



Continuance acceptance of computer based assessment through the integration of user's expectations and perceptions

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ABSTRACT

The Information Systems (IS) community has put considerable effort on identifying constructs that may explain the initial/continuance use of computer based learning or assessment systems. This study is a further step toward IS continuance acceptance delivered in Computer Based Assessment (CBA) context. Specifically, it aims at the exploration of continuance acceptance in CBA context and the development of a new approach for continuance use. This approach is applied by measuring user's expectations before the interaction with the system and user's perceptions after the interaction. The sign (\pm) and the intensity of the difference between pre and post measures is actually the strength that drives users to continuance intention to use. Through these measurements it is possible to estimate student's level of confirmation for each essential determinant of CBA continuance acceptance. Results underline Confirmed Ease of Use and Confirmed Playfulness as the direct determinants of continuance acceptance. Through Confirmed Playfulness important determinants, such as Confirmed Usefulness and Confirmed Content influence Continuance Behavioral Intention. Confirmed Facilitating Conditions and Confirmed Goal determine Confirmed Ease of Use and Confirmed Usefulness respectively. Important implications of these results are discussed.

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1. Introduction

As use of information technology becomes integral part of learning procedures, researchers explore what motivates learners to accept Learning Management Systems (LMS). Numerous researchers have identified variables that may explain the use of computer based learning or assessment systems. While previous studies mainly investigated the initial acceptance of LMS, continuance usage and acceptance of LMS have not yet attracted the same level of attention. Nevertheless, continuance usage and acceptance are crucial when designing and implementing LMS. Part of these systems is computer based assessment (CBA). Summative and Formative CBAs provide many advantages to tutors and learners such as: time and place flexibility, immediate feedback and results, cost reduction, learner's self-evaluation and learner's evaluation by tutors. Previous studies highlighted Perceived Playfulness and Perceived Ease of Use as the most important determinants of CBA's acceptance (e.g. Terzis & Economides, 2011a).

However, the development of a research model that explains the continuance usage will extend previous knowledge and it will help developers to provide better services for learners and tutors. The current study attempts to identify the factors affecting learner's continuance usage in the context of Computer Based Assessment (CBA) by proposing a new approach.

LMS initial or continuance acceptance is based on Information Systems (IS) acceptance literature. Initial acceptance of IS is expressed by notable theories and models such as theory of planned behavior (TPB) (Ajzen, 1991) or technology acceptance model (TAM) (Davis, 1989). These theories were evolved by other researchers by adding new variables (e.g. Karahanna, Straub, & Chervany, 1999) or by combining previous theories (Venkatesh, Morris, Davis, & Davis, 2003) in order to explain more efficiently the users' behavioral intention. These models have been extensively used in many different contexts such as internet, e-mail, e-banking, e-commerce, e-learning, software etc.

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On the other side continuance acceptance takes into consideration user's expectations and the evolvement of user's perceptions over time. Previous findings showed that there are different motivations for pre-adopters and post-adopters (Karahanna et al., 1999). Bhattacharjee (2001a), introduced a post-acceptance confirmation model, the Expectation-Confirmation Model (ECM), based on expectation-confirmation theory (ECT) (Oliver, 1980) and TAM (Davis, 1989). ECT supports that satisfaction is the most important variable regarding continuance use of a product or a service, and it examines both pre-consumption and post-consumption variables in order to define satisfaction, while, TAM supports that the intention to use a system is defined by Perceived Usefulness and Perceived Ease of Use. Therefore, ECM explains IS continuance intention with post adoption expectations (Perceived Usefulness), satisfaction and confirmation.

In the last decade, various researchers inspired by ECT and ECM in order to investigate IS continuance acceptance. Recently, ECM expanded with Perceived Enjoyment, Perceived Playfulness, Perceived Ease of Use, self-image congruity and regret, past use (Hong, Thong, & Tam, 2006; Kang, Hong, & Lee, 2009; Lin, Wu, & Tsai, 2005; Thong, Hong, & Tam, 2006). Moreover, other researchers combined ECT or ECM with other theories such as task-technology fit (TTF) (Larsen, Sorebo, & Sorebo, 2009) and Theory of Planned Behavior (Liao, Chen, & Yen, 2007). Kim and Malhotra (2005) proposed a longitudinal model of continued IS use which combines TAM with updating and feedback mechanisms and repeated behavioral patterns (habits).

Previous studies and theories have been adopted, applied, combined and evolved by many researchers in e-learning context in order to explain continuance use (Chiu, Hsu, Sun, Lin, & Sun, 2005; Chiu, Sun, Sun, & Ju, 2007; Chiu & Wang, 2008; Lee, 2010; Limayem & Cheung, 2008; Roca, Chiu, & Martinez, 2006; Wang, Wang, & Shee, 2007).

However, previous models treated expectations, perceptions and confirmation as separate and different variables. This study, based on disconfirmation theory (Churchill & Surprenant, 1982; Sherif & Hovland, 1961), proposes a model which combines learner's expectations before use and intentions after use for each variable in order to measure the actual interaction between learner and system and its impact on behavioral intention. The actual interaction for each variable will explain if a learner wants to continue to use the system. Since the model proposed in this paper involves a CBA context, we used variables that have already been proposed by Computer Based Assessment Acceptance Model (CBAAM) such as Perceived Playfulness, Perceived Usefulness, Perceived Ease of Use and Content to explore continuance use of CBA (Terzis & Economides, 2011a). Thus, this study has two goals: (1) the development of a new approach for continuance use by using disconfirmation theory, and (2) the exploration of continuance acceptance in CBA context.

The organization of this paper is the following: In Section 2, we present the theoretical background which led to the development of the proposed model. Section 3 describes the proposed model. Section 4 and 5 demonstrate the data analysis and the results. Section 6 discusses the research findings. Finally, Section 7 presents implications, limitations, and conclusions of this study, as well as directions for further research.

2. Theoretical background

2.1. Continuance use in IS

ECM is the most known model for IS continuance explanation. ECM treats IT users' continuance decisions as consumers' repurchase decisions. Satisfaction, Confirmation, and Perceived Usefulness determine users' intentions to continue to use an IS. Thus, ECM differentiates from ECT toward three directions. First, ECM claims that pre-acceptance variables are included in confirmation and satisfaction constructs. Second, Perceived Usefulness was used to measured post-acceptance expectations. Perceived Usefulness was the only construct consistently influencing user intention in both adoption and post-adoption phases. Third, ECM includes perceived performance into confirmation construct.

Bhattacharjee (2001b) extends ECM with Loyalty incentives in the context of electronic commerce. Loyalty incentives did not have a direct effect on continuance intention, but it was significant with Perceived Usefulness. Bhattacharjee and Premkumar (2004) developed further ECM with a longitudinal study and they found that disconfirmation and satisfaction are the two most important constructs to understand IT users' belief and attitude change through time. ECM was also extended with Perceived Playfulness (Lin et al., 2005). Perceived Playfulness has a significant effect on Satisfaction and on Continuance Intention. Another contribution regarding the expansion of ECM was the inclusion of more post-adoption beliefs such as Perceived Ease of Use and Perceived Enjoyment (Min & Shenghua, 2007; Thong et al., 2006). Moreover, the effects of "self-image congruity" and "regret" on continuance intention are mentioned (Kang et al., 2009). Another study highlighted the moderating effects of cultural context and student samples (Islam & Mäntymäki, 2011).

Other researchers attempted to integrate or combine ECM with other theories and models such as Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB) (e.g. Lee, 2010). First, ECM was integrated with TPB (Liao et al., 2007). They found that continuance intention for online services is determined by satisfaction, Perceived Usefulness and subjective norm. These findings evolved ECM by taking into consideration the impact of subjective norm on continuance intention. ECM was combined also with Task-Technology Fit (TTF) and Utilization in the context of e-learning (Larsen et al., 2009). This study added that continuance intention is higher when the information system is work-centric and it provides Utilization. Recently, ECM was connected with personality traits through the five-factor model (FFM) (Lin & Ong, 2010, pp. 367–376). This study showed that personality constructs and especially agreeableness influences ECM constructs. In addition, polynomial modeling and response surface analysis were applied in order to further improve the predictability of ECM (Venkatesh & Goyal, 2010). Moreover a study regarding the post-adoption of electronic medical records integrated ECM with TAM (Shaw & Manwani, 2011). The aforementioned research provided an interesting qualitative analysis which showed that feature usage a variable more specific than the general variable of system use, is influenced by their prior experience with the system and the Perceived Usefulness of the feature.

ECM was introduced and further developed in many different contexts. Cross-Channel Instant Messaging continuance use was evaluated through the integration of ECM with the Process Virtualization Theory (PVT) by introducing variables such as communication process's dimensions of sensory, synchronism, relationship, and identification & control (Mengxiang, Lih-Bin, & Kanliang, 2009). A new context that user's continuance behavior is studying microblogging services, virtual worlds and Social Networking Sites (SNS). Particularly, a study found that user's intentions regarding continued use of Twitter is mainly influenced by Perceived Usefulness, satisfaction and habit (Barnes & Böhlinger, 2011). Habit occurs also in other studies as a crucial variable regarding continuance usage (Wilson, Mao, & Lankton, 2010). Another study suggested that user's intention to use the Twitter continuously is determined by social presence, Perceived Enjoyment, and

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