Chapter 5
The Influence of Cognitive Styles on Learners' Performance in e-Learning

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ABSTRACT

This chapter focused the influence of cognitive styles on learners' performance in e-Learning. The author examined the existing practice of style matching where instructional conditions were matched with learners' cognitive styles and found that style matching did not necessarily provide learning gains for learners with different cognitive styles. Instead, he proposed ability building as an effective approach to improve learners' learning. Following the same line, the author further examined the relationship between cognitive styles and instructional situations where situated learning was implemented. The results revealed that instructional situations can significantly influence learners' learning in complex learning and that cognitive style was not, as viewed by many people, a linear relationship between style and performance. Instead, it displayed multi-dimensional relationships with variables related to e-Learning. The author thus suggested that cognitive style should be examined in a broader manner where variables related to e-Learning be considered simultaneously.

INTRODUCTION

With the increasing presence of the Internet in education, research on e-Learning has drawn attention from educators, researchers and other professional practitioners. According to Sedig (2011), e-Learning refers to using digital technologies including the Internet and other computer-based technologies to mediate and support learners' engagement with information (Also see Moore, Dickson-Deane, & Galyen,

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2011). Evidence has shown that e-Learning in general and web-based learning in particular, has great potentials for future education due to its unique affordances in learning (Gonzalez, Jover, & Cobo, 2010). For example, Skylar (2009) studied the differences between synchronous and asynchronous instructional delivery venues and the learning benefits associated with them. The author concluded that the asynchronous delivery venue entails learning flexibility that facilitates self-paced learning whereas the synchronous delivery venue galvanizes learners' interactivity in the web and promotes collaborative learning. Taking from a different perspective, Martin (2008) investigated the instructional function of the linear and non-linear web-based learning. According to Martin, differences in information presentation, that is, linear vs. non-linear, may affect learners' information processing in terms of knowledge association as well as learner control during learning. While previous research has demonstrated relative benefits of the Internet in learning, researchers (e.g., Buckingham, 2004; Lloyd, 2002; Greenfield & Yan, 2006) argue that research on e-Learning should go beyond media effects to examine the underlying cognitive function that affects learners' learning. Lloyd (2002) proposed that the existing research on e-Learning should integrate media effects into a broader understanding of the cognitive functioning of e-Learning and its influence on individuals' performance.

One effort to understand the relationship between cognition and e-Learning is to examine the influence of individual differences such as cognitive styles in e-Learning. Research suggests that cognitive styles can significantly influence the way people process information, thus affect their performance in learning (Liu & Reed, 1994; MacNeil, 1980; Zheng, 2010). For example, Shany and Nachmias (2000) examined the relationship between learners' thinking styles and their performance in a web-based learning environment. They found a significant difference between global and local thinking learners in terms of their performance and online communication behaviors. Similar findings were obtained by Liu, Magjuka, and Lee (2008) who noted that cognitive styles can leverage learners' orientation in learning, particularly in team work, decision making, and so forth. Evidently, cognitive styles bear a strong correlation with learners' online behaviors in e-Learning including online networking, social communication, and web-based information processing. Nonetheless, the extant literature on the relationship between individual differences and e-Learning is primarily characterized by qualitative studies focusing on case analysis (Crown, 1999; Holt & Oliver, 2002) and descriptive research (Koc, 2005; Santo, 2006). Although the above methods have their merits in many ways, a lack of quantitative effort could limit the generalization of the findings which would further affect the scalability, sustainability and maintenance of new knowledge in the cognate area. Moreover, lacking quantitative effort in the above area has begun to hamper the practices of e-Learning. Therefore, the current chapter is set forth to explore the influence of cognitive styles on learners' performance in e-Learning by considering learners' differing orientations and adaptation of e-Learning environments when engaged in web-based learning.

BACKGROUND

Despite the differences including delivery, location, structure, etc. among the learning environments, it is widely recognized that success in any kind of learning environments is attributed to such critical factors as learner characteristics and individual differences (Jonassen & Grabowski, 1993). Jonassen and Grabowski maintained that individual differences such as attitude, aptitude, cognitive styles, learning styles, motivation, and prior knowledge play an important role in learning. Within a rich literature of individual differences, cognitive styles are one of those that have been heavily studied. In the last half century, researchers