

## Chapter 6.3

# Motivation and Multimedia Learning

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### ABSTRACT

In the field of multimedia learning, although research on cognitive effects and their implications for instructional design is rich, research on the effects of motivation in a multimedia learning context is surprisingly scarce. Since one of the major goals of providing multimedia instruction is to motivate students, there is need to examine motivational elements. In this chapter, we focus on 4 major motivation theories—expectancy-value theory, self-efficacy, goal-setting and task motivation, and self-determination theory—and two motivation models—ARCS model and the integrated model of cognitive-motivational processes—that are derived from multimedia research; review the literature on motivation in multimedia learning contexts, suggest that researchers and practitioners

take into account a number of essential aspects to ensure that motivation features incorporated in multimedia learning resources optimize learners' experience; and point out future research directions in model building, hypothesis testing, examining individual differences, and carrying out longitudinal studies.

### INTRODUCTION

Research in the area of multimedia learning so far has focused on the effectiveness of instructional methods and course design. Various approaches of delivery have been investigated and basic principles in terms of memory and associated cognitive processes identified (e.g., Fletcher & Tobias, 2005; Low & Sweller, 2005; Mayer, 2005). Research in this direction appears to be fruitful, although puzzling, sometimes conflicting results,

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do occur. As a convention, in an attempt to integrate or develop “mini theories”, more theories or models from information processing perspectives are proposed and further tested (e.g., Butcher, 2006). However, as pointed out by a number of researchers (Astleitner & Wiesner, 2004; Bernard et al., 2004; Clark & Feldon, 2005; Keller & Suzuki, 2004; Pass, Tuovinen, van Merriënboer, & Darabi, 2005; Volleyer & Reinberg, 2006), motivational aspects in multimedia learning should be regarded as essential elements and research with sound theoretical bases and methodological rigor is much needed.

In this chapter, we attempt to analyze and discuss motivational determinants in effective multimedia learning from social cognitive perspectives. The main issues covered here are as follows. First, we discuss why researchers and practitioners need to adequately consider motivational issues in multimedia learning. Second, we present well-founded motivation theories that are relevant to learning processes and task performance, and review models that can be specifically applied to multimedia learning, teaching and course material development. Finally, we highlight important factors, topics and directions for future motivational research to guide multimedia teaching and learning.

## **THE NEED FOR MOTIVATIONAL RESEARCH IN MULTIMEDIA LEARNING**

It has been almost axiomatic since ancient times even before Aristotle and Confucius that meaningful learning is associated with motivation. However, despite the efforts of some experts in multimedia learning motivation (e.g., Astleitner & Hufnagl, 2003; Gao & Lehman, 2003; Keller & Suzuki, 2004; Song & Keller, 2001), research in multimedia learning at large has not taken motivational issues into account. Instructors may deem that multimedia material and associated operations

are more interesting (e.g., text + pictures + sound) or more accessible (e.g., e-learning at the user's convenient time) than conventional methods. The underlying assumption is that learners who have the opportunity to use multimedia resources should be highly motivated. However, if we scrutinize the literature, we will soon find that multimedia technology together with a certain type of course design may not lead to elevated motivation and superior learning performance. For instance, in a well-controlled study with initial motivational screen and randomization of subject assignment, online evaluation shows that medical students initially with positive attitudes towards computer-based learning (CBL) were not enthusiastic at the end of course, and learning outcomes were significantly affected by students' prior knowledge but not by their CBL use (Hahne, Benndorf, Frey, & Herzig, 2005). The implication is that CBL may hold too much promise in a curriculum scenario, and that hasty implementation of such curriculum-driven CBL program may carry a risk of deteriorating students' positive attitude towards CBL.

In another study which examined the data quality of questionnaire administration, the paper-based group was better than both computer-based and web-based groups, and the affective responses of participants favored the paper-based mode over computer- and web-based modes (Hardré, Crowson, Xie, & Ly, 2007). These results indicate that adopting information technology does not necessarily lead to high motivation. Hoskins and Van Hooft (2005) reported in a study on Web Course Tools (WebCT) that only those students already highly-motivated and academically-able benefited from bulletin board use, suggesting that motivation and academic ability are determinants of achievement in hypermedia learning.

The effect of motivation on multimedia learning was also highlighted by Hwang, Wang and Sharples (2007) in a quasi-experiment. The study found that although the experiment group using VPen (a multimedia annotation tool) appeared to be superior to the control group (learning without

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