Chapter 7

Net Generals’ Multi-Modal and Multi-Tasking Performance in Complex Problem Solving

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ABSTRACT

This chapter examines the influence of multi-modal presentation and multi-tasking on Net Generation students’ performance in complex problem solving. The goals of the chapter are to examine (a) the differences between multi-modal presentation/multi-tasking and non multi-modal presentation/multi-tasking, (b) the influence of visual cognitive style on both types of performances, and (c) the relationship among the variables under study. The findings of the study showed that participants performed best with multi-modal presentation as evidenced in their reduced cognitive load, and their improved self-efficacy and performance in multiple rule-based problem solving. The findings also revealed that multi-tasking could block learners’ learning pathway due to an increase in cognitive load. Discussion on the significance of the findings and their implication for educational community is made with suggestions for future research.

INTRODUCTION

Traditionally, learning is delivered through one mode, that is, either in the form of visual presentation using text (e.g., textbook) or with pictures (e.g., diagrams, photos). An implicit assumption associated with above instructional practice is that learners would become more focused and therefore more efficient in learning when distractions are minimized during the learning process (Swenson, 1980). Nonetheless, with the increasing presence of web technology and multimedia in education, a new generation of learners who are digital-tech savvy and often
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called the Net-Generation (Net Geners) or digital natives, have adapted themselves to multi-modal learning and multi-tasking. Multi-modal learning is typically characterized by processing information through multiple sensory stimuli including auditory, visual, and manipulative resources. Net Geners have consistently used multiple visuals such as images, animation, and videos as source of information search. Meanwhile, they have also displayed an inclination toward working on multiple tasks simultaneously as opposed to one task at a time. Some describe this new phenomenon as Net-Generation phenomenon (Feiertag & Berge, 2008; Jones, Ramanau, & Cross, 2010). Critics attribute the Net-Generation phenomenon to the fast pace of social life, the advancement of new digital technologies, and the exponential increase of new information in the modern society (Jones & Healing, 2010).

Controversy exists concerning multi-modal presentation and multi-tasking (Gonzalez, Jover, & Cobo, 2010; Martin, 2008; Skylar, 2009). Some asserted that multi-modal presentation and multi-tasking improve information processing, thus enhancing efficiency in learning (Kennedy, Judd, Dalgarno, & Waycott, 2010). Others contended that the access of information through multiple sensory stimuli and working with multiple tasks simultaneously can short change the quality of deep learning. Critics of this camp (e.g., Bennett, Maton, & Kervin, 2008) complained about the reduced abilities of Net Geners in writing, spelling, grammar, etc. showing that the writing norm of the Net Geners is represented by “email and texting” styles. They thus concluded that Net Geners may gain breadth in learning, but such knowledge is acquired at the sacrifice of depth in thinking.

Evidently, improving critical thinking of Net Geners has become an issue of central concern for researchers. Meanwhile, researchers become aware that Net Geners’ multi-modal and multi-task performance can be mediated by such factors as visual cognitive style and self-efficacy in learning. The goals of this chapter are to explore (1) the cognitive and affective aspects related to multi-modal presentation and multi-taking; and (2) the influence of visual cognitive style on learners’ performance where multi-modal presentation and multi-tasking were implemented.

WHO ARE THE NET GENERATIONS?

The Net Generation, also known as the Millennial Generation (or Millennials), represent a new generation after Generation X who, as Barnes, Marateo and Ferris (2007) pointed out, are independent and self-autonomous learners, actively seeking information using new technologies, and engaged in social interaction with others online or offline. According to Barnes et al., Net Geners prefer interactive environment with multiple forms of feedback and are interested in assignments that provide different resources where personally meaningful learning experiences can be derived. They are habituated users of new technologies including multimedia, mobile technologies, the web, and other forms of advanced technologies. They tend to multi-task when learning, using the Internet, mobile devices and playing video games at the same time. Net Geners are avid users of online social communication tools such as Facebook, twitter, MySpace, etc. More importantly, they display a social communication pattern that goes beyond time and space boundaries. Kennedy et al. (2010) agree, “Net Generation students demand instant access to information and expect technology to be an integral part of their educational experience” (p. 332).

For many, Net Geners are young people who develop a natural aptitude and high skill level in new technologies (Tapscott, 2009; Winter, Cotton, & Gavin, 2010). Kramer and Bernhardt (1999) noted that new digital technologies like Internet, online gaming, simulations, etc. can significantly influence learners’ behavior, particularly that of Net-Generation. They pointed out that the af-
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