the methodology was discussed. Section 5 describes data analysis and findings. In the last section, the results are discussed and suggestion is provided.

2   THEORETICAL BACKGROUND

2.1   Electronic Portfolio

Electronic portfolio (also known as an eportfolio, e-portfolio, efolio, digital portfolio, webfolio and so on) is an electronic version of a paper-based portfolio (Butler 2006) . Currently, e-Portfolio used is many concepts such as universities, nursing, medical and working environments. There are various definitions of e-Portfolio, but the most comprehensive definition has given by (Challis 2005), which describes it as a
- Selective and structured collections of information1
- Gathered for specific purposes and
- showing/evidencing one's accomplishments and growth which are
- Stored digitally and managed by appropriate software
- Developed by using appropriate multimedia and customarily within a web environment and
- Retrieved from a website, or delivered by CD-ROM or by DVD

Based on the definition by (Balaban et al. 2013), e-Portfolio is "a personal digital record that supports formal, informal and non-formal learning and contains evidence about one's accomplishments in the form of artifacts and reflection on learning which can be provided to whomever the owner has chosen to grant permission."

Recently many universities are using the e-Portfolio system, due to the benefits given to the students and even the faculties and lecturers. E-portfolio gives students the opportunity to compile and reflect upon their work. Its main purpose is to record the students achievement and accomplishments over the years of their studying. E-portfolio is considered as an extension to e-learning systems and complements them by including social computing, wikis and blog features. The capability of online connectivity is transforming learning to more learner-centered and outcome oriented environment (Rennie & Mason 2004). Moreover, LaCour (2005) emphasizes the significant role of e-Portfolio in future learning because of its power in the learning discourse. Le (2012) described that an e-Portfolio in education can be a collection of student contribution in order to select contents, the criteria for judging merit and the criteria for selection, provide evidence on their self-reflection, interact with their friends and teachers, reflect on their reading and experiences, etc.

2.2   Self-determination Theory

SDT is a theory of motivation, which proposes both types of motivation, including intrinsic motivation and extrinsic motivation (Ryan & Deci 2000). Intrinsic motivation means that an individual performs an activity, as it is found interesting itself. While, extrinsic motivation refers to doing an activity because of external stimuli, such as verbal or tangible rewards (Gagne´ & Deci 2005). This theory posits that there are three human needs, namely Competence, Relatedness and Autonomy, which if satisfied, allow optimal function and growth. Competence refers desire to attain various external and internal outcomes and feel effective in performing the required actions. Relatedness refers to desire to developing secure and satisfied connections with others in one's social environment. Autonomy refers to desire to engage in self-initiating and self-regulating activities (Deci & Ryan 1985).

2.3   IS Continuance Model

IS continuance model (Figure 1) was proposed by Bhattacherjee (2001), based on expectation confirmation theory (ECT). The model explains that the users' continuance intention is determined by their satisfaction and their perception about the system/service usefulness. Subsequently, the users' satisfaction is influenced by their perceived usefulness and the extent to which their expectation are

confirmed. Generally the users have some expectations about the system prior using it. If their expectations are confirmed they will be satisfied with the system and their continuance intention to use the system will increased.
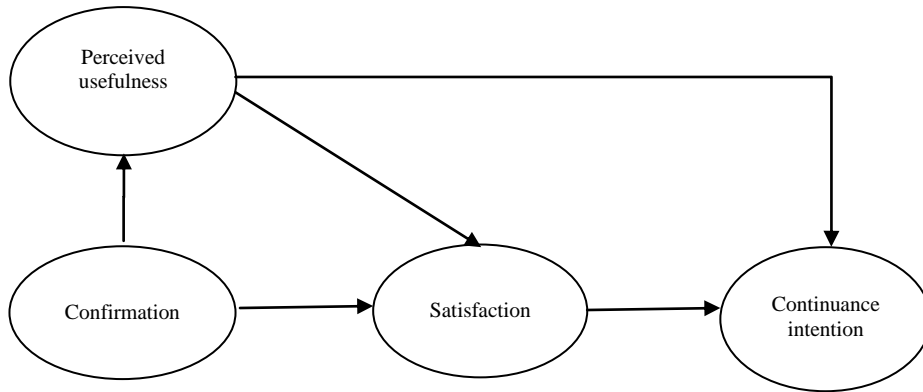

Figure 1.   Information System continuance model

3   RESEARCH MODEL DEVELOPMENT

The research model is developed based on ISCM and SDT, holds that perceived autonomy, perceived competence and perceived relatedness are significant factors in explaining the students' continuance intention to use e-Portfolio (Figure 2). Hypotheses 8,9,10,11 and 12 proposed the relationships based on the original IS continuance model (Bhattacherjee 2001). The hypotheses 1 to 7 were suggested the relationships in order to combine SDT and ISCM.

Students' perceived autonomy reflects the students' desire to utilize the e-Portfolio tools based on their own choice and volition. According to the literature perceived autonomy has a positive relationship with satisfaction (Mason 2012; Sahin 2007) and perceived usefulness (Ho 2010; Roca & Gagné 2008; Sørebø et al. 2009). Therefore, it is expected that if the students feel free to use e-Portfolio as they want to use, they will have positive perception about e-Portfolio and they will satisfied with the system.

H1: Perceived autonomy has a positive effect on the students' level of satisfaction with e-Portfolio use.

H2: Perceived autonomy has a positive effect on the e-Portfolio perceived usefulness.

Students' perceived competence refers to the students' capability in order to use e-Portfolio effectively. In the literature, it is considered similar to self-efficacy. Prior researchers in education, e-learning and online learning contexts have confirmed that self-efficacy has a positive effect on satisfaction (Canrinus et al. 2012; J.-W. Lee & Mendlinger 2011; Liaw 2008; Sun et al. 2008) and perceived usefulness (Ho 2010; Roca & Gagné 2008; Sørebø et al. 2009). Moreover, the positive relationship between perceived competence and confirmation is also suggested in prior researches, especially in the context of e-Learning (Ho 2010; Roca & Gagné 2008; Sørebø et al. 2009). Therefore, it is expected that higher level of competence increase the level of satisfaction and confirmation in students while using e-Portfolio system. Moreover, perceived competence helps students to benefit more from the system. Hence, the related hypotheses are:

H3: Perceived competence has a positive effect on the e-Portfolio perceived usefulness.

H4: Perceived competence has a positive effect on the students' level of satisfaction with e-Portfolio use.

H5: Perceived competence has a positive effect on the students' level of expectation confirmation.

Students' perceived relatedness refers to the students' feeling of being connected and supported by important people. It is similar to subjective norms in the literature (Roca et al. 2006). Perceived relatedness can increase the satisfaction level (Mason 2012). Moreover, the effect of perceived relatedness on perceived usefulness is proposed in the prior studies (Ho 2010; Roca & Gagné 2008; Sørebø et al. 2009). Therefore, it is expected that students' positive feeling regarding their relationship with their peers and lecturers leads to students' positive perception and satisfaction towards using e-Portfolio.

H6: Perceived relatedness has a positive effect on the e-Portfolio perceived usefulness.

H7: Perceived relatedness has a positive effect on the students' level of satisfaction with e-Portfolio use.

Confirmation is defined as the extent to which the user expectations are confirmed (Bhattacherjee 2001). Lower user expectations and higher system performance will be resulted in greater confirmation. According to ISCM, confirmation is related to the perceived usefulness and satisfaction, which is proposed in various researches (Bhattacherjee 2001; Bhattacherjee & Lin 2014; M.-C. Lee 2010; C. S. Lin et al. 2005; Sørebø et al. 2009; Thong et al. 2006). It is also expected that if the students' expectations about e-Portfolio are confirmed, their satisfaction with the use of e-Portfolio will be increased and they will revise their post-usage beliefs of whether e-Portfolio services are useful for them. Therefore, it is expected that:

H8: Students' level of expectation confirmation has a positive effect on the Students' belief of e-Portfolio perceived usefulness.

H9: Students' level of expectation confirmation has a positive effect on the students' level of satisfaction with e-Portfolio use.

Perceived usefulness is related to the extent to which students believe that the use of e-Portfolio will increase their educational performance. As ISCM theorized, perceived usefulness is strongly associated with satisfaction and continuance intention, which are supported in prior researches, such as (Bhattacherjee 2001; Hwang et al. 2011; M.-C. Lee & Tsai 2010; Limayem & Cheung 2008; Sørebø et al. 2009) and (Barnes 2011; Barnes & Böhringer 2011; Bhattacherjee 2001; Bhattacherjee & Lin 2014; Hung et al. 2011; Najmul Islam & Mäntymäki 2012; Sørebø et al. 2009; Sorgenfrei et al. 2013), respectively. Hence, it is expected that the students' perception about e-portfolio usefulness will increase their satisfaction with the use of e-Portfolio, and enhance their intention to continue their usage. The two hypotheses are suggested as below:

H10: Students' perceived usefulness of e-Portfolio has a positive effect on their level of satisfaction with e-Portfolio use.

H11: Students' perceived usefulness of e-Portfolio has a positive effect on their level of intention to continue the use of e-Portfolio.

Satisfaction can be defined as the extent to which e-Portfolio performance is perceived to have met or exceeded students' desires and expectations. The relationship between satisfaction and continuance intention were developed based on the original theory and proposed in many prior studies (Bhattacherjee 2001; Bhattacherjee & Lin 2014; Bhattacherjee et al. 2008; Chen et al. 2009; Chiu et al. 2005; Hsieh et al. 2014; Hwang et al. 2011; Limayem & Cheung 2008; K.-M. Lin et al. 2011; Liu et al. 2010; Sørebø et al. 2009). It is expected that if the students are satisfied with e-Portfolio usage, their continuance intention to use e-Portfolio will increase. Therefore, the hypothesis is:

H12: Students' level of satisfaction with e-Portfolio has a positive effect on their continuance intention to use e-Portfolio.

Based on the expected hypotheses, the conceptual model is proposed in Figure 2.
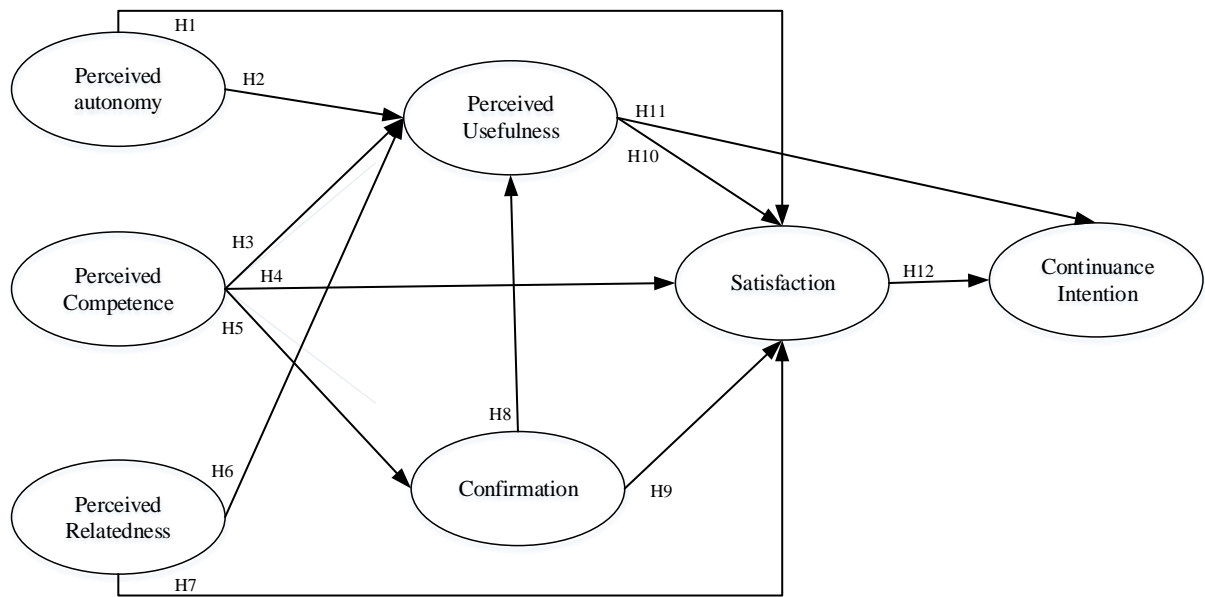
Figure 2.   *Conceptual model*

4   RESEARCH METHODOLOGY

The data for testing the research model were collected through self-administered questionnaires distributed among 384 students from two Malaysian public universities. Since the main focus of this research is on the continuance use of e-Portfolio, only those students, which had experience with e-Portfolio, were participated. Since ten questionnaires were incomplete, totally 374 usable responses were used for final analysis.

The measurement items used in this paper were adopted from previous relevant studies, with a few amendments in the wordings in order to reflect the e-portfolio context. The measures related to ISCM were adopted from Bhattacherjee (2001) and the measures related to SDT were adopted from Sørebø (2009). All items were measured using a five point Likert-type scale, ranging from "strongly disagree" to "strongly agree". Table 1 presents the variables with their measurement items.

	Questions	Cronbach's alpha	Composite reliability	Loading	AVE
IS continuance intention					
CINT1	I intend to continue using e-Portfolio rather than discontinue its use.			0.896	
CINT2	My intentions are to continue using e-Portfolio than use any alternative means (e.g. traditional portfolios).	0.819	0.893	0.875	0.736
CINT3	If I could, I would like to discontinue my use of e-Portfolio during and after graduation.			0.8	
Satisfaction					
SAT1	My overall experience of e-Portfolio is very satisfied.			0.876	
SAT2	My overall experience of e-Portfolio is very pleased.			0.842	
SAT3	My overall experience of e-Portfolio is very contented.	0.872	0.913	0.823	0.723
SAT4	My overall experience of e-Portfolio is absolutely delighted.			0.861	

	Questions	Cronbach's alpha	Composite reliability	Loading	AVE
Perceived Usefulness					
PU1	Using e-Portfolio improves my performance in my educational work.	0.860	0.905	0.848	0.704
PU2	Using e-Portfolio increases my productivity in my educational work.			0.841	
PU3	Using e-portfolio enhances my effectiveness in my educational work.			0.824	
PU4	Overall, e-Portfolio is useful in my educational work.			0.843	
Confirmation					
CONF1	My experience with using e-Portfolio was better than what I expected.	0.849	0.909	0.880	0.769
CONF2	The service level provided by e-portfolio was better than what I expected.			0.861	
CONF3	Overall, most of my expectations from using e-Portfolio were confirmed.			0.889	
Perceived Autonomy					
PA1	I feel free to decide how I want to organize my e-Portfolio.	0.848	0.891	0.819	0.692
PA2	I feel free to use e-Portfolio in my educational work.			0.872	
PA3	I am free to express my ideas and opinions on using e-Portfolio in my educational work.			0.831	
PA4	*When I am using e-Portfolio, I have to do what I am told by my lecturers.*			0.392	
PA5	*My feelings toward e-Portfolio are taken into consideration at work.*			0.283	
PA6	I feel like I can pretty much use e-Portfolio as I want to at university.			0.827	
PA7	There is much opportunity for me to decide for myself how to use e-Portfolio in my educational work.			0.796	
Perceived Competence					
PC1	I feel very competent when I use e-Portfolio in my educational work.	0.8	0.861	0.744	0.554
PC2	The others tell me that I am good at using e-Portfolio in my educational work.			0.733	
PC3	I have been able to learn interesting new skills in e-Portfolio through my educational work.			0.778	
PC4	Using e-Portfolio mostly gives me a sense of accomplishment.			0.747	
PC5	*In my educational work, I usually get much of a chance to show how capable I am in using e-Portfolio.*			0.354	
PC6	When I am using e-Portfolio, I often feel very capable of benefiting from it.			0.720	
Perceived Relatedness					
PR1	I really like the people I work with.	0.778	0.828	0.772	0.576
PR2	I get along with people at university.			0.781	
PR3	*I pretty much keep to myself when I am at university.*			0.220	
PR4	I consider the people I work with to be my friends.			0.665	
PR5	People at university care about me.			0.773	
PR6	*There are not many people at university that I am*			0.361	

Questions		Cronbach's alpha	Composite reliability	Loading	AVE
	close to.				
PR7	*The people I work with do not seem to like me much.*			0.284	
PR8	People at university are pretty friendly towards me.			0.778	

Note1: Removed items are presented in italic.
Note2: The values for Cronbach's alpha, composite reliability and AVE are after removing the items.

Table 1.   Internal consistency, item loadings and AVEs

5   DATA ANALYSIS

The partial least squares (PLS) were employed as the analysis approach and SmartPLS v. 2.0 was used as the main tool for analysing data.

5.1   Measurement Model results

In order to assess the seven reflective variables, the required tests were applied as suggested by Hair (2013). Therefore, the internal consistency (composite reliability), indicator reliability (indicator loading), convergent validity (AVE) and discriminant validity (Fornell-Larcker criterion) were examined. Table 1 shows items, means, standard deviations, loadings, internal consistencies and AVEs. Table 2 shows the discriminant validity among the variables.

	CIN	CONF	PA	PC	PR	PU	SAT
CIN	0.858						
CONF	0.617	0.877					
PA	0.715	0.507	0.832				
PC	0.549	0.425	0.527	0.745			
PR	0.244	0.198	0.235	0.254	0.759		
PU	0.617	0.544	0.651	0.49	0.228	0.839	
SAT	0.706	0.611	0.681	0.546	0.233	0.708	0.851

Table 2.   Fornell-Larcker criterion (discriminant validity)

According to Hair (2013), the items with loading below the threshold of 0.4 should be removed. As Table1 shows, 6 items out of 28 were dropped from the list of measurement items for the final analysis. Furthermore, the values of Cronbach's alpha, composite reliability and AVE were above acceptable threshold. Moreover, as it can be seen from Table 2, the square root of AVE (Diagonal elements) for each variable is greater than its highest correlation with other variables, which suggests satisfactory discriminant validity among variables.

5.2   Structural model results

The results related to hypotheses testing are summarized in Figure 3. The path coefficients are shown above each path and R2 are the percentages presented in each endogenous variable. Nine out of twelve hypotheses were positive and significant.

As Figure 3 shows, the structural model analysis confirms the acceptable level of explained variance (R2) for all endogenous variables, including continuance intention (53%), Satisfaction (68%), Confirmation (18%) and perceived usefulness (51%).
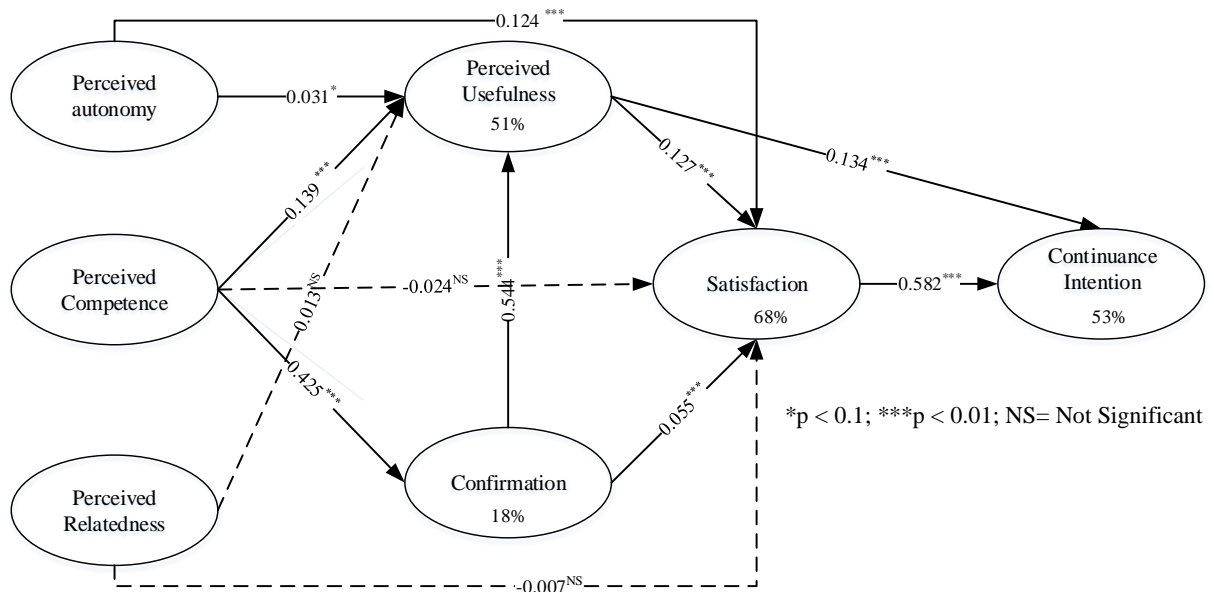
Figure 3.   *SEM analysis of research model*

Hypotheses 1-2 examined the relationship between students' perceived autonomy with their satisfaction and e-Portfolio perceived usefulness, which both were supported. Then, it can be concluded that students' perceived autonomy will have a positive effect on students' satisfaction and perceived e-Portfolio usefulness.

Hypotheses 3-5 examined the relationship between students' perceived competence with perceived e-Portfolio usefulness, students' satisfaction and expectation confirmation. Only the hypothesis 4 was not supported. It can be concluded that the students' perceived competence have a positive and significant influence on the perceived e-Portfolio usefulness and students' expectation confirmation.

Hypotheses 6-7 examined the relationship between perceived relatedness with students' expectation confirmation and e-Portfolio perceived usefulness. Unexpectedly both hypotheses were not supported.

Hypotheses 8-9 examined the relationship between students' expectation confirmation with students' satisfaction and perceived e-Portfolio usefulness. Both hypotheses were supported. Therefore, it can be concluded that the students' expectation confirmation towards the use of e-Portfolio has a positive effect on the students' level of perceived usefulness and satisfaction with e-Portfolio use.

Hypotheses 10-11 examined the relationship between students' level of perceived usefulness towards e-Portfolio usage with the students' satisfaction and continuance intention to use e-Portfolio. Both hypotheses were supported. Therefore, it is concluded that students' level of perceived usefulness towards the use of e-Portfolio has a positive effect on the students' satisfaction and continuance intention towards using e-Portfolio.

Hypothesis 12 examined the relationship between students' satisfaction with their continuance intention towards using e-Portfolio, which is supported. Therefore, it is concluded that the students' satisfaction with e-Portfolio usage has a positive effect on their intention to continue the use of e-Portfolio.

6   DISCUSSION AND CONCLUSION

The aim of this study was to understand the students' continuance intention to use e-Portfolio by integrating self-determination theory and IS continuance model. It is the first attempt in the context of e-Portfolio. This study has found support for four out of seven added hypotheses in order to extend

ISCM with SDT. The findings show that the students are willing to use e-Portfolio more, when they feel competent and autonomy over their e-Portfolio.

The findings revealed that the students' satisfaction with e-Portfolio usage is the most influential factors in determining their intention to continue the use of e-Portfolio, as supported by many previous studies (Bhattacherjee & Lin 2014; Chen et al. 2009; Roca et al. 2006; Zhou 2011). Moreover, perceived usefulness plays an important role in explaining the students' continuance intention. These hypotheses are consistent with the original ISCM theory and prior researches (Bhattacherjee 2001; Bhattacherjee & Lin 2014; Limayem & Cheung 2008; Roca et al. 2006). It describes that if the students perceive that using e-Portfolio will increase their educational performance over the semesters, they will be more satisfied with the system usage and their continuance intention will be increased. The results also suggest that if the students' prior expectations regarding e-Portfolio are confirmed, they feel that e-Portfolio can help them to achieve their goals and therefore, it increases their satisfaction and their level of perceived usefulness with e-Portfolio usage. This hypothesis was also supported in different studies (Bhattacherjee & Lin 2014; Hong et al. 2006; Limayem & Cheung 2008; Roca et al. 2006). According to these findings, perceived autonomy and perceived competence are important in explaining the students' continuance intention to use e-Portfolio. However, among SDT variables, perceived competence seems to be more significant. The relationships between perceived competence with confirmation and perceived usefulness are in line with prior studies (Ho 2010; Roca et al. 2006; Sørebø et al. 2009). This finding may be attributed to the specific context of this research, considering the e-Portfolio features and students' characteristics. Students with higher level of competence will easily perform the system and be able to benefit from it. Therefore, they need less effort to use the system and they can effectively use it in line with their needs and objectives. So, their perception about e-Portfolio usefulness and confirmation of their expectation will be enhanced. Surprisingly, the effect of perceived competence on students' satisfaction was not supported in this research. A possible explanation for that may be related to the high increase in the use of technologies these days. Therefore, the students are mostly experienced on conducting with new technologies. So their competence is less important for explaining their satisfaction in e-Portfolio usage. Moreover, prior studies have confirmed the effects of perceived autonomy on perceived usefulness (Ho 2010; Roca & Gagné 2008) and satisfaction (Mason 2012). These research findings also supported that if the students have ownership over e-Portfolio and feel free to upload their documents and the way of using it, their satisfaction with the system usage will be increased and they find the system useful for their educational purposes. Unexpectedly, the hypotheses related to perceived relatedness were not supported in this study. The lack of support may be related to the choice of measurement items. As those items are originally from work context, may not be fitted in the context of e-Portfolio.

We believe that this study provides significant contributions, in terms of theory and practice. It makes theoretical contributions by integrating SDT, which is a motivational theory, with ISCM, and proposing the new relationships to explain the students' continuance intention to use e-Portfolio. Moreover, the findings suggest that the students' post-usage satisfaction is very important. The e-Portfolio developers and designers should plan to have some strategies to increase the student satisfaction with e-Portfolio use. As the perceived autonomy was found to be important, the managers and administrators should pay more attention to give ownerships to the students over their portfolio, in order to increase their satisfaction. Moreover, for enhancing the students' competence, some training sessions or workshops should be conducted to make the use of e-Portfolio easier for students.

Finally, the researchers and practitioners should pay more attention to the social part of e-Portfolio. Perceived relatedness was found not significant in this research. However, it is considered important in literature. Therefore, researchers may need to investigate how this construct can play its role in increasing the students' continuance intention to use e-Portfolio and may aim to measure this variable with more context specific items. One of the main limitations of this study is that data were collected from only Malaysian universities. Therefore, the researchers can test the model in different contexts or universities in order to check the generalizability of the findings. This research has used the constructs of only two theories (i.e. IS continuance model and self-determination theory) to explain the students'

continuance intention to use e-Portfolio. However, other researchers may look for additional important factors from the literature to be integrated with these theories.

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