Preface

The instructional systems and technology revolution is for all practical purposes a major revolution in the history of education, impacting every facet of curriculum, instruction, and student engagement and participation with a speed beyond ones imagination. As in the case of the digital revolution taking place, the growth and expansion of instructional systems and technology began during the early 1950s but continued on through the following decades. During the 1960s and '70s, instructional systems and technology was mainly limited to the use of audio visual equipment such as record players, tape players, LCD players, and black and white films strips and slides. As a result, the use of this technology was limited to those who had the resources available. With the emergence of computers and communication technologies in the 1980's, new information technologies were born with a strong focus on the dissemination of information by both information providers and users. However, it was not until the advent of personal computers and the ability for users to communicate regardless of their locations directed information technology into the lives of all society and more importantly educational institutions. As we move to the 1990's and much more to the new millennium instructional systems and technology took the form of instructional media, such as CDROM, online courses, eLearning applications, as well as technology enhanced audio visuals displays, instructional video, and games. The most noticeable explosion in this revolution at this time was the creation and expansion of the World Wide Web (WWW) or what society has called the Internet and its potential in to the field of education. During the last decade, the Internet and its associated communication technologies have become a driving force in education allowing people worldwide to communicate and exchange information in ways that have created a totally new dimension known as a virtual world. In recent years, through the use of web-enabled technologies, educational institution and organizations of all types around the world have developed and expanded their traditional educational programs to meet the diverse needs of the world population. These technologies, now allowing readily available educational courses and training modules for everyone regardless of their geographic location, bring the true meaning of the education across the seas to its full realization. This is education made possible through advances in instructional systems and technology.

Now we are beginning to see the instructional interventions of ipod casting, instructional games, and virtual reality and simulations. The aim of instructional systems and technology now, is to integrate the three foundational areas into improving the teaching and learning process. These three foundational areas include:

1. **Design:** The systematic identification of educational needs and the subsequent design, development, implementation and evaluation of materials for use in classrooms and at distant sites.
2. **Development:** The production of materials to meet specific educational objectives including multimedia programs, graphics, and video.

3. **Research/Evaluation:** The planning, design, and implementation of research and/or development projects that apply educational technology principles to any aspect of education or training in a variety of settings, including schools, industry, medicine, and the military.

By integrating each of the three foundation areas, instructional systems and technology paves way to provide students with a quality educational experience.

Looking into this new era of possibilities, instructional systems and technology is considered to be much broader than hardware and software development. Instructional Systems and Technology includes analysis, design, development, evaluation, and implementation and management of instructional systems and other learning environments. Within this discipline, the theoretical research explored in the field is interdisciplinary, encompassing instructional design theories and models; learning and cognition; instructional strategies and tactics; visual design, media design, and interaction design; usability testing and evaluation; educational systems design; production and management systems; and human performance improvement. These contexts include adult learning in business, industry, government, health institutions, and the like.

As we look at this field in depth, we can see that the impact has altered the amount of engagement between the instruction, the student, and content materials within a learning environment. This has caused some to reconsider the value of using technology and differentiated instruction. Moreover, aspects of social interaction like mentoring, role modeling, and community are by products of instructional systems and technology applications. More often, when forced to use instructional technology in teaching, instructors will default to a technology enhance lecture mode, rather than taking advantage of the variety of instructional technology interventions that can expand the teaching and learning process and the educational experience of the student. While instructional systems and technology interventions promises solutions to many educational problems of today, resistance from faculty and administrators to the use of instructional systems and technology interventions in the classroom is not unusual. This reaction can arise from the belief—or fear—that the ultimate aim of instructional systems and technology is to reduce or even remove the human element of instruction. Most instructional professionals however, would counter with this claim that education will always require human intervention from instructors or facilitators. With this key idea in mind, the aim of this publication is not to persuade an individual to use instructional systems and technology, but present to the audience of readers, the knowledge and applications of instructional technology and the benefits of using these interventions in classroom practices

Because instructional systems and technology has profoundly impacted every aspect of life of our lives, numerous researchers around the world have focused on accumulating knowledge on this discipline. The volume of research in the field of instructional systems and technology has by far exceeded many other fields of in education and the sheer impact of research discoveries in this area has become the driving force of many emerging technologies and applications for improving teaching and learning. No longer is this discipline limited to a few areas such as education, but, similar to the field of medicine, business and industry, government and the military. Today, the field of instructional systems and technology is a collection of many disciplines researchers have created. This collection process has been accomplished by producing research results to understand the potentials, problems, and challenges of each individual discipline and by trying to expand the body of literature related to instructional systems and technology.

To access the latest research related to the disciplines of the instructional systems and technology field, I decided to launch a publication project where researchers from all over the world would assist me in providing the necessary coverage of each respective discipline in the field of instructional systems and technology. The primary objective of this project was to assemble current research related to the disciplines selected for this publication by defining the most relevant aspects of instructional systems

technologies, terms, and acronyms related to each discipline, and provide the most comprehensive list of research references related to instructional systems and technology. This book addresses the connection between instructional systems and technology interventions and application of those interventions in the teaching and learning process. Using sound instructional design principles, innovative ideas for technology diffusion, applications, and integration, online learning and training environments, and the cultural perspective, the authors in this book guide the reader from focusing on the technology to focusing on the educational and learning environment.

In order to provide the best balanced coverage of concepts and issues related to the topics of this handbook, current researchers from around the world were asked to submit their chapter describing their unique coverage of instructional systems and technology. Each chapter submission began with the proposal phase. Following the submission phase, each proposal was submitted for blind reviewed by a team of reviewers who indicated the accepted or rejection of the chapter proposal. Following the proposal review phase, each author was then given permission to complete their own chapters for the handbook. After completing their respective chapter, the chapter was then submitted once again for blind peer review once more. After a two round rigorous referred processed of two reviewers, the chapters that were strong and favorable from the reviewers were chosen as entries for this handbook. The idea here was to assemble the best minds in the instructional systems and technology field from all over the world to contribute entries to the handbook. As a result of the double blind submission process, this handbook includes more than 60 entries highlighting current concepts, issues and emerging trends relating to instructional systems and technology. All entries are written by knowledgeable, distinguished scholars from many prominent research institutions around the world.

This book can provide valuable information to wide range audience. This audience includes members from higher education, K-12 education, business and industry, as well as federal, state, and local governments and the military. More specifically, this information can be used by corporate executives, higher education faculty and administrators, educators, researchers, trainers, instructional designer, students, and anyone else interested in how to implement effective instructional systems and technology interventions to promote quality teaching and active student learning and engagement. In particular, this handbook will be valuable to corporate executives, and human resources administrators in seeking examples of how to blend instructional systems and technology with their training and performance improvement initiatives, as well as insights into where such blending might be financially attractive, efficient and strategically beneficial. Training managers might take advantage of examples from this book to help justify eLearning initiatives and strategic plans. This book also appeals to higher education administrators struggling with issues on where to place value and resources as it relates to online and distance education. Clarification of the range of blended learning models can help administrators and staff members from learning and teaching center on college campuses to training faculty member for a wealth of online and face to face teaching possibilities with instructional systems and technology interventions. Teaching with instructional technologies is a new experience for most college faculty, so having a range of examples of how to utilize concepts of instructional systems and technology in the teaching and learning process will become extremely vital. Whether one is designing, developing, implementing or management an online course or designing a technology rich student centered learning environment, instructional designers, teachers, and practitioners alike will need information concerning instructional systems and technology. Those in the field conducting research in instructional systems and technology will benefit from reading chapters on the current research and applications both from the corporate perspective, but also from the higher education perspective. Finally, policy makers reading or accessing this book will discover the value and power in using instructional systems and technology to promote excellence in quality teaching and active student learning and engagement. Hence governmental funding for these types of initiatives and projects needs to reflect this fact. Increasingly, instructional systems and technology is playing a vital and significant role in such educational activities.

The chapters authored were selected because of their expertise and leadership roles within the field as well as the unique perspective they had to tell. With the mix of corporate and military training, non profit organizations, K-12 school, higher education institution, and the medical industry, a wide range of perspectives are covered in this book. This book highlights instructional systems and technology as a growing field of study which uses technological interventions as a means to solve educational and learning challenges. The chapters are not organized by industry. Instead, they are divided into four major themes. These themes include instructional and learning environment design methodologies; technology integration, application, and diffusion; online/web based instruction and eLearning applications; and the sociocultural aspect of instructional systems and technology. This book presents different approaches to accomplish to accomplish the task of promoting quality teaching and active student learning and engagement through technology related interventions. In addition, the handbook provides information about different types of instructional design methodologies, tips and strategies on how to use technology to facilitate active learning, as well as the discussion on the sociocultural aspect of instructional systems and technology. Also to add, this handbook provides related information and strategies to help faculty, trainers, instructional design, and teachers to develop online instructional and teaching materials. The book shows instructors how to create authentic and active learning environments with instructional systems and associated technology. It also provides information to help faculty members, trainers, designer, and research on managing and develop online, Web-based and e-Learning applications with update strategies that facilitate learning.

For all practical purposes this handbook discusses various methods and tools for assessment, testing and evaluation of effective instructional systems and technology interventions for the educational opportunities and challenges. For future development of instructional systems and technology, this book gives information about the trends and issues facing teaching and learning process integrated with instructional systems and its related technologies. In the end, this book contains a wide range of ideas, examples, guidelines, stories, models, and solution all with the basic premise of instructional systems and technology.

With the diverse and comprehensive coverage of multiple perspectives in the field this authoritative handbook will contribute to a better understanding all topics, research, and discoveries in this evolving, significant field of study. Furthermore, the contributions included in this handbook will be instrumental in expanding of the body of knowledge in this vast field. The coverage of this handbook provides strength to this reference resource for both instructional systems and technology researchers and also decision makers in obtaining a greater understanding of the concepts, issues, problems, trends, challenges and opportunities. It is my sincere hope that this publication and the amount of information and research presented will assist colleagues, faculty, students, teachers, and organizational decision makers in enhancing their understanding of this discipline and to effectively integrate instructional systems and technology to meet the needs of our diverse learning population. Perhaps this publication will inspire its readers to contribute to the current body of research in this immense field, tapping into possibilities to assist educational institutions in making all educational opportunities open to participants.

Editors

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