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Learning management systems and cloud file hosting services: A study on students' acceptance

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ABSTRACT

The aim of this paper is to investigate the motivations that lead higher education students to replace several Learning Management Systems (LMS) services with cloud file hosting services for information sharing and collaboration among them. The research approach is based on the Technology Acceptance Model (TAM). More specifically, the model is devoted to identifying barriers and enablers to the acceptance of these technologies. A questionnaire comprising three factors (*Attitude toward using technology, Perceived ease of use and Perceived usefulness*) was applied to a sample consisting of 121 higher education students. Results show that the *perceived ease of use of* cloud file hosting services is above that of LMS tools and services and that cloud file hosting services presented higher levels of *perceived usefulness* than standard learning management tools. In addition, attitude toward using cloud file hosting services is well above that of using LMS tools.

1. Introduction

Information and communication technologies (ICT) rapid evolution is influencing both the public and private contexts (Soto-Acosta, Martinez-Conesa, & Colomo-Palacios, 2010). In this sense, the degree of development of certain domains is considered to be linked to the level of implementation of ICT (Lucio-Nieto, Colomo-Palacios, Soto-Acosta, Popa, & de Amescua-Seco, 2012). However, the adoption of ICT has followed different patterns depending on the environment. Thus, although the business context has reached high levels of ICT adoption, other important contexts for the future of generations such as higher education remain certainly laggard in comparison (Park, 2009).

International reports point out that the implementation of ICT within higher education is still very basic, with high levels of resources underutilization, considering its potential (OECD, 2005; UNESCO, 2011). Therefore, it is necessary to move from the use of ICT as a support tools to efficient learning instruments (e.g. Park, 2009). To address these issues, there is therefore a need for further works that show how to cope with problems and practical issues with regard to the development of current and future ICT to support the learning process (González, 2010; Ossiannilsson & Landgren, 2012). These ICT tools support traditional and complement new forms of learning (e.g. e-learning), which make use of the Internet and other information-related ICT to create experiences that foster and support the learning process (Bose, 2003; Macgregor & Turner, 2009).

One of the main objectives of higher education in today's information technology enabled classroom is to make students more active in the learning process (Saadé, Morin, & Thomas, 2012). Among the tools available to do so are Learning Management Systems (LMS). These systems, known as Virtual Learning Environments too, present high levels of functionality regarding learning activities as well as features for course management and tracking. However, LMS still have several limitations which decrease the learning effectiveness (Yasar & Adiguzel, 2010). Most educational institutions are currently developing the non-attendance aspect with regard to much of their course material by setting up virtual campuses (Sánchez & Hueros, 2010) and LMS. The use of LMS provides students and lecturers with a set of tools for improving the learning process and its management. Nonetheless, as argued by García-Peñalvo, Conde, Alier, and Casany (2011), despite the high levels of LMS adoption, these systems have not produced the desired and expected learning outcomes yet. More specifically, these authors gathered a set of reasons to explain why the adoption of LMS have not contributed further to the learning processes, among these reasons are:

1. Tools are not properly used and often merely become spaces to publish course documents and learning materials.

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2. LMS constrain student collaboration and opportunities of social constructivism, which should not be limited to a period of time (i.e. academic year).
3. LMS are usually focused on the course and institution rather than on students and their needs.

Furthermore, recent research (e.g. Alier et al., 2012) suggests that social networks, cloud based services and mobile applications come to support and complement the lack of LMS' features. In other words, LMS suffer from several limitations such as the lack of openness, resistance to change, failure to take into account the user, lack of integration with the informal context and so on (García-Peñalvo et al., 2011). In this scenario, instructional designers who work in the context of e-learning environments often face with the challenge of incorporating diverse instructional resources to create engaging and coherent e-learning experiences (Dodd & Antonenko, 2012). Among these resources are cloud file hosting services. In addition, students attending traditional off-line learning are starting to use these systems as collaboration tools. The aim of this paper is to investigate the motivations that lead higher education students to replace several LMS services with cloud file hosting services for information sharing and collaboration among them.

The remainder of this paper is structured as follows. The next section presents the background of the work. Following that, the methodology used for sample selection and data collection is discussed. Then, data analysis and results are examined. Finally, the paper ends with a discussion of research findings, future research and concluding remarks.

2. Background

Cloud computing is getting increasing attention and represents nowadays one of most important research topics in computing science. As a result, "cloud computing" is becoming a buzz word in the computing industry (Motika & Weiss, 2012). Thus, the demand for cloud computing is rising because of the popularity of digital devices and the wide use of the Internet (Chung, Park, Lee, & Kang, 2012). Cloud computing refers to both the applications delivered as services over the Internet and the hardware and software systems within the data centers which provide those services (Armbrust et al., 2010).

Cloud computing opens the doors for large economies-of-scale, but it also faces a number of challenges (Jiménez-Domingo, Gómez-Berbís, Colomo-Palacios, & García-Crespo, 2011). The cloud offers benefits such as fast deployment, pay-for-use, lower costs, scalability, rapid provisioning, rapid elasticity, ubiquitous network access, greater resiliency, hypervisor protection against network attacks, on-demand security controls, real time detection of system tampering and rapid re-constitution of services (Subashini & Kavitha, 2011). Thus, moving to cloud services makes users more efficient, facilitates collaboration with their co-operators, and helps users to have seamless access to other digital devices (Park & Ryoo, 2013). Moreover, cloud computing enables the optimization of resources (Duran-Limon, Siller, Blair, Lopez, & Lombera-Landa, 2011) under the consideration of performance evaluation (Stantchev, 2009) and self-optimitization (Krallmann, Schröpfer, Stantchev, & Offermann, 2008). However, cloud applications, like any other disruptive technologies, present also many practical problems (Colomo-Palacios, Fernandes, Sabbagh, & de Amescua Seco, 2012). In other words, the cloud computing service model creates new risks in the computing industry scenario (Rebollo, Mellado, & Fernández-Medina, 2012). These risk issues are related to the maintenance of high service availability and dependability (Stantchev & Malek, 2011), the provision of end-to-end secure solutions, the management of longer-standing service workflows (Wei & Blake, 2010) as well as the IT governance aspects (Stantchev & Stantcheva, 2013) of organizations that use cloud computing (Petruch, Stantchev, & Tamm, 2011).

Cloud storage is a major service offered by cloud computing, which allows data owners to move data from their local computing systems to the Cloud (Yang & Jia, 2012). Companies are becoming more and more aware of the advantages of storing data anywhere in the cloud (Hamlen & Thuraisingham, 2013). Moving data into the cloud offers great convenience to users, since users do not need to care about the complexities of direct hardware management (Wang, Wang, Ren, Cao, & Lou, 2012). Despite of the advantages, this new paradigm of data storage service introduces several security challenges, which must be addressed in the future, these challenges come mainly from confidentiality, integrity and data availability issues (Kumar, Ashok, & Subramanian, 2012).

One popular class of applications utilizing cloud storage are the various file hosting services such as Apple iCloud, Ubuntu One, Dropbox, iCloud, Microsoft SkyDrive, SugarSync, Google Drive, Amazon Cloud Drive, Cubby, YouSendIt and ZumoDrive. A recent review from these services can be found in Needleman's (2012) work, whereas a more research-oriented comparison is conducted by Hu, Yang, and Matthews (2010). Users of these file hosting services are able to store and share files over the Internet through file synchronization. Copies of this files are maintained at two or more places (server and user devices) and changes are automatically introduced at all the other locations.

Dropbox is one the most popular file hosting services. It can be considered as a file/folder synchronization service, since shared folders are synchronized after a certain time depending on file size and available bandwidth. All the contents (files and folders) get automatically synchronized (Garcia-Arenas et al., 2011). Moreover, if work is conducted on a Dropbox file, while the device is offline, changes are synchronized automatically when the device comes back online. However, if concurrent work is performed on a file from different devices, the resulting multiple copies must be manually reconciled (Marshall & Tang, 2012). Despite of Dropbox's users base and its commercial success, recently several issues with regard to privacy, security and trustworthy have been raised (e.g. Caldwell, 2012). In any case, given that Dropbox is a reality that many users employ for professional or academic work, the aim of this paper is to extend previous research that has investigated (e.g. Hunsinger & Corley, 2012) or reported (Lorenz, Kalde, & Kikkas, 2012) the use of Dropbox to cover certain weaknesses of LMS within the higher education setting.

3. The study

In this section, the research approach, sample and data collection as well as instruments validation are presented.

3.1. Research approach

The research approach is based on the Technology Acceptance Model (TAM). Davis' (1989) TAM is an evolution of the Theory of Reasoned Action (TRA) developed by Icek Ajzen and Fishbein (1980). The TRA posits that the intention to accept or reject a particular technology is based on a series of tradeoffs between the perceived benefits of the system to the user and the complexity of learning or using the system. The TRA proposes that behavior results from the formation of specific intentions to behave (Ajzen & Fishbein, 1980). According to the TRA model, two major factors determine behavioral intentions namely: user attitude toward the behavior and subjective norms. Attitude toward the behavior refers to the person's judgment that performing the behavior is