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## Learning through Multimedia Interaction

**S. Mishra and R.C. Sharma, eds., *Interactive Multimedia in Education and Training*, IDEA Group Publishing, 2005, \$69.95, 417 pp., ISBN 1-5914-0394-4.**

It's clear that multimedia information systems are playing a big role in research and development both in academia and industry. *Interaction* is a key feature supported by multimedia systems. This is especially important in education and training. Interactive features provided by multimedia systems make learning as well as teaching more interesting. Increasingly, we've seen classrooms begin to integrate these systems in various formats. With the advent of online classrooms offered over the Internet, interactive multimedia could play a much larger role in the near future.

### Overview

Mishra and Sharma's book on interactive multimedia in education and training contains detailed descriptions of the issues and challenges we encounter in the design, creation, and use of multimedia systems in education. The book covers a wide range of perspectives, from both the instructor's and student's point of view. Different application contexts such as language learning, cartography, engineering education, and health sciences are also presented.

### Discussion of chapters

The 18 chapters in this book are organized into three parts:

- planning and design considerations,
- pedagogical issues, and
- applications and case studies.

### Planning and design considerations

The first section consists of chapters 1 through 6. In chapter 1, the authors discuss the role of multimedia in pedagogical tasks. Issues such as organization, attitude, cost and human resources are presented.

Chapter 2 provides some guidelines and planning techniques for efficient use of multimedia in the classroom. The authors advocate a mixed-mode approach. Studying good design principles to pool resources and enable a suitable environment for learning, training, and performing is important. In chapters 3 and 4, they provide some guidelines and suggestions for designing and implementing these principles. They then provide a theoretical framework for transforming the traditional student-centered discussion into multimedia interaction-based discussion.

The challenges that globalization presents on learning and teaching are discussed in chapters 5 and 6. The authors consider the essential characteristics of learning software that address global education and cut across languages and cultures. The authors claim that the need for narratives is often neglected in interactive learning programs. Therefore, they present research related to the development of two prototypes of narrative interactive multimedia learning environments, as well as a tool they implemented.

### Pedagogical issues

The second section consists of chapters 7 through 12. The authors begin by focusing on the principles of educational software design. A large concern is that educational applications of information and communication technologies have not yet been standardized. To alleviate this problem, the authors present a framework and software called Microworlds. Several guiding design principles such as tool logic, multiple

interfaces, and multiple representations principles were used to design this software.

The issues related to designing multimedia-based tools for a multiliterate clientele is the main thrust of chapter 8. Some cognitive constraints when displaying multiple representations of a concept are highlighted. The authors also provide a set of recommendations for the design of instructional materials. They then detail an empirical validation of a multimedia construct for learning by presenting a theory of transactional distance consisting of four stages of decreasing transactional distance. They then apply this model to various teaching and learning contexts.

Chapter 10 examines the role of working memory and cognitive load that provides the underpinnings of cognitive theory of multimedia learning. The chapter addresses different principles using documented Web-based examples. The authors then go on to consider the role of cognitive skill capabilities in Web-based educational systems.

While discussing interactivity and how people think and react to multimedia instructional materials, the authors present a metaknowledge processing model for courseware design. The last chapter in this section deals with the usability and interoperability issues in e-learning, and the authors consider the requirements of an ideal e-learning resources repository. They also discuss peer-to-peer approaches for information access, as opposed to a centralized World Wide Web access.

### **Applications and case studies**

Applying theoretical concepts in a practical setting can be challenging. This third and last section provides examples of case studies where multimedia systems have been used for different applications. In chapter 13, the authors review a case study where interactive multimedia games are used to teach AIDS prevention. The game was designed using a multimedia role-play application that introduces complex situations using video stories. The authors noted the limitations of this approach so that readers can avoid some of the potential pitfalls.

It was interesting to see examples of interactive learning in engineering education presented in these final chapters. The authors share some expe-

riences about chemical engineering education curriculum development, including an object-oriented programming system. They also mention a case study on an embedded collaborative-system model for implementing a multimedia cartography teaching and learning system. Constructivist learning, systems theory, and multimedia concepts were used in the model's design and development.

The authors emphasized that Cave-automated virtual environments (CAVEs) are helpful for learning science in Chapter 16. They also show how high-quality visualizations, immersive experiences, and stereoscopic imagery in virtual environments contribute significantly toward experiential learning.

Chapter 17 includes a discussion on multimedia learning designs in medicine, dentistry, and health sciences. The chapter contains descriptions on two multimedia modules that complement a problem-based learning approach in health sciences curriculum.

Using an interactive feedback tool to enhance pronunciation in language learning is the focus of chapter 18. The authors present a case study in which biological, physical, and technological ways of perceiving Mandarin Chinese sounds have been used. They also consider the use of speech analysis tools for audio and visual feedback.

### **Conclusion**

This book will be useful to theoreticians and practitioners studying interactive multimedia systems in education and training. It's clear that the chapters are well organized and cover a wide range of topics, although there could have been more discussion of user satisfaction studies. However, information on the design, development, implementation, and application of multimedia systems was presented in an interesting manner. The book seemed fair and helpful in the way that it presented data from case studies to illustrate the successes and challenges in using interactive multimedia for education. **MM**

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