



Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty

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ABSTRACT

This study identifies the critical success factors that influence the acceptance of e-learning systems in developing countries. E-learning is a popular mode of delivering educational materials in higher education by universities throughout the world. This study identifies multiple factors that influence the success of e-learning systems from the literature and compares the relative importance among two stakeholder groups in developing countries, ICT experts and faculty. This study collected 76 usable responses using the Delphi method and Analytic Hierarchy Process (AHP) approach. The results reveal 6 dimensions and 20 critical success factors for e-learning systems in developing countries. Findings illustrate the importance of curriculum design for learning performance. Technology awareness, motivation, and changing learners' behavior are prerequisites for successful e-learning implementations. Several recommendations are provided to aid the implementation of e-learning systems for developing countries which have relevance for researchers and practitioners. Limitations as well as possible research directions are also discussed.

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1. Introduction

Information technology has created new opportunities for education. More than 1000 institutions in 50 countries provide e-learning options (Sharma & Kitchens, 2004). E-learning is a useful tool for enhancing the quality of teaching and learning. E-learning is an “innovative approach to education delivery via electronic forms of information that enhance the learner's knowledge, skills, or other performance” (Sirtongthaworn, Krairit, Dimmitt, & Paul, 2006, p. 139). Arbaugh (2002) defined e-learning as the use of the Internet by users to learn specific content. Other researchers define e-learning as using modern Information and Communications Technology (ICT) and computers to deliver instruction, information, and learning content (Selim, 2007). The stakeholders of e-learning are learners, faculty, administrative and technical staff, and employers (Ozkan & Koseler, 2009).

Online learning systems provide benefits for stakeholders located around the world. Advantages of e-learning for learners include an increased accessibility to information, better content delivery, personalized instruction, content standardization, accountability, on-demand availability, self-pacing, interactivity, confidence, and increased convenience. E-learning reduces costs, enables a consistent delivery of content, and improves tracking, among other benefits for faculty (Kruse, 2002; Ruiz, Mintzer, & Leipzig, 2006; Welsh, Wanberg, Brown, & Simmering, 2003; Zhang, Zhao, Zhou, & Nunamaker, 2004). E-learning reduces classroom and facilities cost, training cost, travel cost, printed materials cost, labor cost, and information overload (Ruiz et al., 2006; Wang, Xu, Chan, & Chen, 2002; Welsh et al., 2003; Zhang & Nunamaker, 2003). E-learning initiatives also require considerable investments in technology such as hardware costs, software licenses, learning material development, equipment maintenance, and training (Childs, Blenkinsopp, Hall, & Walton, 2005; Welsh et al., 2003). Welsh

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et al. (2003) concluded that e-learning has huge potential and can reduce costs in comparison to a traditional classroom environment after initial course development. Despite these benefits, e-learning has a higher drop-out rate than traditional delivered instruction (Bell & Kozłowski, 2002; Brown, 2001; Zhang et al., 2004).

Further, e-learning is still in its infancy in developing countries which experience challenges unique from developed countries. Many developing countries have expressed an interest to implement e-learning (Grönlund & Islam, 2010) but face obstacles in infrastructure, resources, information access (Raab, Ellis, & Abdon, 2002), personal characteristics, support from institution (Brinkerhoff, 2006), technology and connectivity, instructors' design and technology confidence (Hussein, Aditiawarman, & Mohamed, 2007), as well as culture and policy (Shraim & Khlaif, 2010). Alshare, Al-Dwairi, and Akour (2003) reported that technology integration within education in developing countries is lagging due to cultural, political, and economic concerns. The objective of e-learning in developing countries is to provide basic education to a large number of poor students. This is very different than the objective of e-learning in developed countries, which aims to develop an effective knowledge economy and enhance lifelong education (Gulati, 2008). Despite these challenges, opportunities still exist to improve the effectiveness and success of e-learning (Alavi & Leidner, 2001; Gupta & Bostrom 2005; Olfman, Bostrom, & Sein, 2006; Santhanam, Sasidharan, & Webster, 2008).

Various aspects of e-learning have been examined in developed countries including technology-based components (Islas et al., 2007), student and teacher satisfaction (Liaw, Huang, & Chen, 2007), the effectiveness of e-learning (Douglas & Vyver, 2004), participants' interaction in an online environment (Arbaugh & Fich, 2007), and the student experience (Gilbert, 2007). For example, learner attitudes, instructor quality, system quality, information (content) quality, service quality, and support are important factors for learners' satisfaction (Ozkan & Koseler, 2009). Fuller, Vician, and Brown (2006) recommends that any effective e-learning system implementation address technology, pedagogy, and the individual. Lee (2008) identifies several factors which influence e-learning adoption besides perceived usefulness and perceived ease of use.

Studies that examine e-learning adoption critical success factors (CSFs) in a single country are more common than studies that examine CSFs from multiple developing countries. This study uses the Delphi and Analytic Hierarchy Process (AHP) methods to identify the relative importance of factors that impact the success of e-learning. The objective of this study is to identify CSFs that influence the acceptance of e-learning systems in developing countries. The rest of this paper is organized as follows. Section 2 discusses the theoretical backgrounds of e-learning, and influential factors for the adoption and success of e-learning systems in education; Section 3 develops the research framework of this study; Section 4 describes the research methodology that this study employs; the results are presented in Section 5; discussions of the results and implications are provided in Section 6; the paper concludes in Section 7.

2. Theoretical backgrounds

The e-learning literature indicates that both external (social, environment) and internal sources (individual characteristics) are crucial for e-learning implementation. Previous e-learning studies applied various theories to examine the determinants of e-learning adoption and effectiveness. This section reviews CSF studies in the e-learning literature and identifies major theoretical perspectives related to e-learning research, namely social cognitive theory, IS success model, technology acceptance model, and motivation theory.

2.1. Critical success factors in e-learning

There are a number of factors important for e-learning. A higher level of individual computer self-efficacy is positively associated with a higher level of learning performance which increases the use of e-learning (Wu, Tennyson, & Hsia, 2010). Intrinsic motivations (Davis, Bagozzi, & Warshaw, 1992) and extrinsic motivations (Teo, Lim, & Lai, 1999; Roca & Gagné, 2008) are additional factors examined for learners and instructors using e-learning systems. Lee (2010) found that perceived usefulness has a direct positive effect to the intention to use e-learning while perceived ease of use and perceived enjoyment have an indirect positive effect to intention to use. In contrast, Roca and Gagné (2008) found that perceived usefulness, perceived ease of use, and perceived playfulness are primary determinants of e-learning continuance intention.

A number of CSFs of e-learning studies have been found in both developed and developing countries. Volery and Lord (2000) conducted a CSF study with students at an Australian University finding that technological factors (ease of access, support interaction, design, etc.), instructors' characteristics (attitude toward students, teaching style, technical competence, encourage students interaction, etc.) and students' characteristics impacted online delivery effectiveness. Soong, Chan, Chua, and Loh (2001) found that human factors, instructors and students' technical competency, instructors and students' mindset about online learning, level of collaboration, and IT infrastructure are CSFs for online course resources in Singapore. Selim (2007) classified the CSFs for e-learning into four factors based on student observations including instructors' characteristics (teaching style, attitude toward students, technology control, etc.), students' characteristics (motivation, technical competency, perception of content and system, collaboration in interaction, etc.), technology (ease of access, internet speed, screen design, etc.), and institution support (technical support, computer availability, learning material accessibility and printing, etc.). Govindasamy (2002) reported seven important factors for e-learning implementation including institution support, faculty support, student support, teaching and learning, course structure, evaluation and assessment. Strong pedagogical foundations, especially content issues, student support and assessment, are essential for the success of e-learning implementation.

CSFs for e-learning include technology and infrastructure, design, instructor and learner characteristics, support, and content issues. Additional success factors include course and environmental dimensions (Sun, Tsai, Finger, Chen, & Yeh, 2008), transactional presence (Shin, 2003), and knowledge management (Mosakhani & Jamporzme, 2010). Numerous factors affect e-learning implementation success but the majority of CSF studies is conducted in one country and use students as the primary data source (Mosakhani & Jamporzme, 2010; Selim, 2007; Shin, 2003; Sun et al., 2008; Volery & Lord, 2000).

2.2. Social cognitive theory (SCT)

SCT analyzes human behavior, attempts to predict human action, and develops a clearer understanding of changes in human behavior. SCT also explains IT adoption and guides research in the field of social and psychology studies (Bandura, 1977, 1986). SCT explains the

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