Main article

Using an educational computer program to enhance student performance in financial accounting

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ABSTRACT

We develop an educational computer program, *Principles Aren't That Hard* (PATH), to enhance intrinsic motivation and performance in accounting education. We include Blackboard and the traditional paper medium as additional system types for comparison purposes. The results show that relative to Blackboard and the traditional paper medium, PATH leads to highest intrinsic motivation, which increases system use. The findings also indicate that the effect of intrinsic motivation on system use is stronger when perceived usefulness is higher than lower. When users perceive a system to be useful for attaining their goals, this form of extrinsic motivation promotes rather than impairs intrinsic motivation which further enhances system use. Additionally, the results suggest that perceived competence fully mediates the impact of system use on performance. This study's identification of perceived competence as a mediator furthers understanding of the inconsistent findings reported in previous research on the effect of system use on performance.

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1. Introduction

The objective of educational technology is to enhance accounting education by assisting students in problem-solving (Holcomb & Michaelsen, 1996). Accounting educators are devoting attention to use of educational technology to motivate and assist students to learn technical accounting concepts (Humphrey & Beard, 2014). Online homework software such as Connect, MyAccountingLab, and Wiley Plus have emerged as educational technological tools for facilitating learning. To enhance learning, accounting education includes other educational technological tools such as the Internet (Jensen & Sandlin, 1995), course management software (Jensen & Sandlin, 1992a, 1992b), and Web-based applications (Baker & White, 1999; Murphy & Hoeppner, 2002).

While interesting computer game features can promote learning of technical accounting materials, accounting educators need to recognize that the purpose of computer games is to focus on instruction rather than entertainment. A computer game designed to enhance performance should not be a transformation of an entertainment game or the traditional paper medium. Instead, these computer games should entail educational value with an appropriate level of fun to motivate increased engagement in learning (De Freitas, 2006). Since learner support in a game-based learning environment is essential for positive learning effects, instructional design is a necessary but not sufficient condition for enhanced learning (Garris, Ahlers, & Driskell, 2002; Knotts & Keys, 1997; O'Neil, Wainess, & Baker, 2005).

Despite efforts directed toward the exploration of game features such as fantasy, interactivity, and sensory stimuli of value to education (Law & Sun, 2012), the effect of computer games on performance has not produced consistent results (Leemkuil & de Jong, 2012). While computer games are more effective than the traditional approach such as case studies in terms of knowledge acquisition or mastery of complex situations (Pasin & Giroux, 2011), these benefits are not observed in some studies (Vandercruysse, Vandewaetere, & Clarebout, 2012; Wouters, van der Spek, & Van Oostendorp, 2009). While an extensive analysis reveals the absence of instructional design in most game-based learning studies, only about 10% of these studies can be considered to be based on learning theory (Wu, Hsiao, Wu, Lin, & Huang, 2012). This might shed light on the mixed findings on the impact of computer games on performance.

The purpose of computer games is to obtain desirable learning outcomes and specific learning goals while sustaining user attention. The extant literature focuses on exploration of potential features influencing learning such as feedback types (Svingby, 2010), user experiences (Law & Sun, 2012; Wang & Hsu, 2014), or learning intentions (Kong, Kwok, & Fang, 2012). A need exists for additional work on effectively designing computer games to promote learning of technical accounting materials. To fulfill this need, we design a computer program, *Principles Aren't That Hard* (PATH), to facilitate learning of complex and abstract accounting concepts, which require higher order cognition. Since Blackboard and the traditional paper medium are frequently used in higher education, we examine these delivery formats to facilitate comparison with PATH. PATH is a novel intelligent tutoring system designed to assist learning of technical accounting materials. In particular, PATH incorporates interest-enhancing game features such as animation, enhanced user-computer interaction, appealing interface design, and immediate system feedback (available in certain PATH modules). Such features are limited in Blackboard and almost non-existent in the traditional paper medium.

Relative to a computer instruction system such as Blackboard, a game-based learning environment provides users with a captivating affective experience (Lepper & Cordova, 1992), leading to enhanced engagement (Prensky, 2007). Interesting interfaces can enhance user affective experiences (Baker, D'Mello, Rodrigo, & Graesser, 2010; Mandryk & Atkins, 2007). For example, pedagogical interventions attenuate negative user affect such as boredom and confusion (Baker et al., 2010) and computer-based interventions increase engagement in learning environments over prolonged duration of time (Bickmore, Schulman, & Yin, 2010; Bickmore & Picard, 2005). The benefits of game-based learning include stimulating learner's imagination, promoting curiosity, motivating exploration of challenging tasks (Hoffmann, 2009), and learning via an engaging and enjoyable manner (Law & Sun, 2012). A game-based training strategy promotes intrinsic motivation (Venkatesh, 1999; Venkatesh & Speier, 2000) because lack of intrinsic motivation may cause students to think that they are being forced to go through agonizing learning sessions (D'Mello, Olney, Williams, & Hays, 2012). We expect PATH users to exhibit higher