



How to stimulate the continued use of ICT in higher education: Integrating Information Systems Continuance Theory and agency theory



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ABSTRACT

This study examines the motivations underlying teachers' intention to continue using information and communication technology (ICT) in higher education. In an extended model based on Information Systems Continuance Theory (ISCT) and agency theory (PAT), teachers' continuance intention is theorized as a function of their perceived usefulness of ICT and confidence in the effect of incentive structures. The research model was analyzed using structural equation modeling (SEM) with LISREL, and seven out of eight hypotheses were supported. By combining the two theories, the paper fills a gap in the literature by addressing both personal and managerial perspectives. Thus, the study contributes to Information Systems continuance research by theorizing and validating an extended model that integrates two complementary perspectives and by explaining the interrelationships between these perspectives. Finally, the theoretical and practical implications are presented and discussed, and suggestions for future research are provided.

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1. Introduction

Information and communication technology (ICT) has become increasingly pervasive in higher education. Colleges and universities are working hard to provide a high quality of education and to become attractive, innovative and socially useful institutions. Use of digital tools are considered as important in bringing these institutions a step closer to this goal, particularly with a view to facilitating improvements with respect to teaching quality and learning outcomes.

The objective of this study is to examine how university management can stimulate teaching academics to continue and increase the use of ICT in teaching and learning. Because of the continuous introduction of new technology, changes in higher education are ongoing; therefore, identifying ways to motivate teachers to utilize ICT has become a major concern for university management. One of the main challenges is that ICT enables new “possibilities” for teachers and students; it does not provide a “ready to use” resource (Sørebo, Halvari, Gulli, & Kristiansen, 2009, p. 1177). Today's teaching academics have access to a wide variety of ICT resources; however, only a limited number of available system features are in use (Jaspersen, Carter, & Zmud, 2005).

Traditional teaching methods still dominate (Ørnes, Wilhelmsen, Breivik, & Solstad, 2011) even though blended learning, including the increased use of open educational resources (OER) and Web 2.0 technologies, allows for variation in the teaching, learning, and assessment process.

IS continuance theory (ISCT) is widely used to explain user acceptance and continued use beyond the implementation phase and may also be an appropriate theoretical framework for explaining users' long-term acceptance in academic settings (Sørebo et al., 2009). Traditional user acceptance models, such as the technology acceptance model (TAM) and the post-acceptance model (PAM), consist of ICT-centric concepts (Alter, 2003). A consequence of this is that these models lack work-centric concepts (Larsen, Sørebo, & Sørebo, 2009) and, therefore, “do not address how managers can proactively influence users' attitudes and actions toward organizational goals” (Bhattacharjee, 1998, p. 140). Hence, there is a need to incorporate work-centric constructs that can explain how university management influence on teaching academics continued use of ICT, which is complementary to the traditional ICT-centric concepts in the PAM. In particular, there is a need for theoretical frameworks that explain the impact of managerial tools—for example, incentives and control structures (Bhattacharjee, 1998). Principal-agency theory (PAT) is commonly accepted in economics studies and is among the best theories used to describe relationships in organizations (Eisenhardt, 1989).

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Combining ISCT with PAT will provide a theoretical synthesis that explains personal use both from an ICT-centric as well as from a work-centric and hence a managerial perspective. The present study addresses this issue by integrating ISCT and principal-agency theory-derived variables in a research model to explain personal IS usage in a university setting. Hence, principal-agency theory is used to explain how the management can motivate the academic staff, and this theory, therefore, forms the underlying theoretical work-centric perspective in this study.

There are several reasons to study the personal use of ICT in organizational contexts by integrating the two theoretical perspectives. First, such an approach may provide a more comprehensive understanding of the phenomenon than each perspective may allow in isolation. For example, previous studies has pointed out that incentives, which is a core variable in agency theory, may be critical to motivate teaching academics to use ICT (Bhuasiri, Xaymoungkhoun, Zo, Rho, & Ciganek, 2012; Hung, Chang, & Hwang, 2011), but empirical testing is virtually absent. Accordingly, the present study may contribute to our understanding of how important teaching academics' confidence in the effect of incentive structures are to motivate them to use ICT in an academic setting. Second, to our knowledge, no studies have theoretically integrated principal-agency theory with the ISCT framework to explain teaching academics ICT use from a managerial perspective. Some studies have, however, utilized relevant principal-agency variables within this context (Al-Busaidi & Al-Shihi, 2012; Tao, Cheng, & Sun, 2012), but none of these studies build explicitly on agency theory. Accordingly, previous studies have not fully investigated the ways in which principal-agency theory-generated variables should be modeled into such a synthesis. Third, there exist some studies outside the context of "teaching academics and university managers" that combine principal-agency theory with ISCT, but these have revealed mixed empirical support (Bhattacharjee, 2001b; Tao, Cheng, & Sun, 2009). It follows from this that there is a general need for more research on core principal-agency variables within an ISCT framework.

2. Theoretical framework

2.1. Information Systems Continuance Theory

Information Systems Continuance Theory was developed by Bhattacharjee (2001a). The theory is primarily based upon expectation confirmation theory (ECT) (Oliver, 1980) and includes elements from the TAM (Davis, 1989). The main focus is to explain the user's intention to continue using ICT, and hence, not the user's first-time use of ICT. According to Bhattacharjee (2001a), IS users' continuance decision is similar to consumers' repurchase decision; however, due to the consumer-behavior centrality of ECT, he argues that ECT needs to be extended to cover IS continuance. The latter theory focuses on post-acceptance variables since the effects of any pre-acceptance variables are already captured within the confirmation and satisfaction constructs. Post expectation is, however, included, as it is considered important for products or services for which expectation may change over time. Within ISCT, expectation is represented by perceived usefulness.

ISCT is widely used in studies that seek to explain continued use of ICT, including educational contexts. In a study combining ISCT and self-determination theory, Sørø et al. (2009) explain teachers' motivation to use e-learning technology. In a study of the use of Internet-based learning technologies, Limayem and Cheung (2008) extend the IS continuance model by adding habit as a moderator between IS continuance intention and actual continued use. Tao et al. (2009) examine the factors that influence college students to continue using business simulation games. These

three studies demonstrate that ISCT is successful in explaining the use of digital technologies among teachers and students in educational contexts.

2.2. Agency theory

The principal-agent problem was initially formulated to study the separation of ownership and control that arose with the rise of professional managers controlling assets they did not own (Berle & Means, 1932). The principal-agent perspective addresses the agency relationship in which one entity (the principal) delegates work to another (the agent) who performs the work according to a mutually agreed contract (Eisenhardt, 1989). Since the principal is unable to monitor the agent completely, uncertainty will occur in such relationship, and the problems of hidden information and hidden action will arise. Hidden information arises pre-contractually because the agent possesses private (hidden) information about its true quality (Akerlof, 1970). Hidden action takes place post-contractually after the principal hires an agent who may not exert the promised effort or engage in hidden actions that profit him or her at the principal's expense (Jensen & Meckling, 1972). The principal-agency theory attributes the agency problems to three reasons (Bhattacharjee, 1998): (1) goal conflict: the agent and the principal may have different goals; (2) information asymmetry: the agent cannot be observed by the principal; and (3) differential risk preferences: the principal and the agent may have different attitudes toward risky behavior.

Principal-agency theory is considered to be a ubiquitous theory that has been applied to numerous types of relationships and explains transaction arrangements between self-interested parties with incongruent goals in the presence of uncertainty.

3. Research model and hypotheses

Principal-agency theory is used to explain how management can motivate academic staff to increase their use of e-learning, and its core concepts are incentives, goal conflict, and risk aversion. The variables in ISCT are confirmation, satisfaction, perceived usefulness, and IS continuance intention.

As previously expressed, our main argument for integrating ISCT with core concepts from agency theory is to move educational research in the direction of understanding how risk aversion, goal conflict, and confidence in incentive structures influence teaching academics' ICT continuance decision. The main proposition is that the concepts from agency theory have considerable potential to explain teaching academics' continuance intention.

Confidence in incentive structures are assumed to be a potential cause of instrumental behavior; that is, teaching academics choose to use ICT independent of their level of satisfaction/dissatisfaction with the present ICT solutions. The reason for this is that confidence in incentive structures may lead to instrumental use of ICT due to the possibility that enhanced learning performance may be the source of various rewards that are extrinsic to the task context, such as promotions or monetary gains.

This study explains the continued use of ICT in higher education by integrating two models that have received limited theoretical and empirical attention: PAT and ISCT. The expectation is that the integration of these two models may provide a more comprehensive understanding of the phenomenon than each perspective may explain separately. To our knowledge, no previous studies have theoretically integrated PAT with the complete ISCT framework to explain the use of ICT from a teaching academic perspective.

Our research model is shown in Fig. 1.

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