Interactive Multimedia in Education and Training

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Preface

There have been many experiments and innovations in the field of education and training regarding knowledge delivery. From face-to-face to virtual education, different technologies have played great roles at different times. In the last two decades, due to the advent of computer technologies, information delivery has got new meaning. Development, access, and transfer of text, sound, and video data have given a unique face to classrooms, libraries, and training and resource centers, in the form of interactive multimedia programs.

Interactive multimedia as a subject/topic is still in its stage of infancy, which excites and attracts educational technologists. However, design and development of an interactive multimedia program is a complex task involving a team of experts, including content provider(s), multimedia developer(s), graphic designer(s), and, of course, the instructional designer(s), who most of the time plays the role of a project manager as well. This book is not about multimedia development, but the subject matter delves into the complex issue of planning, guiding, and designing multimedia from the instructional perspective. As such, we address pedagogical issues, applications, and effectiveness.

What is Interactive Multimedia?

Multimedia has been defined in a number of ways. It is not our intention here to go into the details of these definitions. But, in order to clarify the use of the term in the context of the book, we would prefer to quote a few of them:

Definition 1: “Multimedia is the combination of a variety of communication channels into a co-ordinated communicative experience for which an integrated cross-channel language of interpretation does not exist” (Elsom-Cook, 2001).

This definition gives way for two approaches—one that is termed the “multiple-media” utilization, and the other in which a combination of different channels acquires unification as a medium. The latter approach leads us to the next definition:

Definition 2: “… multimedia can be defined as an integration of multiple media elements (audio, video, graphics, text, animation, etc.) into one synergetic and symbiotic whole that results in more benefits for the end user than any one of the media elements can provide individually” (Reddi, 2003).

Definition 2 essentially tries to emphasize the second approach of Definition 1 with more clarity and spells out the components of multimedia. Taking a systems theory perspective, it also tells us that the overall effectiveness of multimedia is better than any one component of it. But, neither of the definitions explicitly includes the “interactive” power of multimedia, as in Definition 3:

Definition 3: “The term ‘interactive multimedia’ is a catch-all phrase to describe the new wave of computer software that primarily deals with the provision of information. The ‘multimedia’ component is characterized by the presence of text, pictures, sound, animation and video; some or all of which are organized into some coherent program. The ‘interactive’ component refers to the process of empowering the user to control the environment usually by a computer” (Phillips, 1997).

Though the authors of various chapters use different words and phrases throughout the book, the intentions are invariably in tune with Definition 3 referred to above.

Multimedia has been a favorite area for organizations as a means of training employees. McCrea and others (2000) and Urdan and Weggen (2000) found online training being given preference by organizations, considering that with this method, employees can be trained in less time, with less cost, and more effectively than with other methods. It has been found that integrating multimedia into course delivery certainly adds to the advantages (Najjar, 1996).

Authors of the various chapters in this book critically examine interactive multimedia as a tool for education and training in various settings. Much has already been said in the literature about how-to aspects of multimedia development (Boyle, 1997; Phillips, 1997; Villamil & Molina, 1998; Lachs, 2000; Elsom-Cook, 2001; Low et al, 2003; Reddi & Mishra, 2003). Here, the authors make
Planning and Design Considerations

Planning for multimedia is a much broader consideration than the design and development issues. It is important because the implementation of multimedia-enabled teaching and learning has to be integrated into an already existing system and practice. Moreover, issues such as media mix, choice, and teaching—learning includes organizational change, changes in attitudes, and issues related to cost, acquisition of appropriate technologies, and human resources. In Chapter 2, Geraldine Torrisi-Steele provides conceptual guidelines and a planning framework for effective use of multimedia in education. Banerji and Scales in Chapter 3 review current developments in performance support systems and recommend use of interactive multimedia based on performance-centered design for teaching and learning. In Chapter 4, Loreen Butcher-Powell provides a theoretical framework for enhancing teaching through the use of Web-based multimedia strategy for computer-based learning materials that can be adaptable to many languages and cultures. Based on the experiences gained in the development of a group of software systems, the authors describe software characteristics and tools that can be successfully implemented in global education. In the last chapter of this part (i.e., in Chapter 6), Lisa Gjedde describes a narrative (storytelling) framework for designing multimedia learning environments.
individual’s attention and processing during a multimedia presentation (signaling principle)
6. where words or narration and pictures or narration are presented simultaneously in time and space (contiguity principle)
7. where individuals experience concurrent narration and animation in short, user-controlled segments, rather than as a longer continuous presentation (segmentation principle)

In Chapter 11, Elspeth McKay examines contextual issues involved in interactivity of multimedia instructional materials and the cognitive style construct as a meta-knowledge acquisition process. From a human–computer interaction (HCI) perspective, she describes a framework applicable in Web-based educational systems. In the next chapter (Chapter 12), Retalis looks into the issue of interoperability of multimedia learning objects. This chapter describes a brokerage system for the exchange of learning resources.

Applications and Case Studies

Interactive multimedia has applications in a variety of situations in education and training, in corporate presentation, in advertising, and in many other areas. In this part, there are six chapters presented as illustrative case studies of the application of multimedia. In Chapter 13, José Rodríguez Illera describes the use of interactive multimedia in AIDS prevention. The design of the multimedia package adopts some of the lessons outlined in Parts I and II of this book, especially the use of role play as narrative and the social construction of meaning that make it a successful program. Katia Tannous in Chapter 14 describes some examples of multimedia use in engineering education that extensively uses the power of simulation. In Chapter 15, Balram and Dragicevic report a new embedded collaborative system for structuring and managing multimedia in cartography teaching and learning. In Chapter 16, Leo Tan Wee Hin and others describe a multimedia system for learning science in an informal setting of a science center in Singapore. The authors present a case of high-quality visualizations, interactivity, immersive experiences, and stereoscopic imagery in the multimedia virtual environment that contributes toward experiential learning and has the significant influence of the constructivist approach. In Chapter 17, Mike Keppell and others describe the use of multimedia in dental and health science courses. Using a case-based learning design and learner-centered approach, the illustrative multimedia examples demonstrate the importance of instructional design. In the last chapter of the book (i.e., Chapter 18), Felicia Zhang reports on the use of interactive feedback tools to enhance language learning, in this case, Chinese Mandarin.

Conclusions

In education and training settings, interactive multimedia packages have been found to be used as library-based multimedia resources for teachers and students; as supplementary curricular material for a specific course; as a tool for teaching and reinforcing analytic and reading skills and for building an entire course around the use and creation of multimedia materials (Bass, n.d.). In the modern society, where computer and Net technologies are becoming indispensable, the learning technologies are found to be deployed in all sectors: schools, colleges, universities, and industries. The emergence of the knowledge and educational content industry, the emergence of virtual campuses of learning, the availability of new learning and training tools, and the deployment of such tools to meet the diverse needs of learners have greatly influenced education and training systems. The needs for lifelong learning, just-in-time training, and retraining led to the development of widely accessible and reusable digital multimedia content and learning repositories. As the contributors of this book point out, the advantages are multifarious: increased interoperability, reusability, and individualization of digital learning materials. The learners are benefited in terms of increased quality, relevance, and contextualization of their learning.

The primary objective of Interactive Multimedia in Education and Training is to document and disseminate relevant theoretical frameworks and the latest empirical research findings and showcase illustrative examples of multimedia applications in various disciplines. The 18 chapters included in this book have attempted to achieve this objective and shall be useful to teachers, researchers, educational administrators, and policy makers as a one-step reference point on innovative use of multimedia, based on sound pedagogical principles. Nevertheless, there are still gray areas, such as the assessment of multimedia packages, their costs, and return on investment (ROI). In spite of this gap, it is expected that this book will encourage teachers/trainers and administrators to plan, design, develop, and implement interactive multimedia in educational settings: in basic, secondary, higher, and further education, and in business and industrial training.
References


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Felicia Zhang has a B.A. (University of Queensland, Australia), Graduate Diploma in Education (University of Melbourne, Australia); Certificate in Teaching English as a Foreign Language (TEFLA) granted by the Royal Society of Arts, United Kingdom; and Master of Arts in Applied Linguistics (Honors) (University of Melbourne, Australia). Ms. Zhang has had more than 10 years of teaching and research experience in the area of language teaching and learning. Since 1994, she has been researching ways of incorporating computer technology into the classroom and teaching curriculum. Ms. Zhang is currently a Lecturer in Chinese and Applied Linguistics at the University of Canberra, Australia. She is currently doing her Ph.D. in the area of pronunciation teaching in Mandarin using a methodology that combines the use of audiovisual materials with a number of computer-enhanced learning software. One of her major concerns in utilizing technology in teaching is the need to cater to a wide range of student needs, i.e., from students with advanced computer skills to students who do not have access at all to technology.