Preface

INTRODUCTION

The International Journal of Information Communication and Technology Education (IJICTE) published a striking series of manuscripts pertaining to teaching and learning with technology in its publication year 2007. The articles contained in this Volume 3 of the *Advances in Information and Communication Technology Education Series* are the best of the best in the areas of design, development, and collaborative tools for addressing technology for the classroom.

Design tools offered in Section I have been subdivided into *Theory* and *Practice*. The theory-based tools discuss gender bias in science, technology, engineering, and mathematics as well as the technology acceptance model. The importance of understanding why, after nearly five decades of progress in information technology, women are still underrepresented in the field is critical to the future of the discipline. Too, computer anxiety caused by low acceptance of technology as a viable educational instrument for learning is another cause for concern by leaders in the IT community. The influence of constructivist e-learning system on student learning outcomes rounds out our look at design tool theories. From a .Practice-based perspective, five chapters argue issues of didactic teaching, e-pedagogy, teaching practices, and agent-oriented design – all with a bent toward best practices of teaching and technology. Designing courses rich in digital media offers new hope in furthering distance education. And, further research in designing traditional versus online courses is always welcomed by IT advocates.

In Section II of *Information Communication Technologies for Enhanced Education and Learning: Advanced Applications and Development*, several very interesting chapters introduce advanced applications of PowerPoint for classroom and staff training. Graphics presentation software is now capable of advanced features providing innovative models for creating self-paced lessons. As a result, these technology-based lessons are producing increased student attention, comprehension, and, most of all, achievement. To successfully implement technologies into the classroom, increased notice is being taken of training programs for faculty and instructors. In this section of the book are several professional development theories and models that have been proven effective for designing staff and faculty training environments. The final chapter in the section describes the techniques used by the author to optimize student learning while teaching Java programming language.

Collaborative Tools (Section III) are on the rise, both in the classroom and throughout society in general. Asynchronous tools support any learning event where interaction occurs intermittently with a time delay. Learners participate according to their own individual schedule and are typically separated geographically from the instructor. The text offers an examination of Web-based portfolios, Web-based dialogues, plus an array of interactive asynchronous technologies such as blogs, wikis, podcasts, etc. as well as procedures for assessing online discussion forum participation. Synchronous tools are becoming even more plentiful with the rise in popularity of learning management systems. Several chapters compare the various formats for synchronous communication and discuss how to sustain online collaboration and successfully transition from face-to-face to online instruction.

DESIGN TOOLS

In the first chapter, Wasburn shares her investigation into the critical shortfall of skilled professional in the science, technology, engineering, and mathematics (STEM) disciplines. Part of the solution, the author posits, is to attract more women to careers in these areas. In Chapter I, "*Media and Women in Technology*," several pertinent questions explore the possibilities of using a media-centered approach to achieve the goal if increased participation by women. The chapter examines the theoretical presumption that exposure to positive television images of women as technology professionals will attract more of them to STEM careers. Also studied are the causal factors as well as an understanding of the dynamics taken to produce desired results. The chapter finishes with a look at what the empirical data suggest about the viability of the hypothesis and the anecdotal evidence that supports the hypothesis.

Chapter II, "*The Gender Communication Gap in Online Threaded Discussions*," by Gefen, Geri, and Paravastu focuses on threaded discussions as key tools of online education. The implications of this study to practice cannot be underrated. For example, the investigation found that men and women communicate differently online; a finding that was probably intuitively assumed in the past now comes with an impact on what that means in the distance education environment. The chapter discusses how discussion sub-groups form and how they encourage reticent students to actively participate in the course discussions. Gender stereotypes are presented—even those precipitated by the computer. The paper concludes with recommendations for controlling online conversations, discreetly but directly, focusing the positive discussion on learners who might otherwise be ignored because of gender preferences.

Chapter III, "*The Technology Acceptance Model (TAM) and the Continuance Intention of Using WebCT: A Case of College Students in Estonia,*" by Ifinedo investigates the influence of *ease of finding* and *Computer anxiety* on the technology acceptance model and a popular course management system, WebCT. Eight hypotheses were developed to test the structural model and the data supported all but one of the eight hypotheses. The study's implications for research offer the reader many opportunities to expand upon Ifinedo's investigation beyond the initial usage phase and offers insights about adopting content management systems for teaching and learning. While the scope of the study is not sufficient to generalize the findings, the author suggests that future studies should increase the sample size as well as incorporate the impacts of other relevant variables, including peer-pressure, age, gender, and facilitating conditions.

Chapter IV establishes the *Influence of Constructivist E-Learning System on Student Learning Outcomes*. The two-phased study begins by examining the process of creating a constructivist e-learning *environment*; phase two expands the investigation to constructivist e-learning *systems* in actual classroom environments. Student learning outcomes are compared between students who used constructivist e-learning with those who used a traditional learning environment. CES-trained students did better than traditional.

Chapter V presents substantial results from two projects that deal with teaching and learning with digital media in basic and higher education. The first project studied electronic learning tools perceived as "didactical actors" and uncovered new relations between learners and didactical technology. The second project found that linking evaluation and technology increased the learner's commitment to e-learning modules in higher education. Both projects in "*The Didactical Agency of Information Communication Technologies for Enhanced Education and Learning,*" offer a new perspective on the active role of technology in learning processes. Wiesner-Steiner, Wiesner, Schelhowe and Luck advocate that these cases clearly imply both a social and technology sensitivity to the didactical approach and its key role for learning with information communication technologies.

Shelley, Swartz and Cole propose that distance learning is the new paradigm of instruction in their Chapter VI, "*Comparative Analyses of Online and Traditional Undergraduate Business Law Classes: How Effective is E-Pedagogy?*" In their study of e-learning and e-pedagogy growth in importance in the delivery of higher education, they investigate the cost of higher education, changing student profiles, and scarcity of traditional classroom space. They examine changing student demographics, working adults, students in the military, and residents of rural communities as well as of other countries. Their original study (IJICTE, 2007) found no statistically significant difference between the online and traditional instructional/learning formats with regard to any of the four research questions on student satisfaction and student learning. The results from the second study presented here had more mixed results. There was a significant difference found in student satisfaction with the instructor and with the course structure. Also, student learning, as measured by final course grades, was higher for the online course students. Read more about this study and the similarities and differences it found between studies barely two years apart.

Continuing the theme of Design Tools, Chapter VII, "*Student Perceptions of Data Flow Diagrams vs. Use Cases,*" by Millet and Nelson presented their investigation into data flow diagrams and use cases, two popular methodologies in teaching as well as in practice. Fifteen sections of the author's systems analysis course were introduced to structured analysis techniques as well as object-oriented methodologies. Results indicate that, while students find the use cases methodology slightly easier to understand, they believe that data flow diagrams are significantly better at communicating with users and programmers. Exposing students to one methodology before the other apparently did not lead to significant changes in student perceptions of these methodologies, so the authors posited that future systems analysis courses are free to cover these two methodologies without concern for their sequence in the course.

Chapter VIII, "*Promoting Undergraduate Education with Agent Based Laboratory,*" is presented by Hong Lin. In the field of software engineering, agent-oriented design provides for accountability and responsibility for complex software systems during design and execution. The research presented was partially supported by NSF grant, "Acquisition of a Computational Cluster Grid for Research and Education in Science and Mathematics." Student research projects were supported by U.S. Army Research Office Award through Scholars Academy of the University of Houston-Downtown. The goal of the project was to integrate various networking technologies into one client/server model to provide a uniform lab environment for different lab activities. Read how they accomplished this objective by recognizing, considering, and adding/deleting services or features in a top-down strategy.

The final manuscript dealing with Design Models, "*Supporting Arguments for Including the Teaching of Team Competency Principles in Higher Education,*" examines optimum workplace effectiveness in knowledge intensive industries. Chapter VIII takes into account not only the competencies of individuals but also those that comprise the teams within which they must operate. This study finds that although the incorporation of various types of group work into pedagogies is already fairly common within institutes of higher education, such incidents fail to embrace a rationale for, or the potential benefits of, multiple contributor environments. It continues to argue for including the teaching of team competency principles in higher education and a competency teaching model is introduced for consideration by the reader.

DEVELOPMENT TOOLS

PowerPoint continues to play a primary role in adding technology to classroom learning. Whether it is used for formal classroom presentations or individualized training scenarios, graphics presentation supports visual learners. In Chapter X by Tomei, "*Creating an Interactive PowerPoint Lesson for the Classroom,*" examines many features of PowerPoint not usually considered and even less often implemented into

classroom presentations. The interactive lesson is a self-paced, student-controlled, individualized learning opportunity embedded with assessments and offered to augment individualized instruction; corrective instruction, additional practice, or enrichment activities. Learn all about action buttons, hidden slides, and the kiosk browser and follow the step-by-step instructions on how to construct assessment slides in this chapter that walks the reader through the steps needed to create a lesson suitable for either a formal multimedia classroom presentation, an individualized lesson, or a self-taught enrichment experience on home computers.

Chapter XI profiles three virtual schools, each at a different stage of development and each employing a successful distance education program to develop its professional staff. Several innovative professional development environments are discussed, including the Electronic Classroom of Tomorrow, iQ Academies, and Virtual I.D.E.A.L. school as well as barriers to sustaining distance education. "*Planning Staff Training for Virtual High Schools,*" by Thompson and Berge conclude that many of the factors they studied to address the issue of virtual schools and online education are really not much different than the standards of success identified by brick and mortar institutions.

"*Training Prospective Online Instructors: Theories Utilized by Current Online Instructors,*" by Cicciarelli reports on empirical research about online instructor use of different design theories. The review of the literature does an excellent job of familiarizing the reader with the three widely recognized schools of educational thought: behaviorism, cognitivism, and humanism. The, Chapter XII takes the reader beyond this discussion to a look at the empirical research describing theories preferred by online instructors. Mastery learning, simulations, multiple intelligences, transactional distance, and social and cooperative learning theories are some of the top 15 most common applications mentioned. The study found nine of the 15 theories were in widespread use in online courses. The reader is encouraged to read the results of this paper to determine the reasons why.

A second chapter focusing on graphics presentation in general and PowerPoint specifically is offered by Fedisson and Braidic in their Chapter XIII manuscript, "*The Impact of PowerPoint Presentations on Student Achievement and Student Attitudes*." The research study was grounded in an examination of seventh grade students tested on their knowledge of sentences and nouns in a language arts classroom and conducted over a two-year period. Students were asked questions regarding the use of the projector and PowerPoint presentations, the factors that helped them achieve a better grade on classroom tests, and their recommendations/ preferences for using graphics packages in the future for teaching writing, spelling, and grammar. The use of technology to motivate students achieve a higher mastery of skills is well documented in this paper.

Chapter XIV, "*Teaching Java™: Managing Instructional Tactics to Optimize Student Learning,*" portrays the results of a study targeting information systems students in a graduate section and an undergraduate section of an introductory Java graphical user interface course. Knowledge transfer and software self-efficacy were the targeted criteria of the study and the results showed progressive improvement in rule test performance and software self-efficacy across the several instructional events. These results extend previous work that the author shares with the reader in an early issue of the *International Journal of Information Communication and Technology Education*.

COLLABORATIVE TOOLS

Chapter XV, "*Toward an Increase in Student Web Portfolios in New York Colleges and Universities,*" investigated the existence of Web portfolios on academic Websites citing disappointing results when surveying New York State colleges and universities for these tools of authentic assessment. DiMarco's

goal for this project was to promote Web portfolios by offering the current level of student Web portfolio usage and activity within New York colleges and universities and suggesting a sample syllabus to build Web portfolios into curriculums. He found a low number of portfolios (a mere .39 percent) of the enrollment population and yielded some interesting data for further investigation. Two facts seemed to evolve from this study. The first fact was few Web portfolios are readily available; the second was that many academic Websites posted documents regarding the virtues and involvement of Web portfolios, yet these institution's Websites showed no tangible implementation of Web portfolios by students.

Döös, Fåhræus, Alvemark, and Wilhelmson offer their investigation into group, Web-based dialogues as conversations that *link ideas via digital conversations.* The introductory remarks of Chapter XVI suggest a number of factors influencing the development of group discussions on the Web and their potential value to participants. Their study, "*Competent Web Dialogues: Text-Based Linking of Thoughts*," examines experience-based learning, collective learning, dialogue competence, synchronous or asynchronous text meetings, and other considerations for teachers and students. The conclusions center on how the experience of distance education programs noted in this paper using technology to supplement learning platforms produced several positive benefits for consideration by the reader.

"*Employing Interactive Technologies for Education and Learning: Learning-Oriented Applications of Blogs, Wikis, Podcasts, and More,*" by Hsu discusses several interactive technologies and their uses, the underlying educational psychology that governs their uses and some possible applications for education in general and the management of knowledge specifically. For readers who have not explored blogs, podcasts, wikis, and the like, Chapter XVII defines these "conversational technologies" along with the characteristics and suitable applications most appropriate to course-related activities. For those readers inclined to research, the author suggest some of the broader research issues that should be examined include measuring the quality and quantity of learning that occurs when employing these specific technologies and tools.

Social constructivist learning tools, in the form of online discussion forums, remain central to online education as the modality continues to evolve in functionality. Chapter XVIII, "*Assessing Online Discussion Forum Participation,*" by Shaul*,* examines how the development of student assessment has caused social constructivist theory to lag behind other schools of educational psychology. The author introduces a software program for instructors to help them evaluate online discussion forums quickly, easily, and consistently. Then, he updates the reader on the latest status of the project before making the software available to users.

This next study classified students in both traditional and e-learning (i.e., synchronous) classrooms. Traditional classroom students (64%) attended all classes in a face-to-face format while the e-learning students (36%) attended some of their classes face-to-face and some classes via the synchronous format. "*Synchronous Hybrid E-Learning: Empirical Comparison with Asynchronous and Traditional Classrooms,*" examined numerous hypotheses. The first investigated whether students were less satisfied with the synchronous learning environment when learning unfamiliar courses. The second hypothesis evaluated overall student satisfaction with the synchronous and traditional learning formats. The third and final hypothesis measured overall student satisfaction by evaluating student intent to enroll in future courses. While the results offered in Chapter XIX offered by Negash, Emerson, and Vandegrieft may be limited to the specific courses examined in this study, they do provide important new information in the assessment of online learning.

Hui and Russell explore the dynamics of intersubjectivity on online professional development and reveals new evidence for the management of two variable forms of intersubjectivity, temporary suspension and resistance and disagreement. Findings from Chapter XX, "*Understanding the Effectiveness of Collaborative Activity in Online Professional Development with Innovative Educators through Inter-*

subjectivity," provide useful implications for advanced applications and developments with information communication technology in innovations for enhanced learning and teaching as they relate to the evaluation of teacher effectiveness in implementing collaborative online problem-based activities.

"*Effective Questioning to Facilitate Dynamic Online Learning,*" addresses the need for a learning community to promote effective discussion through the practice of questioning. Braidic shares ideas for effective questioning strategies in an online environment in Chapter XXI that can help instructors achieve well defined goals. Whether in a traditional classroom or in an online learning environment, instructors must develop a place where students feel comfortable with questions. Readers will become familiar with I.Q. (I Question), an extension of Bloom's prompts that infuses questions-asking techniques into student assignments via article readings, cases, and the like to engage the learners in various levels of questioning.

The final Chapter XXII in the book, *Transitioning from Face-to-Face to Online Instruction: How to Increase Presence and Cognitive/Social Interaction in an Online Information Security Risk Assessment Class*," explores interaction and presence as two of the most important goals of online education. The authors provide guidelines and examples of how to design an online course in information security in a manner that will enhance interaction and presence and are readily adopted by other disciplines.

Information Communication Technologies for Enhanced Education and Learning: Advanced Applications and Development represents a unique examination of technology-based design, development, and collaborative tools for the classroom. Theory is mixed with practice and asynchronous is combined with synchronous apparatus with the expressed purpose to foster teaching and learning with technology. Enjoy the latest installment of the *Advances in Information and Communication Technology Education Series – Volume 3.*