Preface

Early computer researchers sought ways to use the new invention for learning and teaching purposes. Instructional computing at that time took place on mainframes in the form of typing and reading text, but serious efforts were made to further utilize the computer power to serve education. Examples include the Programmed Logic for Automated Teaching Operations (PLATO) (Alpert & Bitzer, 1970) project, which managed to integrate text and graphics, and the Time-shared, Interactive, Computer-Controlled Information Television (TICCIT) (Merril, Schneider, & Fletcher 1980) project, which introduced the concept of learner-controlled instruction. A major advantage in such environments is the availability of information in the centralized system that was sharable by all users. The invention of microcomputers in the late ’70s made it possible for businesses, schools, and homes to enjoy computing. The new small size computers were not restricted to text, but allowed colored graphics, animation, and voice. Input became possible through the mouse, touch screens, scanners, and microphones, in addition, to the keyboard. Various forms of output became possible (in addition to the black-and-white monitor) such as colored monitors, LCDs, colored printers, and speakers. Although at first the new computers were stand-alone and information could not be shared, networking solved this problem. In the late ’70s and early ’80s Apple computers were the first widely available microcomputers that had most of the early courseware, only to be superseded by IBM-compatible computers that gained wide popularity and continued to grow its market share up to present day. Network technologies allowed PCs to communicate and share information and processing power. At first, Local Area Networks (LANs) were developed followed by the Wide Area Networks (WANs), and then the Internet made of LANs and WANs started to grow rapidly. Today, millions of people use the Internet to pursue various businesses, pleasure, and learning activities. However, a major setback in computer-based instruction is the unavailability of tools that make use of the new multimedia technologies to develop the software. Developers tend to glue together various technologies to build the system and struggle to overcome the incompatibilities of software and hardware.

With regard to learning, there is an ongoing debate on the effectiveness of computers to facilitate learning. Research findings vary: some researchers report considerable improvements in learning levels through the use of the computer as a learning medium, while others found little or no improvements. Many researchers

believe that the benefits are attributed to the way computer-based instruction is designed. Alessi and Trollip (2001) emphasize that in order to facilitate learning in an efficient way, the process must include: information presentation, learning guidance, practice, and assessment. Information should be presented using verbal, pictorial, and/or textual representation. Skills to be learned must be modeled, especially the ones that involve following a certain procedure to carry out a task.

Another important approach is the use of examples to illustrate the applications of a concept, rule, skill, or procedure. Learner guidance can be implemented through interaction between the learner and the medium. The learner may answer questions about factual information, apply rules, principles in problem-solving activities, or practice procedural skills. The teaching medium observes the learner going through the lesson and corrects errors, as well as giving suggestions and hints. Practice sessions can be offered to improve the learners' speed, fluency, and retention. During these sessions the medium may observe and make short corrective statements. Ending a learning session with tests may prompt the start of a new session. Finally, tests give feedback to the level of learning and quality of teaching. Intelligent programs must assess the learner's knowledge and must decide on the weak areas that need to be enforced. It should offer the learner the chance to continue using parts of the program to improve on those specific areas. Additionally, alternative modes of presentation, examples, and drills could also be useful and may be more suitable to the learner.

Common types of interactive multimedia, as reported by Alessi and Tropllip (2001), include tutorials, hypermedia, drills, simulations, and games. Programs that present information and guide the learner are classified as tutorials. Hypermedia programs are more open-ended and allow the learners to choose their own paths through the material. Drills are specifically designed for practice to gain speed, fluency, and retention. Simulations are more complex and can be used for direct instruction. In addition to information presentation, they guide the learner and offer practice sessions. Games are used as discovery environments and may be combined with simulations and drills. They may be used to integrate learning across a number of areas as is often done in adventure gaming. They can be combined with drills and simulations.

Another important question we are often faced with is when to use computers to improve learning. Many believe it is more effective when other media have shortcomings. Example situations in which computer-based instruction can be useful is when the use of other means of learning are either expensive or dangerous, such as in the case of simulators to train pilots, when safety is in concern as in chemistry laboratories, or the need for 3-D and other computer effects that are not supported by other media. Other reasons could be intended learners' special needs such as visual or auditory disabilities.

In recent years the powers of computers have increased exponentially and the technology related to developing multimedia systems is continually advancing. These advancements, coupled with that of network technologies, made it possible

to build virtual learning environments that can simulate real-life situations and provide a safe, controlled place to learn. Such environments simulate the real world, providing the students with the context for the learning process to take place. They can represent a virtual laboratory in which experiments can be conducted; virtual worlds in any time and place; or virtual office, plant, or store for a company. These allow the student to control the learning process, develop an ability to solve high-level problems, make learning a personal experience, model the complexities and uncertainties of working in the real world, and can also accommodate a wide range of student learning styles.

Another newcomer to the world of education is the virtual university that became possible with the advances of the Internet and the World Wide Web. These offer the learner anywhere in the world a variety of courses and study programs that s/he can access and interact with in the comfort of her/his home. All real university services and functions are simulated on the Internet so that no physical interaction will be needed to complete a program. Such a setup allows learning to reach any person, anywhere, at any time; facilitates group learning; and makes a wide body of learning material timely available.

In recent years multimedia computing has expanded from being a research area to become a field of study taught in universities. It became important for students to learn the development and application of this technology in the field of education and many others, and at the same time researchers continue to offer solutions and improvements. This book presents a collection of the latest research findings in the field of virtual education that is carried out by researchers around the globe. They have been carefully selected from five tracks in the IRMA (Khosrow-Pour, 2002) conference titled, "Issues & Trends of Information Technology Management in Contemporary Organizations." The book is made up of 18 chapters and organized into the following five parts: The Virtual University, E-Collaboration, Web-Based Learning and Teaching, Effective E-Learning, and IT Teaching Cases.

Four papers related to virtual universities are grouped under the first part. In Chapter One Barjis presents an overview of virtual university studies pertaining to issues, concepts, and trends, and provides recommendations for future designers. The second chapter by Lassila and Howell examines information systems (IS) education criteria and sets guidelines as a framework for the development of online IS programs. The third, by Valenti, Panti, and Leo, addresses the issue of quality assurance of Web-based degrees through the MODASPECTRA (MOtor Disability Assessment SPECialists TRAining) Web-based degree. In the fourth Durrett, Burnell, and Priest present a Smart Agent-based Resource for virtual Advising (SARA).

Papers related to collaboration via the Web are grouped under the E-Collaboration part. Chapter Five, by Fernandes, Holzer, Forte, and Zaerpour, identifies key factors that motivate to share and reuse pedagogical documents. Chapter Six, by L. Gouveia and J. Gouveia, proposes a model for developing a World Wide Web-based system that allows interaction between users and contents. In Chapter Seven Klein

explores normative influence as a barrier to creative idea generation that is present in small groups and suggests IT-based solutions to remove barriers. Chapter Eight by Forzi and Laing presents a new approach for a customer-oriented e-business modeling with specific attention on inter-organizational cooperative networks and re-intermediation, as well as on information management within distributed manufacturing networks.

Part Three gathers a number of papers that address the general use of the Web in teaching and learning. Chapter Nine Stein examines whether gender and age factors affect students' ICT literacy and Web usage. Chapter 10, by Freedman, Tello, and Lewis, identifies potential communication barriers between instructor and students in an online educational environment, and suggests ways to reduce or eliminate them. Chapter 11, by Espejo, Mana, and Bato, looks into the use of the Internet in the Philippines in education. The paper investigates the reasons behind the difference in the levels of education provided by public and private schools.

The Effective E-Learning part gathers papers that suggest ways to improve computer-based learning. In Chapter 12 Frick, Sautter, and Øverbekk suggest the use of modeling techniques to gain understanding of causes and relationships in learning environments. Chapter 13 by Alkhalifa and Albalooshi introduces a three-dimensional framework aimed at evaluating educational software. Born and Jessup in Chapter 14 discuss the concept of performance assessment in a virtual classroom environment, including the proposition that using traditional assessment processes alone is not sufficient. Chapter 15 by Webster explores the use of cognitive styles and meta-cognitive skills in the design and development of E-Learning environments.

Part Five gathers three selected cases of teaching in IT. Chapter 16, by Asoh, Belardo, and Crnkovic, presents a case study of the Multi-Purpose Access for Customer Relations and Operational Support (MACROS) project, designed to help implement a new vision of business of state agencies within New York State. In Chapter 17 Murtuza discusses the benefits of literary works in systems analysis courses, and management information system curriculum in general. Chapter 18, by Martin, illustrates the problems that can develop quickly when an organization does not have defined goals, effective management, and supporting information systems.

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Acknowledgments

The editor would like to acknowledge the help of all involved in the collection and review process of the book, without whose support the project could not have been satisfactorily completed. I wish to thank all of the authors for their insights and excellent contributions to this book.

A further special note of thanks goes to all the staff at Idea Group Inc., whose contributions throughout the whole process, from inception of the initial idea to final publication, have been invaluable. Special thanks go to Amanda Appicello, the Managing Editor, for her prompt support throughout the process. Final words of thanks go to Abdulla Alderzi and Eshaa Alkhalifa for proof reading the preface and providing useful comments.