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Understanding the effect of e-learning on individual performance: The role of digital literacy

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ABSTRACT

With the diffusion of easy-to-use Web 2.0 tools, such as podcasts, blogs and wikis, e-learning has become a popular mechanism for individual training. While individuals use these tools in the hope that their training will improve their performance, this relationship is not a given. This paper proposes that an individual's level of digital literacy affects her performance through its impact on her performance and effort expectations. To explain the influence of digital literacy on the intention of individuals to continue using e-learning and their performance, we integrate the concept of digital literacy with the Unified Theory of Acceptance and Use of Technology (UTAUT) and test our model using survey data from New Zealand accountants working in small and medium-sized enterprises (SMEs). The results indicate that these relationships were significant: digital literacy on users' performance and effort expectations, performance expectations on users' intentions to continue using Web 2.0 tools, and continuance intention on performance. These findings suggest that individual digital literacy facilitates the use of e-learning, and should be considered when examining the impact of the latter on performance.

1. Introduction

E-learning, especially in the form of web-based technologies, is increasingly being used by organizations to train their employees (Wang, Ran, Liao, & Yang, 2010), because it lowers the cost of delivering training, increases the flexibility of learning in terms of place and time, encourages the self-management of learning, and enables on-demand training (Admiraal & Lockhorst, 2009; Jutla, Bodorik, & Dhaliwal, 2002; Salas, Kosarzycki, Burke, Fiore, & Stone, 2002; Wang, 2011). These advantages mean that e-learning now accounts for about a third of the US$200 billion global corporate training industry (Rayson, 2013).

At an organizational level, the use of technology for workplace learning can help resolve budget and scale issues. The benefits of e-learning largely revolve around convenience, because learning can take place at a distance and at a time and pace suited to learners' needs (Welsh, Wanberg, Brown, & Simmering, 2003). This is advantageous for large organizations, who have many employees working in various locations across a range of work processes, which require communication and collaboration. For small and medium-sized enterprises (SMEs), which have fewer employees and operate in fewer locations, the advantages of e-learning are the enhanced flexibility and the access to expertise that is not available locally (Park & Wentling, 2007; Sambrook, 2003). However, the acceptance of e-learning in SMEs is still problematic, with the reasons including limited technology budgets and a skeptical attitude borne out of the perception that e-learning is largely non-interactive learning that does not meet their learners' needs (Sambrook, 2003; Welsh et al., 2003).

However, while e-learning has become more widely accepted, its effectiveness is not assured. For example, there can be misalignments between the practice of technology-supported learning and organizational norms in areas such as knowledge sharing (He & Wei, 2009). E-learning at workplaces can also be less effective if it is not clearly related to business and performance requirements, and if little job analysis was carried out before it was adopted (Vaughan & MacVicar, 2004). These obstacles can decrease employee motivation and learning and transfer effectiveness. Thus, to make workplace e-learning more effective, job competencies and performance requirements should be aligned with the norms and practices embodied in e-learning (Wang, 2011).

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E-learning's effectiveness also depends on the level of individual and social support available when it is being adopted (Cho, Cheng, & Lai, 2009; Liu, Chen, Sun, Wible, & Kuo, 2010). The ability to collaborate with remotely-located peers may address learners' social needs and make them more satisfied with online learning and motivated to use it (Salas et al., 2002). Learners may also be more satisfied and keen to continue their learning if they are able to control and customize their learning, as their learning experiences will then be a better fit with their preferences (Derouin, Fritzsche, & Salas, 2005).

Although there is substantial research on the impact of workplace e-learning, little work has examined professionals' perceptions of, and reactions toward, this technology-delivered pedagogical innovation (Chiu & Wang, 2008). This is a significant gap because a lack of consideration for learners' perceptions and attitudes toward workplace e-learning can impede the use of e-learning applications (Admiraal & Lockhorst, 2009; Brown, Murphy, & Wade, 2006; Servage, 2005; Vaughan & MacVicar, 2004).

Thus, it is important to understand the role of individual attitudes toward technology, since e-learning usage depends on it. As new generations of e-learning technology, such as podcasts, wikis and blogs, enter workplaces, being able to quickly adopt and use them for one's training becomes a valuable skill because it means greater control over one's learning environment-individuals can try different tools, and pick and choose which ones fit their needs and preferences best. Individuals who, on the other hand, are less able to adopt new tools may be stuck with e-learning from the previous generations which may be less customizable, less portable, and difficult to query, making their e-learning experience less enjoyable. Individuals who are better able to adopt new tools may start using them if the new tools fit their learning styles or preferences better, while those who find it difficult to adopt new systems may be trapped into using systems that they do not like (Ahmed, 2010).

The constant shift in and upgrading of e-learning technology highlights the value of exploring the impact of individuals' digital literacy on the adoption of e-learning in the workplace. Digital literacy comprises more than the abilities to use software or use a digital device; it involves a large variety of complex cognitive, emotional and sociological skills, which users need to function effectively in digital environments (Martin & Madigan, 2006). Digital literacy is a broader concept that integrates several skill-sets and related literacies, such as information evaluation and knowledge gathering (Virkus, 2003). Updating these abilities will be necessary, as people's circumstances change and as changes in the digital information environment bring about the need for new understandings and abilities (Markless & Streatfield, 2007). While a basic level of digital literacy would include the ability to send e-mails, prepare documents using computers, and search for information on the Web, the competencies required to fulfill this fundamental level of digital literacy increase as the use of technology, particularly mobile technology, expands. Thus, being digitally literate today arguably includes skills such as being able to use messaging applications on smartphones and create digital artefacts using applications such as WordPress and Twitter.

The broader set of skills required to be competent at e-learning is an overlooked issue in research, and this study's first contribution is that it addresses this gap by introducing digital literacy to the Unified Theory of Acceptance and Use of Technology (UTAUT). The study's second contribution is to clarify the impact of e-learning on individuals. This objective was motivated by contradictory and inconclusive reports about the consequences of using e-learning found in prior studies on this topic (e.g. Cheng, 2011).

The next section provides the background to the study, before presenting the research model and the hypotheses to be tested. Following the discussion of the methodology and results, the paper concludes with implications for practice and research, and possible directions for future research in this area.

2. Theoretical background

2.1. E-learning

An e-learning system is a web-based communication platform that allows learners, without limitations on place and time, to access diverse learning tools, such as discussion boards, assessments, content repositories, and document sharing systems (Martins & Kellermanns, 2004; Ngai, Poon, & Chan, 2007). By themselves, traditional training methods are no longer able to satisfy the demands for continuous employee development and re-skilling (Roca & Gagné, 2008). E-learning makes learning more accessible because, not only can individuals study when it is convenient for them, but they also have access to coaching and support potentially round-the-clock. This means that it is possible to provide an experience more similar to a classroom, with experts tutoring learners located anywhere in the world (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). E-learning is quickly becoming a vital part of the learning and teaching process (Pituch & Lee, 2006) because it makes communication among learners and between learners and instructors/teachers more efficient (Martins & Kellermanns, 2004). It also helps organizations increase the geographical reach of their training resources and complement face-to-face training activities.

These benefits mean that encouraging the use of e-learning is important for organizations, in particular SMEs. A basic way to increase use of a system is to enhance user acceptance of it (Ong, Lai, & Wang, 2004). Prior research has recognized that the perceived usefulness (PU) of systems is critical for gaining acceptance of new technologies among users (Bhattacherjee, 2001). Studies on e-learning acceptance (Liu et al., 2010) have confirmed that this factor is relevant in the e-learning context also. PU is influenced by individual differences in cognitive style and gender, and external factors, such as the availability of support, system characteristics, and the social context in which technology adoption takes place (Lu, Yu, Liu, & Yao, 2003). In the e-learning context, researchers have similarly studied predictors such as encouragement by peers, the extent of technical support, computer efficacy and experience, and various system attributes (Ngai et al., 2007; Ong et al., 2004; Pituch & Lee, 2006).

We extend the current body of knowledge in e-learning acceptance by investigating the role of digital literacy. Digital literacy is the ability to access, search, evaluate, modify and distribute digital media, and develop skills in the use of new technologies (Ng, 2012). It is related to an individual's inclination toward technology, and has both technical (possessing the abilities to use technologies) and cognitive (having the judgment to make appropriate choices when manipulating and gathering information) aspects. Digital literacy is an important determinant to consider as the number of e-learning tools has expanded in the recent past to incorporate Web 2.0 innovations, such as blogs, podcasts, wikis and RSS feeds. The rapid spread of these tools has meant that individuals often have had to train themselves in how to use these tools, instead of relying on infrequent corporate training sessions (Ullrich et al. 2008). Individuals with a high level of digital literacy have been better able to leverage these new tools to self-manage their training and carry out their continuing education activities in an informal setting, reducing the disruption to their working lives (Hargittai, 2010).