Factors affecting the acceptance of IT tablet products for academic reading by university students

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Abstract

Since the benefits of information and communication technology for learning have been recognized, many universities continue to invest advanced technologies for students' learning activities. Recently, tablets, such as Apple iPad, have received much attention. Thus, it is expected that tablets can be accepted by users for academic and nonacademic reading. However, there is little empirical evidence regarding the determinants of accepting tablets for academic reading. Thus, in this study, we propose an integrated model based on Unified Theory of Acceptance and Use of Technology (UTAUT) and IS and learning literatures to examine the determinants of using tablets for university students' academic reading. A total of 164 responses were collected from a Taiwanese university and structural equation modeling (SEM) techniques were applied to test the proposed model and relationships. Theoretical and practical implications and future research directions are discussed.

Keywords: UTAUT, Tablet, Cognitive Absorption, Perceived Convenience, Perceived Financial Cost

1. Introduction

Because of the advance of information technology, academic reading is no longer limited to paper-based books. Digital technology which includes picture, audio and video can make reading more vivid for readers. Recently, tablets which can provide digital reading ways for readers have received much attention. According to iHS

iSuppli, it was estimated that global tablet shipments would grow to 242.3 million units by 2015, up from 19.7 million units in 2010 (Alexander, 2011). In addition to the advantage of providing digital contents, a tablet has the features of easy to carry and allowing readers to access to the Internet anywhere. Thus, it is expected that tablets can be the alternatives for readers except of paper-based books.

However, if a tablet is not accepted by readers, it is a failed innovation for reading (Lucas, 1975). Technology acceptance related topics have been received much attention by research. Although, there are some famous theories (Ajzen, 1991; Fishbein & Ajzen, 1975) and models (Davis, 1986; Davis, 1989) for researchers to investigate users' perception and acceptance behavior towards information technology, there is little evidence known regarding the determinants of the acceptance of tablets for academic reading. Extending our understanding regarding the determinants will be useful for universities to establish e-learning strategies and will be helpful for system designers to develop a better product. Thus, we aim to develop a model based on Unified Theory of Acceptance and Use of Technology (Venkatesh, Morris, Davis, & Davis, 2003) to examine the factors that influence the acceptance behavior of academic readers using tablets. Because university students are primary users of tablets for academic reading, in this study we focus on university students' perceptions and behaviors.

There are six sections in this study. The following section describes the literature for this study. The third section illustrates the research model and hypotheses of this study. The fourth section explains our research methodology, including sampling and measures. The fifth section is the data analysis and finding for the research. The final section presents the discussion and conclusions.

2. Literature Review

Unified Theory of Acceptance and Use of Technology

Unified Theory of Acceptance and Use of Technology (UTAUT) is based on several models and theories, such as, theory of reasoned action (TRA), theory of planned behavior (TPB), technology acceptance model (TAM), motivational model (MM), a model combining the TAM and TPB, model of PC utilization (MPCU), innovation diffusion theory (IDT) and social cognitive theory (SCT). It provides a more integrated conception for research to better understand users' behavior towards technology. In the model, four variables which are performance expectancy, effort expectancy, social influence, and facilitating conditions affect behavior intention directly (Venkatesh et al., 2003). There are also four moderators in the model. They are gender, age, experience, and voluntariness of use (Venkatesh et al., 2003). It is suggested that UTAUT provides a better explanatory power than most of other technology acceptance theories (Venkatesh et al., 2003).

Cognitive absorption

Driven from the literatures of personality trait dimension of absorption, the state of flow, and the notion of cognitive engagement, cognitive absorption refers to the state of deep involvement with a system or software (Agarwal & Karahanna, 2000). It is an intrinsic motivation related variable. Cognitive absorption consists of five dimensions which are temporal dissociation, focused immersion, heightened enjoyment, control, and curiosity.

Perceived convenience and perceived financial cost

Perceived convenience refers to the degree of perception held by users that they can use tablets to read academic contents at a time, at a place, and in the process that are more convenient for them (Yoon & Kim, 2007). Perceived financial cost refers to the degree to which people believe that using tablets for academic reading will cost money (Luarn & Lin, 2005). Mobile related innovations have the features of convenience and high financial cost (Wang & Tai, 2008). Thus, it is suggested that the two variables should be important for the study of the acceptance of tablets for academic reading.

3. Research Model and Hypotheses

Figure 1 presents the research model of this study for investigating the factors that affecting the acceptance of tablets for academic reading by university students. It is based on Unified Theory of Acceptance and Use of Technology and the literatures regarding cognitive absorption, perceived convenience and perceived financial cost.

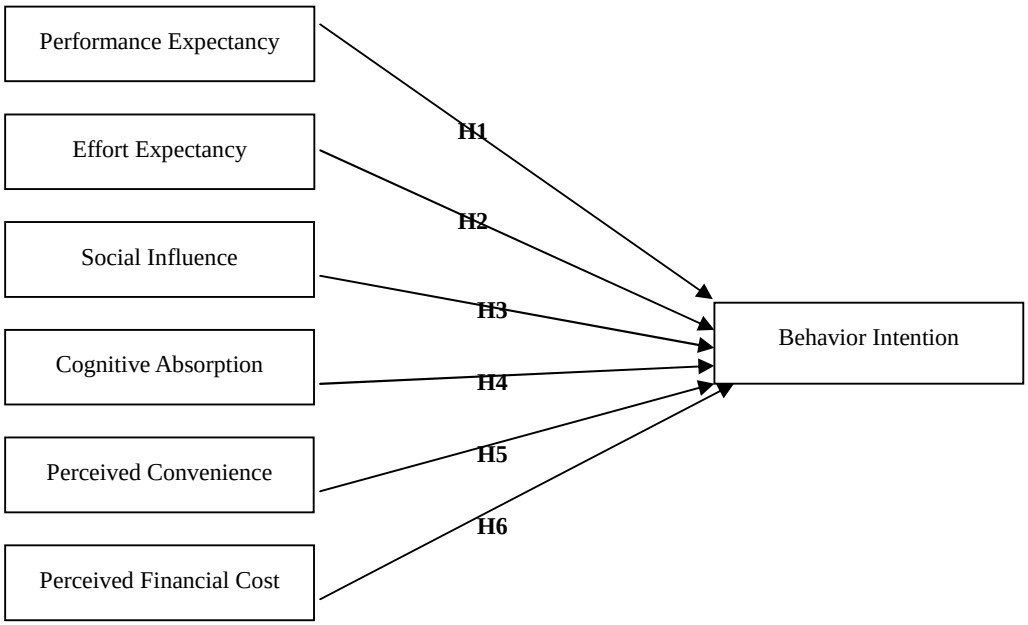

Figure 1: Research Model

According to the Unified Theory of Acceptance and Use of Technology,

performance expectancy, effort expectancy and social influence are important antecedents of behavior intention (Venkatesh et al., 2003). It is suggested that performance expectancy, effort expectancy, and social influence positively influence behavior intention. These relationships have been supported by theories and confirmed by empirical research (Wang & Shih, 2009). Thus, we propose the following hypotheses:

H1: Performance expectancy will have a positive effect on behavior intention to use tablets for academic reading

H2: Effort expectancy will have a positive effect on behavior intention to use tablets for academic reading

H3: Social influence will have a positive effect on behavior intention to use tablets for academic reading

Since the extent of readers' cognitive absorption will influence the outcomes of learning (Saade & Bahli, 2005), it is suggested that the variable is important for academic reading context. Logically, if a reader using tablets to read cannot obtain a satisfied learning outcomes, he or she will not utilize tablets for reading. Previously, because of the limitations of PC and notebooks, digital reading is not convenient. Tablets provide a more convenient way for readers to read at some place. Thus, perceived convenience should be an important motivation variable for readers to accept it for reading (Yoon & Kim, 2007). Furthermore, using tablets to read may need the cost of tablets, digital content, and mobile service. The cost is higher than that of a paper-based book. Thus, it is suggested that perceived financial cost negatively influences the acceptance of innovation (Wu & Wang, 2005). Based on these reasons and findings, the following relationships are proposed:

H4: Cognitive absorption will have a positive effect on behavior intention to use tablets for academic reading

H5: Perceived convenience will have a positive effect on behavior intention to use tablets for academic reading

H6: Perceived financial cost will have a negative effect on behavior intention to use tablets for academic reading

4. Research Methodology

The sample of this study contained students at a university in Taiwan. Before the volunteers in the university filling in the questionnaire, the researchers took a few minutes to explain the purpose of this study and to illustrate how to complete the questionnaire. A total of 164 responses were received. University students have the characteristics of higher frequency of computer and mobile technology usage and academic reading. Thus, we believe that the sample is considered to be appropriate for this study.

Our research model consists of seven variables, including performance expectancy, effort expectancy, social influence, cognitive absorption, perceived convenience, perceived financial cost and behavior intention. All variables were measured using existing scales. The scale items used to measure performance expectancy, effort expectancy, social influence and behavior intention were adopted from Venkatesh et al., (2003) and modified to suit tablets and reading context. Similarly, cognitive absorption was adopted from Agarwal & Karahanna (2000), perceived convenience was adopted from Yoon & Kim (2007), and perceived financial cost was adopted from Luarn & Lin (2005). Performance expectancy, effort expectancy, social influence and perceived convenience were measured by four items each. Behavior intention was measured by three items, cognitive absorption was measured by nineteen items, and perceived financial cost was measured by two items.

5. Data Analysis and Finding

The reliability of the seven variables in our research model was measured using composite reliability. The values of all variables were above 0.7 and the results are considered as acceptable for field research (Nunnally, 1978). Validity was measured by standardized factor loadings and average variance extracted (AVE). The results illustrated that convergent and discriminant validity were adequate.

Table 1: Fit indices for structural model

	$\chi 2$	SRMR	RMSEA	GFI	χ^2 /df	NFI	NNFI	CFI	AGFI	PNFI
Structural model	331.1	.05	.05	.88	1.58	.9	.95	.96	.85	.74
Criteria		< 0.1	< 0.08	> 0.9	1--5	> 0.9	> 0.9	> 0.9	> 0.9	> 0.5

For testing the structural model, nine common model-fit measures were used to assess the overall goodness of fit of the research model: standardized root mean square residual (SRMR), root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), chi square to degrees-of-freedom ratio (χ^2/df), normalized fit index (NFI), non-normalized fit index (NNFI), comparative fit index (CFI), adjusted goodness-of-fit index (AGFI) and parsimony normalized fit index (PNFI). Compared with the recommended indices (see table 1), the indices of the research model are suggested as good enough for further assessing the path coefficients of the structural model.

The statistical results of the six hypotheses are shown in table 2. The analysis

methods of testing hypotheses include standardized parameter estimates and t-values for each equation. Hypothesis H1 assessing if performance expectancy has a significantly positive effect on behavior intention. Inconsistent with our expectation, results showed that performance expectancy did not significantly influence behavior intention. Similarly, effort expectancy, social influence, perceived convenience, and perceived financial cost all did not significantly influence behavior intention. Thus, hypotheses H1, H2, H3, H5, and H6 were not supported. In addition, hypothesis H4 hypothesized that cognitive absorption will have a positive effect on behavior intention. As expected, hypothesis H4 was supported. That is, cognitive absorption was the only variable influencing university students' behavior intention to use tablets for academic reading.

Table 2: Hypotheses testing

Relationships	unstandardized parameter estimates	standard errors	standardized parameter estimates	t-value	significance
Performance expectancy→behavior intention	.09	.12	.08	.72	.48
Effort expectancy→behavior intention	-.07	.08	-.07	-.82	.41
Social influence→behavior intention	.15	.10	.16	1.47	.14
Cognitive absorption→behavior intention	.94	.32	.70	2.90	.00
Perceived convenience→behavior intention	-.23	.29	-.17	-.80	.42
Perceived financial cost→behavior intention	-.08	.09	-.07	-.91	.36

6. Discussion and conclusion

Since less evidence can be provided for understanding academic reading of a tablet, this study proposed a research model for testing the determinants of behavior intention to use a tablet in the context of academic reading. Based on Unified Theory

of Acceptance and Use of Technology and MIS and learning literatures, this study proposed an integrated model in order to address this issue. There are six hypotheses in the research model. Consistent with our hypothesis, users with higher levels of cognitive absorption were more likely to use tablets for academic reading. However, inconsistent with theory and previous works (Luarn & Lin, 2005; Venkatesh et al., 2003; Wang & Shih, 2009; Yoon & Kim, 2007), performance expectancy, effort expectancy, social influence, perceived convenience, and perceived financial cost did not have significant effects on behavior intention to use tablets for academic reading.

In addition, there are some suggestions for research and practice. Firstly, our results suggest that cognitive absorption has a significantly positive effect on the behavior intention to use tablets for academic reading. Thus, the designers of tablets and digital content should pay more attention on how to improve users' cognitive absorption of reading. Secondly, because our results did not confirm most of the relationships, we suggested further research should conduct more research to target this topic to find out the important determinants, especially by qualitative methods if there is no appropriate theoretical framework. Thirdly, the reason that most of the hypotheses were not supported may be that there are some variables moderating the proposed relationships (Baron & Kenny, 1986), such as gender (Venkatesh & Morris, 2000). We suggest other research can develop a model by adding moderators in order to better understand the issue.

Furthermore, some limitations need to be addressed. Firstly, there might be other important factors that are not included in our research. Secondly, our study was conducted at a single university in Taiwan. The results might have limited generalization for other populations. Thirdly, in our model, we did not test users' actual usage behavior.

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