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The factors that predispose students to continuously use cloud services: Social and technological perspectives

Yong-Ming Huang

Department of Applied Informatics and Multimedia, Chia Nan University of Pharmacy and Science, Tainan City, Taiwan, ROC

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ABSTRACT

Cloud services have been widely used in education in recent years. However, the factors that determine students' continuance intention to use such services have received surprisingly little scholarly attention. Previous studies have shown that students may discontinue using a specific technology even if they have initially accepted it. Therefore, this research seeks to identify what factors may influence students' continuance intention to use cloud services. This research not only developed a research model by incorporating social and technological factors but also tested a series of hypotheses derived from the model. Our research findings suggest that (1) attitude toward using is the most important factor behind students' continuance intention to use cloud services; (2) social presence is the most significant factor that directly influences students' attitude toward using cloud services; (3) perceived ease of use plays a more important role than perceived usefulness in influencing students' attitude toward using cloud services.

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1. Introduction

Cloud services have been widely used in education (González-Martínez, Bote-Lorenzo, Gómez-Sánchez, & Cano-Parra, 2015). They are rendered on the basis of cloud computing, a promising paradigm. Regarding the pool of various resources (e.g., software) as a cloud, the paradigm has developed these resources into a riotous profusion of services such as Google Docs (document service), Prezi (presentation service) and Dropbox (file hosting service) and then delivers them over the Internet (Arpaci, Kilicer, & Bardakci, 2015; Huang, Wang, Guo, Shih, & Chen, 2013; Lee, Lee, & Kim, 2013). These services enable teachers to develop their teaching scenarios by using free or low-cost schemes rather than expensive proprietary productivity tools (Huang et al., 2013). More importantly, these services have considerable potential to realize certain pedagogies such as collaborative learning (González-Martínez et al., 2015). For example, Al-Zoube (2009) suggested that Google Docs is useful to realize collaboration among students, because it enables students to easily distribute documents to others and manage different versions of each document. Similarly, Huang (2015) used Prezi, a cloud-based presentation service, to help students edit a shared slide online synchronously. With the support of Prezi, students can not only work collaboratively, but also discern immediately any change made by others.

Nevertheless, only a few studies have systematically explored the factors that affect students' continuance intention to use cloud services from social and technological perspectives. In fact, students' continuance intention has been gradually viewed as an important indicator for the value of an educational technology (Lee, 2010; Lin, 2011) because students may discontinue

E-mail address: ym.huang.tw@gmail.com.

using the technology even if they have initially accepted it (Lee, 2010). As a result, examining students' continuance intention has become a vital issue nowadays. However, a majority of literature still focused simply on students' intention to use these services (Arpaci et al., 2015; Cheung & Vogel, 2013; Conde, García, Rodríguez-Conde, Alier, & García-Holgado, 2014; Huang, 2015; Taylor & Hunsinger, 2011). Tan and Kim (2011) conducted a pioneering study. They employed Google Docs to support students in collaboratively completing a group project and further revealed that perceived usefulness and satisfaction are significant factors behind their continuance intention to use the technology. However, they did not examine the influence of social factors on students' continuance intention to use cloud services. So far, social factors such as social influence have been viewed as significant determinants of using cloud services (Cheung & Vogel, 2013; Huang, 2015); besides, they may play an important role in influencing students' continuance intention to use such services. The deficiency in the existing literature indicates the critical need for exploring the factors that influence students' continuance intention to use cloud services from a more comprehensive perspective.

To this end, this research developed a research model by incorporating social and technological factors. Specifically speaking, this research firstly adopted Google Docs to support the subjects in collaboratively writing animation scripts, and then designed a questionnaire regarding their opinions on Google Docs so as to examine what factors affect their continuance intention to use this service. Finally, a series of analyses were performed to clarify how and to what degree the social and technological factors prompted the subjects to continue using Google Docs. The findings from these analyses provide researchers and instructors with practical knowledge that helps them develop and apply cloud services in different educational contexts.

2. Theoretical background and related studies

2.1. Theoretical background

Understanding the factors that influence users' intention to use information systems (IS) has been viewed as an important issue. Previous related studies mainly concentrated on the investigation of users' initial intention. These studies widely employed the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), the theory of planned behavior (TPB) (Ajzen, 1985, 1991) and the technology acceptance model (TAM) (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) as a theoretical basis to explain user acceptance of IS. Developed by Fishbein and Ajzen (1975), TRA suggests that attitude and subjective norm significantly influence behavioral intention, which in turn affects actual behavior. According to this theory, attitude refers to "a person's general feeling of favorableness or unfavorableness toward some stimulus object" (Fishbein & Ajzen, 1975: 216), subjective norm refers to "the person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein & Ajzen, 1975: 302), and behavioral intention refers to "a person's subjective probability that he will perform some behavior" (Fishbein & Ajzen, 1975: 288). Proposed by Ajzen (1985, 1991), TPB adds perceived behavioral control to TRA as the third factor. Perceived behavioral control refers to "people's perception of the ease or difficulty of performing the behavior of interest" (Ajzen, 1991: 183), which is postulated to affect behavioral intention and actual behavior. TAM was adapted from TRA by Davis et al. (Davis, 1989; Davis et al., 1989). They added perceived ease of use and perceived usefulness to illustrate user acceptance of IS. Perceived ease of use refers to "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989: 320), while perceived usefulness refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989: 320). TAM and TRA are similar in holding that the actual use of IS is determined by behavioral intention, and behavioral intention is determined jointly by attitude toward using and perceived usefulness. In addition, attitude toward using is influenced jointly by perceived ease of use and perceived usefulness, while perceived usefulness is significantly influenced by perceived ease of use.

2.2. Related studies on users' continuance intention to use IS

Later, researchers in this field gradually shifted their focus onto the investigation of users' continuance intention, and widely employed the IS continuance model. Developed by Bhattacherjee (2001), this model comprises four main constructs, namely confirmation, perceived usefulness, satisfaction, and IS continuance intention (Bhattacherjee, 2001). Confirmation originated from expectation confirmation theory (Oliver, 1980), which means that users have specific expectations of a particular product before using it, and then actually use it and compare its performance with their expectations, and finally determine the degree to which their expectations are confirmed (Bhattacherjee, 2001). Satisfaction implies that "a psychological or affective state related to and resulting from a cognitive appraisal of the expectation-performance discrepancy (confirmation)" (Bhattacherjee, 2001: 354). IS continuance intention refers to the degree to which a person is willing to continue using an information system (Bhattacherjee, 2001). Based on the definitions of these constructs, Bhattacherjee (2001) formulated the following hypotheses: (1) confirmation positively and significantly affects perceived usefulness and satisfaction; (2) perceived usefulness positively and significantly affects satisfaction and IS continuance intention; and (3) satisfaction positively and significantly affects IS continuance intention. Due to the successful development of the IS continuance model, many educational researchers have applied and modified the model to carry out relevant studies (Roca & Gagné, 2008; Shin, Shin, Choo, & Beom, 2011; Smith & Sivo, 2012; Tao, Cheng, & Sun, 2009), in which technological factors such as perceived ease of use and perceived usefulness are frequently identified as the determinants of users' continuance

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