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## **Chapter VIII**

# **Multiple Representations in Multimedia Materials: An Issue of Literacy**

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## **Abstract**

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*The movement toward utilising multimedia learning environments in teaching has increased dramatically in recent years. This chapter reports on current research trends relevant to the development of these environments. Specifically analysing issues related to designing for an ever increasing multiliterate clientele. It highlights the use of multiple representations and investigates some cognitive constraints present when displaying this information. Lastly, when learners are given a level of choice in accessing materials they may be further empowered in their knowledge acquisition. An understanding of these basic concepts will play an important role in our approach to Instructional Design. Therefore a set of recommendations is made for the design of these materials.*

## Introduction

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The trend toward using multimedia learning environments as the preferred basis for teaching (particularly teaching at a distance) has increased dramatically, particularly over the last five years. This chapter reports on current research trends investigating the development of multimedia course materials. Specifically, it analyzes relevant instructional design (ID) issues and reflects on the concepts involved in catering to a multiliterate clientele and how the use of multiple representations may enhance the learning opportunities of students, primarily postsecondary learners. First, it will investigate the role that learning styles play in the learning process and what should be considered when preparing instructional material, looking closely at the importance of visualization in the representation of concepts and the current understandings of what it means to be literate in a culture saturated with visual elements. It will be seen that our understanding of these basic concepts will play an important role in our ID approach to teaching and learning, particularly when using visual and multiple representations in the multimedia learning environment. Second, it will investigate the cognitive constraints experienced by learners when information is displayed in multiple ways in such an environment, and whether it will be beneficial to learner cognition to provide users with a level of interactive choice. Finally, a set of recommendations will be made as to an appropriate format and potential way forward for the design and delivery of multimedia instructional materials.

## Different Learning Styles

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In developing instructional materials, contemporary educators are required to be keenly conscious that many learners, for many reasons, have vastly different learning styles. Although most researchers agree that different learning styles exist, and freely acknowledge the significant effect that learning styles have on the learning process, they are unable to form a consensus regarding the establishment of a single set of accepted principles (Vincent & Ross, 2001). For instance (see Figure 1), a recent study conducted by Liu and Ginther (1999) found that approximately 20–30% of American students were auditory learners; about 40% were visual; while the remaining 30–40% were tactual/kinesthetic, visual/tactual, or some combinations of the above (Study 1). Another study (Study 2) found that approximately 50% were auditory, followed by 33% visual, and 17% kinesthetic (Vincent & Ross, 2001). Although these figures vary, it is clear that people learn in different ways. In a similar vein, it is now known that

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