

Chapter XI

Effective Characteristics of Learning Multimedia

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ABSTRACT

Developing effective educational software requires an understanding of the complexity of multimedia components. The relationship between the characteristics of learning multimedia and learning outcomes of students is explored in two studies carried out in Estonia with multimedia textbooks and multimedia drills. Included are those characteristics likely to be effective for all students, boys, girls, high-achieving students, and low achieving students. Concluding recommendations based on the results of these studies should be useful for teachers and for developers of multimedia software.

INTRODUCTION

Educational software is used extensively in many schools all over the world. Comparisons of data supporting the effectiveness of educational software indicate that learning is enhanced by some but not all programs. Every teacher wants to use the best educational software but deciding which one is the best is challenging. Experimenting with educational software of unknown quality runs the risk of being useless or even detrimental to student learning. Prognostication based on correlations between the characteristics of edu-

cational software in concrete learning conditions and results in terms of student learning would be valuable in the selection and use of programs in the classroom. Knowledge of these relationships would also be useful for software designers who are interested in guaranteeing high product quality. If they know that specific characteristics of educational software influence learning, they can strategically design programs that incorporate the effective characteristics.

The relationship between the characteristics of learning multimedia and learning outcomes of students are considered in this chapter.

The aims of the chapter are as follows:

1. To describe the characteristics of educational software that are effective in terms of student learning;
2. To analyse the characteristics of effective educational software to determine gender differences;
3. To analyse the characteristics of effective educational software to determine differences in terms of high-achieving students versus low-achieving students.

The chapter is organized into three parts. The structure of the chapter is as follows:

Part one provides definitions and descriptions of multimedia and describes its components – text, static graphics, animations, sounds and video. Part two presents the results of prior research on the effectiveness of some characteristics of learning multimedia. Part three includes a discussion of the effective characteristics of learning multimedia, according to two investigations carried out by the author in Estonia with multimedia textbooks and drills. The effective characteristics of learning multimedia for all students, for boys, for girls, for high- and for low-achieving students are compared in this part. Recommendations based on findings are included.

MULTIMEDIA AND ITS COMPONENTS

As computers became available to schools and as various media for the computer were developed, educational software programs for students in the classroom came to the mainstream as a way to enhance student learning. Various elements of media (text, sound, static graphics, animation, video) were incorporated in educational software. Multimedia could be defined in different ways. Laurentiis (1993) defines multimedia as a means to display text, graphics, animation and video

with sound. Brett (1998) states that multimedia is a computer-delivered combination of communication elements (text, sound, pictures, photos, animations and video). Different elements of communication are combined and linked and therefore the multimedia message may be greater than the sum of the individual parts. Dubois and Vial (2000) note that a multimedia presentation uses different media in conjunction with each other. Gyselink et al. (2000) assert that multimedia usually consists of connections of various types of information: verbal (words, sentences or short text), presented in either visual or auditory formats; pictorial (illustrations, photos, graphics), presented visually in either a static or animated way, and sound.

Uden and Campion (2000) maintain that despite the typical conception of multimedia as interactive learning, it is also associated with traditional learning principles. Many aspects of multimedia are different from sequential, computer-based learning and hypertext. Goyne et al. (2000) recommend that learning multimedia should capitalize on aspects that support learning but are not available in traditional learning materials; for example, computer software programs can accommodate both visual and auditory learners.

Boyle (1997) declares that text could be one of the most effective components of learning multimedia. Text has a great influence and it does not matter if it is presented on the paper or on the computer screen. According to some researchers, text in multimedia materials is not so easily processed as printed text. This point of view is based on some evidence of disorientation, non-tangibility, lack of resolution, and lack of experience (Cassie, 2003). On the other hand, Matthew (1997) states that electronically presented text enables multi-sensory learning that allows mutual influence of both text and illustration. The comprehensibility of electronic text might therefore be better than in the case of the printed text.

Electronic text could be hypertext as well. Hyperlinks enable one to choose the content and

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