Technology Support for Engagement Retention[1]:

The Case of BackPack

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Abstract: Instead of training users to accept and adopt new learning systems, the challenge nowadays is to retain users on a long-term basis. Instructors and students that have grown up in the digital age see IT as part of life which makes initial acceptance and adoption fairly easy but long-term retention more difficult. Therefore, the challenge on utilization is switched from users' pre-acceptance behaviour (whether they are likely to adopt learning systems) to post-acceptance behaviour (whether they will continue to use the learning systems in the long-term). The traditional model of user behaviour suggests that successfully adopted learning systems that were at one time perceived as being useful and easy to use would likely achieve a high rate of user continuance. However, a paradox exists, as user continuance is often not as high as expected. There is also a theoretical gap between technology acceptance and system continuance for which continuance behaviour cannot be explained by traditional technology acceptance models.

This study extends a post-adoption model on habit and IS continuance to investigate the effect of personalization (which includes personal content management, personal time management and privacy control) on learning system continuance. Empirical results suggest that personalization has a positive influence on perceived usefulness and habit, but does not directly influence continuance intention. The results of the case study indicate consistently that there is a need to archive and re-access past course materials with personalized content, but different constraints (e.g., material format, physical space, etc.) prohibit systematic archiving of all past course materials. Both quantitative and qualitative results suggest retaining personalized learning content is perceived as being useful and would enhance continuance intention indirectly.

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[1] This paper is an extension of our previous work published in PACIS 2009. The purpose of this study is to chronicle the efforts to make BackPack successful and include some administrator, instructor and student reaction to the use of BackPack.

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1. Introduction

A persistent problem at universities is student retention of learning materials both within and across courses. As a course proceeds, the expectation is that a student will accumulate and preserve personal notes, as well as annotated materials. Across courses, the expectation is that materials from one course will build on others with the occasional need to go back to access materials for review or, ultimately, in conjunction with capstone requirements. Hopefully, students will find course materials with their own personal annotations useful as they proceed through life, especially those who return for more formal education.

Traditionally, retention of course materials has been confined to paper-based folders. However, the broader use of learning management systems and the general focus on computer-based support has enabled a range of applications capable of assisting students in accumulating and retaining personalized course materials. Personalizing individual learning is believed to be the critical area in the new era of individualized learning (Christensen et al. 2008). Often learning systems provide a number of personalization options for individual users. We define "personalization" in this paper, using three characteristics in personal memorandum use (Burton 1994): (1) personal content creation, (2) privacy control, and (3) daily activities. Burton (1994) claims that internal memorandum is a type of personalization option among academics for learning and collaboration which was already in effect before the evolution of computer-mediated communication. BackPack is one such product that fulfils the three criteria suggested by

Burton (1994). It seeks to provide students with a customizable method of personalizing and retaining learning materials. It allows automatic new content updates and past content archives. The content can both be independently generated as well as downloadable from a learning management system. Personalizing features, such as make and share annotations, note-taking and scheduling, are integrated into the system.

A number of issues are raised, however, as students are encouraged to make use of computer-based applications for retention of course materials. These include the post-adoption behaviour of users, especially in the continuance intention. Much more important than initial successful adoption, continued use of the learning system is the key to its success (Chiu & Wang 2008). Some representative factors that affect post-adoption behaviour include perceived usefulness, ease of use, satisfaction and habit formation.

Specific research questions that arise from these issues are:

1. What are the characteristics of course material retention?

2. Does personalization in a learning system enhance continuance intention? If so, how?

This paper explores the acquisition and trial of BackPack with a select group of students as a precursor to an institution-wide launch. The approach taken is a combination of a theory-based survey and semi-structured interviews to ascertain impact and implications. Lessons learned are presented as well as directions for future research.

2. Background

Technology acceptance was initially designed to predict intention to technology use. Classic models such as Technology Acceptance Model (TAM) (Davis 1989) and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003) have been applied and validated in educational contexts (e.g., Martins et al. 2004; Landry et al. 2006; Gibson et al. 2008). These studies posit that TAM and its extensions consistently explain users' behaviour. Particularly, features that students perceive as being useful and which positively influence initial adoption behaviour have been reported in the literature (Landry et al. 2006).

Models on acceptance have also been extended to predict post-adoption behaviour. Traditional research on IS post-adoption sees long-term retention behaviour, also known as IS Continuance, as an extension of technology acceptance. TAM and its extensions have been widely incorporated in IS post-adoption research (Jasperson et al. 2005). For example, Saeed & Abdinnour-Helm (2008) suggest that IS usefulness is perceived as a critical factor that impacts IS post-adoption behavior.

However, a paradoxical relationship exists between acceptance behaviour and long-term retention behaviour. There is evidence suggested by Lippert & Forman (2005) that perceived usefulness has a weak, not strong, relationship with IS Continuance intention. This paradoxical relationship can also be observed in the case of educational information systems (IS). A number of successful learning systems are evenly packaged as an Open Source model that is freely available for adoption and modification (Kanellopoulos et al. 2007). A paradoxical observation is that some of these learning systems are eventually not utilized by students and teachers, even after successful adoption.

This paradoxical observation suggests that a theoretical gap exists between acceptance behaviour and continuance behaviour. Earlier work has proposed that a single unitary model does not work for explaining both user acceptance and predicting future continuous usage (Agarwal & Prasad 1997). Some missing constructs in IS continuance research may be social factors (Thompson & Higgins 1991), IS habit (Limayem et al. 2007) and level of satisfaction (Bhattacherjee 2001). To sum up, TAM does not adequately explain social factors and the impact they have on post-adoption behaviour. Instead, TAM explains only the attitude for acceptance based on individual users' perceptions.

When compared with the research on users' adoption behaviour, until recently little research has been carried out to investigate users' post-adoption behaviour in new dimensions. Researchers are now trying to address the theoretical gap between technology acceptance and post-adoption behaviour by separating post-adoption into new domains. Some recent examples of post-adoption behaviour being studied are innovative IT use after acceptance (Ahuja & Thatcher 2005), users' experience with technology (Castan~eda et al. 2007), and cultural effects on technology utilization after acceptance (Lippert & Volkmar 2007). However, the fundamental questions of why users continue to use IS, and how to sustain continuance, have not been adequately addressed. Concepts applied in this study include retention, habit and continuance, and personalization, and are discussed in greater detail below.

2.1. Retention

The term "retention" is common in the literature on marketing and customer relationship management. In contemporary IS research, the concept of "retention," or known as "IS continuance," is one of the post-adoption issues that researchers are interested in. For example, models in consumer behaviour research (e.g., expectation-confirmation theory (Oliver 1980)) have been extended to address issues in IS continuance (Bhattacherjee 2001), rather than extending post-adoption models solely from pre-acceptance models such as TAM.

Clearly, IS continuance is not as simple as an "extension of adoption behaviour" (Limayem et al. 2007). Possible clues to the paradoxical observation between acceptance and continuation are the underlying psychological factors that have not been examined in TAM. Previous attempts have been made to identify such psychological factors influencing continuance behaviour, Bhattacherjee (2001) has identified user satisfaction, a construct missing in TAM and its extensions, that brings "disastrous" consequences in IS continuance if ignored. Hong et al. (2008) argue that IS users continue to maintain their relationship with IS because it either fulfils their needs or there are no alternative ways to accomplish their needs.

Contemporary IS continuance research changes the traditional view of IS retention from a multi-purpose model incorporating pre- and post-acceptance factors into a purely post-acceptance IS model (Sørebø & Eikebrokk 2008). Behaviour in IS Continuance, as suggested by Bhattacherjee (2001), comprises two critical factors, namely satisfaction and confirmation (i.e., whether expectations from users regarding IS usage are fulfilled). Like repurchasing behaviour of consumers, satisfaction and confirmation are found to have a strong positive influence on IS continuation behaviour.

Recently, considerable research has been carried out to investigate the continuance intention of students using learning systems (e.g., Chiu et al. 2007; Chiu & Wang 2008). General findings from IS have also been verified and supported in

educational contexts, suggesting that satisfaction is positively related to learners' intention to continue using Web-based learning systems. Further, system use is positively related to learners' satisfaction with Web-based learning (Chiu et al. 2007), and further factors have been proposed to have an influence on continuance intention. Other findings in learning systems continuance behaviour have also been published. Hayashi et al. (2004) posit that computer self-efficacy is not a strong moderating effect between satisfaction and continuance intention. Chiu and Wang (2008) point to the importance of subjective task value in building loyalty to the learning system.

2.2. Habit and Continuance

IS habit is defined as "the extent to which people tend to use IS automatically because of learning" (Limayem et al. 2007). Contemporary IS literature argues that models determining acceptance behaviour are not the most critical ones in determining IS continuance behaviour. For example, Venkatesh et al. (2008) found that as time passes, the power of habit in influencing system use is greater than either behavioural intention or behavioural expectation. Ortiz de Guinea and Markus (2009) summarize three assumptions that trigger continued IS use: emotion, habitual IT behaviour, and environment cues on good design at the system. This recent IS post-adoption literature posits that habitual behaviour is critical in influencing IS continuance.

Derived from e-commerce research that shopping habit mediates repurchase intention, (Khalifa & Liu 2007), IS habit is also found to have influencing power on IS continuance. Limayem et al. (2007) tested two models on habit in their research: (1) habit as a direct effect to IS continuance usage, and (2) habit as a moderator to IS continuance usage. Both models are empirically supported. However, the second model in which habit moderates the link between intention and continuous usage is reported to have significantly higher explanatory power than the direct model.

2.3. Personalization

Although the literature postulates that habitual use of IS provides an "unconscious" way to promote long-term IS continuance, few studies have suggested which features could develop IS habits. On the one hand, Ortiz de Guinea and Markus (2009) emphasize the importance of IS habit in promoting "efficient and effective automatic behaviour" which "can be beneficial to people and organizations." On the other hand, there is a paucity of IS research that proposes direction for IS habitual development. An exception is Kim et al. (2005) who suggest practical implementations to maintain the unconscious IS habit of habitual online new users during web site re-design. However, ways to develop new habitual behaviour among new users has not been addressed in Kim et al. (2005). The scope of Kim et al. (2005) is only on maintaining existing habitual behaviour of heavy users.

Providing good functionalities and environmental cues (such as a good user interface) is another clue to IS continuance (Ortiz de Guinea & Markus 2009). One solution in developing long-term IS habitual behaviour among users is to provide useful functionalities and environmental cues, as suggested by Ortiz de Guinea and Markus (2009). In this view, personalization in learning systems is a potential solution for IS habitual development.

Research in consumer loyalty and retention suggests that personalization may build up continuance intention through increased switching cost and satisfaction levels.

Vatanasombuta et al. (2008) purport that providing more customized services with collected preferences enhances customer loyalty by increasing the barrier in switching costs. Similarly, Zhang & Wedel (2009) report that personalized shopping lists in online stores create shopper dependency that gradually develops re-purchasing habit with the online store. Ball et al. (2006) point out that service personalization brings greater customer satisfaction and trust which, in turn, indirectly enhance loyalty. Apart from the claims above, other literature also shows that personalization is the important feature for online shoppers' repurchase (e.g., Agarwal & Venkatesh 2002; Pearson & Pearson 2008) and retention in a loyalty programme (Ferguson & Hlavinka, 2008).

Research in computer science has suggested some ways of answering the question of habitual development through personalization. Extensive effort has been made to develop systems that learn user's habit to provide better personalization service (e.g., Mulvenna et al. 2000; Westerink et al. 2002)., learning users' habits with artificial intelligence systems helps in constructing users' personal preference lists based on usage pattern to provide a personalized service. Applied in the business context, such technology improves customer retention by building up habit through personalization. IT enables businesses to track individuals' buying habits and then provide personalized service. Ives and Mason (1990) postulate that personalization allows businesses to understand individual customers' needs.

Personalization is possibly an answer to addressing IS habit development. However, the effect of personalization in developing users' IS habit, and particularly in developing automatic use of IS, has not been thoroughly studied. We are attempting to fill in this theoretical gap by investigating the role of personalization in influencing continuation intention.

2.4. BackPack

BackPack is an extension of the Blackboard Learning Support System. It is differentiated from Blackboard by its capability for mobility and personalization options on content management and time management (e.g., diary, to-do list, calendar, appointment reminder, etc.). Specifically, personalization options in BackPack include (1) "New Notes" - a function that enables students to create new content; (2) "Capture" - a feature that enables students to capture a document for personal annotation; (3) "Calendar" - a function that enables students to set up appointments and tasks; and (4) "Personal Course" - a feature that enables students to create a new personalized course and manipulate personal content. Users are able to archive past course materials through BackPack. BackPack also allows users to control who can access their contents, thus preserving individual privacy.

In spring 2008, BackPack was adopted as an extension to the Blackboard course management system in City University of Hong Kong. Before the official institutional launch of BackPack, a small pilot group comprising five undergraduate students from different disciplines (Arts, Business, Science and Engineering) was set up to evaluate the product. User experience was captured and corrective measures (e.g., bug fix) were conducted. In the summer term 2008, BackPack was further tested with a group comprising some 30 Year 2 undergraduate students in a mentorship programme in the IS Department. Empirical studies were conducted throughout the summer term to evaluation continuance intention of students before the product was institutionalized.

3. Research Approach

Using both positivist and interpretivist approaches, we are proposing hypotheses that influence continuance intention and identify a number of practices for educational practitioners and technologists to ensure that long-term retention can be achieved. Our work is based on the model of habit and continuation intention that was proposed initially by Limayem et al. (2007) and later extended to the teaching and learning context (Limayem & Cheung 2008). We adopt the definitions of personalization proposed by Burton (1994) to study the effects of personalization applications in continuation intention. The teaching and learning system we adopted in the study was BackPack, which provided the personalization applications as defined by Burton (1994).

Engagement retention of BackPack is an example of IS continuance in the educational context. BackPack is chosen as the learning system for this study because of its personalization features which differentiate it from its parent, Blackboard. In the university, Blackboard is the centralized learning system which is deployed institutional-wide. This guaranteed that all students surveyed had at least one year of experience using Blackboard. In fact, most of the students treated Blackboard as a system for retrieving course materials and submitting assignments without little personalization. Another issue we considered was training support. As an extension of Blackboard, it was obvious that they could easily master BackPack without much help and assistance.

Theories of IS continuance are also potentially valid for learning system continuance which is an IS application in the educational context. Students' intention of continued use of a learning system is similar to IS users' intention of continued use. Students are free to opt for using traditional means of accessing subject content and then collaborating with their peers after initial acceptance. In this view, learning systems can be treated as a subset of IS in the educational context.

We formed our research model by extending Limayem et al.'s (2007) model with personalization as a direct cause of perceived usefulness, habit and continuance intention. Figure 1 shows our proposed model with the inter-relationships between the constructs.
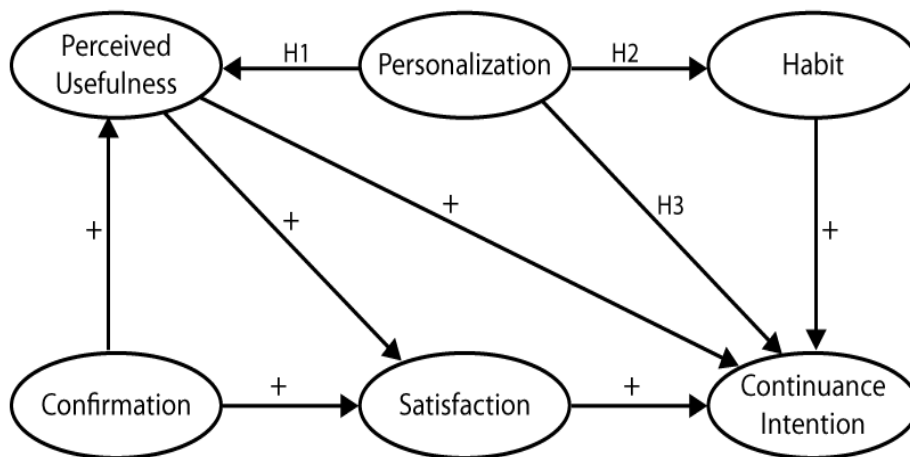

Figure 1. Proposed Research Model extended from Limayem et al. (2007)

3.1. Hypotheses

Research of personalization in consumer behaviour provides some direction as to how personalization relates to perceived usefulness, which, in turn, influences satisfaction and habit. Personalization brings in competitive advantage through addressing the self-esteem of customers. The cognitive style defined as the "individual's preferred and habitual approach to organizing and representing information" (Riding & Rainer 1998; Frias-Martinez et al. 2007) is believed to be a key element in personalization that improves user satisfaction in the digital library system. Christensen et al. (2008) offer a revolutionary prediction for personalized learning through information and communication technology that will gradually "disrupt" and replace traditional "standardized" teaching and learning activities within what they foresee as 20 years. All these findings suggest that personalization in learning systems: (1) is useful, (2) develops new user habits, and (3) enhances continuation.

This leads to our first hypothesis:

H1: Personalization is perceived as a useful feature in learning systems.

As suggested by Limayem et al. (2007), habit has a moderating effect on IS continuance. Developing users' habit in utilizing IS can be a way of improving IS continuance. One of the ways to develop users' habit is through increasing the cost of switching to other systems. Hong et al. (2008) assert that switching cost has a direct effect on continuation intention, while habit has an indirect effect on continuation via influencing the switching cost. Research in e-commerce also shows that personalization and switching cost dominate online customers' repurchase decisions rather than price, which was originally believed to be the most important element in online retailing (Rodríguez-Ardura et al. 2008). In order to use the systems' personalization features, it is necessary for the user to configure the personal profile before using the systems for the first time. Initially setting up the personal profile in a system is time consuming. The effort and time spent on initial personal profile setting become the first switching cost that discourages users from switching to a new system. Further, switching to a new system means that the user needs to re-configure all personal parameters, thus creating a significant habitual inertia (Kim et al. 2005) to the existing IS.

In many studies, unconscious automatic use of IS, also known as habit, is believed to be one of the factors driving continuous IT usage (e.g., Ortiz de Guinea & Markus 2009; Hong et al. 2008; Limayem et al. 2007; Kim et al. 2005). Limayem et al. (2007) posit that habit plays a moderating effect between IS continuance intention and actual IS continuance behaviour; later this model was verified in the educational context (Limayem & Cheung 2008). Habit has different effects in influencing long-term IS continuance behaviour, for example, through increasing users' switching cost (Hong et al. 2008). Another interesting finding is that heavy IS users are likely to interact with IS in an unconscious way and have inertia towards changes (Kim et al. 2005).

Therefore, we form the second hypothesis on personalization and habit as:

H2: Personalization is positively associated with users' habits of learning system usage.

Our preliminary findings provided encouraging support for H1 and H2 and gave us some suggestions for refining our model to include the direct effect of personalization on continuance intention. It was found that personalized content and personalized applications had a positive impact on learning system continuance. First, in the teaching and learning context, "standard" options treating every individual in the same way did not

give any continuation intention. Students tended not to use the mobile applications unless it was made compulsory in assessment. They believed that the existing applications for teaching and learning did not utilize the mobile device, especially the personalization functions. Second, usage of personalized applications in daily social life continued since students reported that they used their PDAs mainly for personal purposes outside the classroom. Some students used the mobile device as their cellular phone. MP3 player, MSN Messenger, games and Google Map were the other popular applications used for personal purposes. When students were asked which applications they would like to use, they requested personalized applications that supported learning and teaching; for example: (1) a personal multimedia content editor that enabled them to record audio and video and make personal annotations, (2) a content editor than enabled them to personally create and annotate learning content, and (3) a personal learning diary integrated with a daily schedule.

Based on the feedback collected on the focus group meeting on the mobile learning system, it was concluded that personalization was an important component perceived to be useful in long-term utilization. As suggested by various e-commerce research, personalization is perceived to provide useful features for both customers and merchants (e.g., personal profile, preference list). Therefore, we form the third hypothesis on personalization and continuation intention, based on our preliminary observations and suggestions by Burton (1994):

> *H3: Personalization is positively associated with continuance intention on learning system usage.*

3.2. Methodology

To collect evidence for verifying and supporting our first two hypotheses in the educational context, a pilot study in the form of a focus group meeting was held in Spring, 2008 with Year 1 undergraduate students majoring in Information Systems. The focus group meeting was conducted in a relaxed atmosphere where all members were encouraged to express their ideas in a formative and qualitative fashion. The theme of the meeting related to a new mobile learning system that contained options on teaching and learning with a high degree of personalization. These personalization options covered both teaching and learning needs, as well as individual users' needs in their daily social life.

Our model was tested quantitatively and qualitatively using a positivist case study approach. A survey with a group of undergraduate students who served as mentors was conducted in 2008. After the survey data was available, we conducted structured interviews with the stakeholders (students, teachers and administration).

3.3. Survey

Questionnaires were administered in July 2008 to a group of 48 student mentors who were first-year students in IS and would be promoted to Year 2. A total of 24 questionnaires were returned. However, two questionnaires were considered to be invalid: one due to incompleteness and the other because the respondent would discontinue studying in the coming semester and would therefore be unable to evaluate the intention to continue using BackPack. There were a total of 22 valid questionnaires that were analyzed in the study, giving a response rate of 46%.

Perceived usefulness (Davis 1989), perceived ease of use (Davis 1989), confirmation (Bhattacherjee 2001), satisfaction (Sprang et al. 1996; Bhattacherjee 2001), continuance intention (Limayem et al. 2007), personalization (self-developed based on our definition of personalization) and habit (Limayem 2007) were measured in the self-administered questionnaire. These constructs were deemed to be appropriate as their validity has been confirmed by wide adoption in the literature and similar studies.

Our model is tested with Partial Least Squares (PLS) with PLS-Graph version 3.00. PLS is adopted in this study because of its ability to specify relationships among the conceptual factors of interests and the measures underlying each construct, thus showing how strong the relationships are and whether the hypotheses are empirically true with small to medium sample sizes (Limayem et al. 2007).

3.4. Structured Interview

After the survey results were available, structured interviews were conducted with three sets of stakeholders (participating students, instructors and university administration) to obtain qualitative feedback. The main focus of the interviews was to consolidate feedback on the following aspects:

1.   Reference to any course materials in the past;

2.   Use of course materials from relevant courses;

3.   Sharing of course materials with peers;

4.   Archiving of past course materials for future use; and

5.   Access to past course materials.

4. Results

We first conducted the survey and analyzed the quantitative data, followed by the structured interviews to obtain qualitative feedback for the findings. This section presents the results from our survey and structured interviews.

4.1. Survey

Our findings suggest that H1 and H2 are supported, with significance at the 0.05 level and the 0.01 level, respectively. However, H3 is not supported due to its weak significance. Figure 2 shows the PLS analysis of our model.

The reliability and validity of our model are measured in Table 1, following the approach suggested by Limayem et al. (2007). The average variance extracted is considered to be satisfactory because the values are 0.773 or above. The composite reliability is generally satisfactory at the 0.773 level, except for Continuance Intention, which is reported to be marginally satisfactory at 0.688.
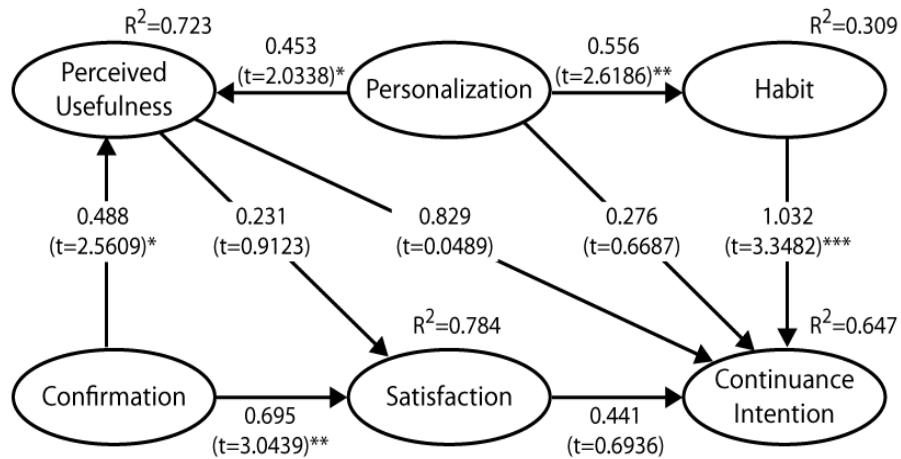
Figure 2. PLS Analysis of our model (*: Significance at 0.05 level, **: Significance at 0.01 level, ***: Significance at 0.001 level)

Table 1. Table of Reliability and Validity Measurement

Construct	Item	Loading	St. Error	t-value
Perceived Usefulness (PU)				
CR = 0.960	PU1	0.9556	0.0171	55.7507 ***
AVE = 0.889	PU2	0.9561	0.0219	43.7221 ***
	PU3	0.9165	0.0456	20.1393 ***
Personalization (P)				
CR = 0.872	P1	0.9533	0.0231	40.5921 ***
AVE = 0.774	P2	0.7226	0.2214	3.6925 ***
Habit (H)				
CR = 0.939	H1	0.9166	0.0449	20.3913 ***
AVE = 0.837	H2	0.9274	0.0407	22.7144 ***
	H3	0.9099	0.0335	27.0204 ***
Confirmation (C)				
CR = 0.917	C1	0.7538	0.2058	3.7281 **

AVE = 0.787	C2	0.9466	0.0262	35.5197 ***
	C3	0.9536	0.0175	54.3395 ***
Satisfaction (S)				
CR = 0.917	S1	1.000	1.0000	0.0000
AVE = 0.787				
Continuation Intention (CI)				
CR = 0.688	CI1	0.3862	0.3574	1.2167
AVE = 0.558	CI2	0.9445	0.0465	20.6998 ***

4.2. Structured Interview

Reference to other course materials, especially reference to the course materials from the pre-cursor and pre-requisite courses, is considered to be important and useful by both participating students and instructors. In the students' viewpoint, referencing to the materials of a pre-cursor or pre-requisite course is common practice. In reality, Instructors also advise students to refer to course materials of pre-requisite courses. A typical case reported in the interviews is that an instructor teaching, for example, the course Management Information Systems II refers the students to the materials in the pre-requisite course Management Information Systems I.

Use of course materials from a relevant course is also reported by both students and instructors. Students commented that they sometimes refer to the course materials of a different but relevant course during the learning process. This can be a course that students have taken in the past or a course that their peers have taken which is perceived as being useful. Instructors also use course materials across different relevant courses. While the instructors are assigned with teaching duties involving relevant courses, sometimes the syllabus overlaps and the instructors may use the part of course materials across different but relevant courses. An example reported in the interviews is a series of Business Process Management courses. These courses are with similar content but are targeted to different groups of students with different majors. By nature, the syllabus sometimes overlaps, thus making materials reuse feasible.

Sharing of course materials with peers is considered to be rare among students. The feedback from one student indicated course materials to be highly personalized. Sharing of materials is often limited to reference books that do not involve high volume of personalized contents. "It is better for (my peers) to use different materials in which suit their own skills of learning," said the student. The annotations and remarks, even shared by different students, may not be useful to the other students. In the viewpoint of instructors, sharing of course materials across peers is not common. In fact, they normally rely on the materials that are produced by their own course team.

Archiving past course materials is seen as good practice by students, but not every student keeps a full set of past course materials. It is agreed that past course materials would be useful in the future; however, it is common that after completion of a course hard copies of course materials are "put aside," as commented by one student. Further, the archive consists mainly of hardcopies of materials. As not every student keeps a full

set of archives, the instructors cannot expect that the students will always have access to the past course materials. This may create a heavier workload for instructors, because they may need to provide extra information in class regarding background knowledge.

It is worth noting that students appreciate the availability of digital soft copies of course materials for archiving. In reality, students report that it is easier to access past course materials with soft copies that are stored in the computer. When being asked whether a system like BackPack is useful in archiving materials for future access, students mentioned that the availability of soft copies is crucial. "If I can have soft copy, then I will use it. However, if I use the hard copy, then I won't.," said one student. This is confirmed by the instructors' attitude towards access to past course materials e.g., "Only the students who maintain those materials themselves (can have access to the materials in past pre-requisite courses)."

The administration further posits that the whole idea of BackPack is to make personalized archiving and access to past materials available throughout the institution. "The concept of BackPack is to archive the full set of learning materials, not only the notes but also the full history of interactivities (e.g., online discussions, assignments, and tests) throughout the students' entire university life," reported one administrator. BackPack is perceived as a broader view that keeps the whole course site with both materials and interactions in an offline mode so that students can re-access their past courses even though the academic year ends.

5. Discussion

In this research, we address different issues in course material retention. We first identify the need for course material retention for re-access in the future. Interestingly, access to course materials remains a personal practice and sharing between peers is rarely reported. In the quantitative analysis, we introduce personalization as a new construct in the extension of Limayem et al.'s (2007) framework on IS habit and continuance intention. We first hypothesize (H1) that personalization is perceived as a useful feature in learning systems. Empirically, H1 is supported. Qualitatively, students also reported in written feedback that they perceived personalization options, especially privacy control, to be important features that should be emphasized and improved. Thus, based on both empirical and formative evidence, our results support H1.

We then hypothesize (H2) that personalization is positively associated with users' habit on learning system usage. Empirically, H2 is supported with high significance. To generalize the findings, more extensive longitudinal research is to be carried out in the next steps to discover the relationship between personalization and habit in learning systems continuation with a sufficiently large population.

Finally, we hypothesize (H3) that personalization is positively associated with users' continuance intention on learning system usage. H3 is, however, rejected due to its weak significance. Rather than studying the direct relationship between personalization and continuance intention, the focus of next steps should be placed on investigating the indirect relationship between personalization and other constructs that indirectly lead to continuation intention, such as confirmation and satisfaction.

In summary, personalization does not directly increase users' intention to system continuance. In fact, personalization directly influences habit. Learning system users perceive the ability to personally annotate, create, edit learning content, and to keep track

of daily activities through a calendar to be useful. In addition to the above personalization features, users have a high desire for privacy.

5.1. Lessons Learned

It is worth noting that archiving course materials for re-access is perceived as good practice. Although BackPack supports archiving full sets of interactive learning materials, it is infeasible to fully archive a course if the course content is not in digital format. Intuitional effort may be required to change the culture of teaching staff. For example, institutions may hire temporary teaching assistants and student helpers to convert traditional teaching materials (e.g., transparencies) into digital format. It is also advisable to launch workshops to train students and instructors in using BackPack for the best course material retention practice.

5.2. Limitations and Directions for Future Research

Our results indicate some directions for future work. First, the reliability would be improved with a more extensive survey with a larger population size (e.g., N=150). Second, as H3 is not supported empirically, we should refine the model accordingly. The refined model should include the indirect effect of personalization and continuation intention. For example, a possible new hypothesis can be "personalization is a moderator between habit and continuance intention" as a competing model to our existing model.

Next steps include a comprehensive longitudinal study with two groups of students (undergraduates and postgraduates) across different disciplines in the university. Empirically, we expect to administer online questionnaires with 4-week intervals over the semester. Formatively, we expect to collect feedback through focus group meetings with students of different faculties over the semester.

6. Conclusion

By analyzing the inadequacy in existing pre-acceptance and post adoption behaviour research, we are attempting to extend the existing pre-acceptance and post-adoption model with more explanatory factors addressing users' behaviour. The goal of our study was to evaluate how personalization affects pre-acceptance behaviour and continuance intention of a learning system. Limayem et al.'s (2007) model on habit and IS continuance was used as the foundation of the research. An empirical study on a new learning system, BackPack (designed with extensive personalization features), was carried out in the summer of 2008 to evaluate how personalization affects learning systems continuance intention. Data were collected from Year 1 undergraduate students majoring in IS.

We identified personalization as a critical component that positively affects IS habit and perceived usefulness. However, we found no direct strong relationship between personalization and continuance intention. Based on our quantitative findings, the research model should be refined to include the indirect effect of personalization and continuation intention during the semester in a real course context. Addressing the limitations on course nature and sample size, we recommend a comprehensive longitudinal study across different disciplines to replicate these findings.

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