Preface

MODELS, INITIATIVES, AND ASSESSMENTS

Introduction

During the publication year 2006, the International Journal of Information Communication and Technology Education (IJICTE) evidenced a focus on models, educational initiatives, and assessment of instructional technology. Many of the articles shared with our readership throughout the year concentrated on the results of investigations on these three educational apparatus.

By definition, a model is a pattern, plan, representation, or description designed to show the structure or workings of an object, system, or concept. (Wikipedia, 2007). They may refer to abstractions, concepts, and theories used to estimate, predict, or forecast events. In his paper, Gerald Grow (1996) offers a cognitive model of learning that begins with comprehension to predict what prior knowledge will be relevant and which strategies might prove to be useful in teaching. Next, learning occurs when this new information becomes a part of a learner's existing knowledge network. Finally, recall comes into play to call up stored information in response to some cue for use in a process or activity. Memory is reconstructive. Grow's final comment is worth remembering here, "In a nutshell: cognition is an active, recursive, integrated process by which we continuously model the world and continuously modify the model." These working definitions of a model will serve us well.

Adapting Information and Communication Technologies for Effective Education re-introduces a series of models for consideration that include the TUI model for faculty development, blended ICT models for higher education, the KARPE model for differentiating teaching and learning with technology, the ADDIE model applied to online instruction, and the TRAKS model for IT training in organizations.

Educational initiatives are nothing new to education. In point of fact, the discipline is replete with examples of initiatives started and dissolved, tried and abandoned, successes and failures. Educational initiatives attempt to introduce or promote a culture of quality within education by raising concerns related to student learning, providing services related to assessment, professional development of teachers, curriculum and pedagogy, and influencing educational policy, for our purposes, in the realm of technology.

In this text, the reader is provided updated investigations into several important technology-based initiatives. They include technology-assisted problem packages for engineering, incorporating geographic information systems, programming with decision trees, a scheme for increasing female interest in science curriculum, using vignettes to exapnd higher order thinking, anchoring e-commerce courses with business plans, supporting special needs learners in cyber schools, game modding and customized learning

opportunities, infusing project management in student technology projects, and teaching networking using practical laboratory exercises.

Evaluating educational technology programs is challenging. Thankfully, the research and the literature are beginning to fill the void in what we know about the successful integration of technology. As more and more universities, schools, and corporate training organizations develop technology plans to ensure technology will directly benefit learning and achievement, the demand for more investigations into an understanding of how technology impacts learner achievement becomes even greater. The question, thus, becomes how do you evaluate educational technology programs that vary in the students they serve, the curriculum they teach, and the technologies employed?

Adapting Information and Communication Technologies for Effective Education offers four revised articles from 2006 that address ICT assessment in universities, student satisfaction in management information system programs, factors that impact the successful implementation of a laptop program, student learning and electronic portfolios, and strategic planning for e-learning.

A recap of the chapters, by category (models, educational initiatives, and assessment) follows.

Models

In their chapter, Graham and Semich introduced a three-step staff development program for linking technology training with theory to transform pedagogy. The model proposed three key phases: training, application, and integration. Their updated research, seen in Chapter I, on the three-phase model entitled, "Integrating Technology to Transform Pedagogy: Revisiting the Progress of the Three Phase TUI Model for Faculty Development," highlights the progress that one university has made to transform the teacher-centered classroom into a technology rich, learner-centered environment.

Information transfer is a tradition in higher education. In the information transfer model, knowledge is passed from the experts (tutors) to the learners (students) by means of lectures and textbooks. Increased costs often dash any hopes of increasing the educational impact of these traditional resources by augmenting them with more advanced technology-enhanced ICT tools. Drossos, Vassiliadis, Stefani, and Xenos argue that new, low-cost educational models based on constructivism can be used in parallel with traditional learning to introduce a blended (or enhanced) learning approach. In such a blended environment, organizational, educational and technological issues need to be considered as a whole. Their initial manuscript introduced a light-weight blended educational model based on cooperation and experimentation. Chapter II, "Blended ICT Models for Use in Higher Education," adds a developmental framework and discuss its quality aspects based on the ISO standard.

The knowledge, application, research, practice, and evaluation (K-A-RPE) model was initially offered as a benchmark for differentiating technology-oriented teaching and learning. The K-A-RPE model was added to the progressive, hierarchical classification systems of other taxonomies. Additional undergraduate, masters, and doctoral programs in instructional technology were added to the original data presented in the 2 2006 article. The findings shared by Tomei in Chapter III titled, "The KAR-P-E Model Revisited: An Updated Investigation for Differentiating Teaching and Learning with Technology in Higher Education," now include some 87 programs, 1542 courses, and over 14,000 learning objectives.

Online education has quickly become a widespread and accepted mode of instruction among higher education institutions throughout the world. Although many faculties who teach traditional courses now embrace teaching online, others still feel intimidated when asked to develop a course using technology. The ADDIE model, first presented in the July-September 2006 issues of the *International Journal of Information and Communication Technology Education*, is a five-step process that has proven equally adept at designing both traditional and online instruction. The five steps,

analysis, design, develop, implement, and evaluate, provide the framework for solid instructional design techniques. In Chapter IV**,** "Applying the ADDIE Model to Online Instruction," Shelton and Saltsman add to their assembled best practices and augment their initial findings with new suggested strategies for online class design, syllabus development, and online class facilitation. Both novice and experienced online instructors alike will benefit from the ideas, tips, and tricks published in this chapter.

Introduction of new information technology (IT) in organizations is a necessary, but not sufficient, condition for organizational success. Effective adoption and use is fostered by the integration of IT into an organization's strategic planning in areas of technology use, planning, and training. Despite the strategic nature of technology training in organizations, most existing studies on technology training address only operational issues (e.g., training needs assessment, learning, delivery methods, etc.). More strategic concerns (i.e., enhancing business productivity) are largely not addressed by the current literature. To address this gap, Srivastava and Teo explored the role of IT training in hierarchical organizations, in Chapter V, entitled "TRAKS Model: A Strategic Framework for IT Training in Hierarchical Organizations," the authors synthesize various ideas related to change management, training needs analysis and IT adoption to evolve a strategic IT training framework for hierarchical organizations; namely, the TRAKS model. The first contribution presented in volume 2, number 4, of the *International Journal of Information and Communication Technology Education* offered framework for recognizing the differences in IT training requirements at various levels of employees. The model suggested tracking training requirements based on attitudes, knowledge, and skills for different segments of employees. The revised manuscript augments the original study with discussions of actionable and comprehensive tools that can be used for systematically planning IT training. The result: enhanced productivity and a more complete and robust training itinerary.

Educational Initiatives

Sidhu and Ramesh present their work in Chapter VI, entitled "Technology Assisted Problem Packages for Engineering," on the development of technology-assisted problem solving (TAPS) packages at the University Tenaga Nasional (Nigeria) that began with an investigation into the development of interactive multimedia based packages targeted for engineering. Their original work was shared in volume 2, number 1 issue of the *International Journal of Information and Communication Technology Education*. This chapter continues the research into the philosophy, design, and development of interactive multimedia for solving engineering dynamics problems.

Increasing demands for basic computer skills at today's colleges parallel advancements in overall information technology use. As a consequence, many colleges and universities have initiated campus laptop programs to provide their students opportunities to grow their computer skills and experiences. However, the success of laptop programs is very much dependent on the degree to which students and faculty are accepting a laptop environment and are willing to implement such programs. Defining which conception factors are necessary is essential for successful implementation. In their initial investigations reported in the *International Journal of Information and Communication Technology Education*, Changchit, Cutshall, and Elwood examined student perceptions of the required laptop programs in order to distinguish which factors they perceive as important. In Chapter VII, "Perceptions of Laptop Initiatives: Examining Determinant Factors of University Students for Laptop Successful Implementation," the authors add to our understanding of the factors that encourage student support of laptop initiatives and how such programs can be made more useful to students as well as more beneficial to universities.

Schools of business can benefit from adoption of geographic information systems (GIS). In Chapter VIII, "Incorporating Geographic Information Systems for Business in Higher Education," Gadish pre-

sented a brief overview of this technology along with an example of how it can be incorporated into a business school curriculum. Benefits for business schools, their students, and faculty are discussed and a comprehensive approach for promoting such spatial thinking is presented. The goal of the research was to determine ways to empower faculty to adopt GIS-based research and teaching while producing business school graduates who can promote spatial thinking in their own organizations. The follow-on manuscript validates the findings and uncovered that, with time and effort, an increased awareness of spatial thinking and use of GIS technology benefits business school administrators, faculty and students.

The design for this chapter focused on a library of decision tree algorithms in Java that were eventually used as a programming laboratory workbench. Kalles and Papagelis found decision trees to be one of the most successful machine learning paradigms. Chapter IX's experiments with decision trees found that using components and visual tools facilitate decision tree construction. The resulting system has been built over a number of years and has been successfully used in a programming laboratory for junior computer science students. The underlying philosophy, expanded in this follow-on study of "Programming Drills with a Decision Trees Workbench," was to achieve a solid introduction to object-oriented concepts and practices based on a fundamental machine learning paradigm.

Chapter X, "CareerQuesting Revisited: A Protocol for Increasing Girls' Interest in STEM Careers," by White and Wasburn, introduces an educational strategy to foster the interest and persistence of middle school girls in science, technology, engineering, and mathematics (STEM) careers. In the chapter, criteria are offered that would assist middle school teachers in the evaluation of Websites to serve as supplemental learning activities within prescribed curricula. As the authors' investigations continued, new evaluative criteria distinguished successful factors between boys and girls, allowing teachers to adopt them reducing the concern that they are providing an unfair advantage to either sex.

A challenge in teaching and providing any type of instruction in the online learning environment is to ensure that participants are engaged in the process and find meaning in their learning. Kish's previous case study, "Overview of Using Vignettes to Develop Higher Order Thinking and Academic Achievement in Adult Learners in an Online Learning Environment," investigated the use of vignettes as a teaching strategy and learning activity in a hybrid online course. The generative learning model was explored and two outcomes were anticipated: (1) enhancement of academic achievement and (2) higher order thinking. The modified study in Chapter XI discusses the methods used to teach adult learners how to respond to and create vignettes for their own teaching and presentation purposes. Participants responded to teacher-generated vignettes, created diagrams and rubrics, created their own vignettes, and recorded their observations concerning vignettes in reflective learning logs. The research findings indicate that the use of teacher-generated vignettes can increase academic achievement, and that learner-generated vignettes can help students achieve higher order thinking; a most appropriate example of a technology-based initiative.

Graduate-level educators are challenged by the diversity and currency of subjects covered in e-commerce courses. In Chapter XII, "Business-Plan Anchored E-Commerce Courses at the MBA-Level," Huang found the use of the business plan model a viable means for addressing those challenges. The apparatus of a business plan links subjects together while tendering students with real-life experiences. Learning, with proper curriculum design and delivery, gives students an opportunity to be reflective practitioners. Results from Huang's initial study are sustained in this revised paper as he continues to show one successful methodology for learning.

In Chapter XIII, "Cyber Schools and Special Needs: Making the Connection," Hipsky and Adams introduced the concepts of a new educational delivery network formally coined "cyber schools." For targeted K-12 students, the cyber school strategies have become particularly successful, especially to meet the needs of students with exceptionalities. In the *International Journal of Information and*

Communication Technology Education (volume 2, no. 4), Hipsky and Adams studied 468 students of the Pennsylvania Cyber Charter School and six dominant themes including: communication, interests, focus, less-stigma from the special education label, education differences in comparison to other methods, and cyber school shortcomings. The study employed the action research model to uncover the techniques and strategies at work in today's cyber schools. The revised investigation and latest results presented in this text augmented the teacher-tested documents from the original study and enhanced the cyber learning model for special needs strategies established through this research.

A game mod(ification) describes an adaptation for another purpose of an existing commercially available computer-based game originally created for an entirely different intention. Using game modding, a user can participate in the creative process by taking the setting of their favorite game and customizing it for entertainment (or educational) purposes or to deliver new knowledge and fresh information. For years, commercial computer-based game developers committed considerable resources towards preventing users from "hacking" into or "hijacking" their games. Now several computer-based game developers actually encourage partner-users to build additional content and seek the advantages of producing quality commercial computer games and customized instruction. Chapter XIV, "Game Mods: Customizable Learning in a K16 Setting," focuses on mainstream, accessible games with straightforward tools that are easily integrated into a learning environment. Read the author's updated version of these interesting instructional technologies and how they might be applied to today's classrooms.

Chapter XV, entitled "Project Management in Student Information Technology Projects," by Rojas, McGill, and Depickere reports on their investigations into the use and usefulness of project management in student IT projects. The results show there was a wide range in the application of project management practices with students more likely to produce the initial documentation associated with some of the project management knowledge areas than to make use of it throughout the project. The results also show that the number of project management guidelines applied in student projects is not linked to project success. The revised chapter continues to show the strong relationship between project management plan quality and a good software product discovered in the initial study, and goes further in exploring this aspect of how universities teach project management to information technology students. The project management principles that students have previously learned remain applicable to experiential learning in a project-based course; the experience of applying knowledge to real or simulated projects makes an important contribution to this text.

Finally, motivating students to learn TCP/IP network fundamentals is often difficult because students find the subject rather technical when presented via the lecture format. To overcome this problem we have prepared some hands-on exercises (practicals) that give students a practical learning experience in TCP/IP networking. The practicals are designed around a multi-user, multi-tasking operating system and are suitable for classroom use in undergraduate TCP/IP networking courses. The effectiveness of these practicals has been evaluated both formally by students and informally in discussion within the teaching team. The implementation of the practicals was judged to be successful because of the positive student feedback and that students improved their test results. Chapter XVI, "Teaching TCP/IP Networking Using Practical Laboratory Exercises," describes the practicals and their impact on student learning and comprehension, based on the author's experiences in undergraduate computer networking courses.

Assessment

In Chapter XVII, entitled "Assessment of ICT Status in Universities in Southern Nigeria," Aduwa-Ogiegbaen and Uwameiye offer readers an insight into factors of faculty affiliation and teaching experience with respect to the use of the Internet. Their results, amplified in this revised study, provide three

important findings. First, the faculties of engineering, science and arts (in that order) were the foremost users of the Internet for instructional purposes. Second, the faculties of education and agriculture were the least experienced in using the Internet. And, third, faculty members with less than five years teaching experience use the Internet more than senior faculty members. Readers will most certainly compare their schools with those in this Nigerian study with probably fairly similar results. If such an investigation has not been conducted at your institution, the questionnaire survey and methodology are available in this chapter for your consideration.

In Chapter XVIII, entitled "Using Indices of Student Satisfaction to Assess an MIS Program," the authors demonstrate a methodology by which management information systems (MIS) alumni evaluate the content of courses and their satisfaction with the program. In the initial study first offered in t the *International Journal of Information and Communication Technology Education* (volume 2, no. 2), Chrysler and Van Auken sought to isolate differences in the evaluations of the content of required MIS courses by alumni based upon whether the graduate was using their first year on the job or one's current position as a frame of reference. A factor analysis, a global measure of satisfaction, and a regression analysis were brought into play to measure a student's satisfaction with the entire MIS program. In this updated manuscript, the authors enhance their research by offering implications for evaluating the effectiveness of an MIS curriculum.

Chapter XIX, "How Students Learned in Creating Electronic Portfolios," investigated learning experiences that occurred during development of electronic portfolios for a graduate technology program. Wang and Turner spent time investigating student learning experiences and the problems they encountered in an attempt to understand how they learn in a technology-enriched learning environment. Originally, data were collected through in-depth interviews, participant observations, and documented analyses before, during, and after developing electronic portfolios. Initial findings indicated that creating electronic portfolios support mastery of technology-related knowledge and promote critical thinking and problem-solving skills. This chapter reinforces previous reports that students learn best by doing and even better through collaboration, reflection on artifacts, and synthesis that comes from creating electronic portfolios.

Computer-networked systems create a demand and an opportunity for businesses to approach training and knowledge management from new perspectives. These new training perspectives are driven by the need for businesses to provide the right training quickly and efficiently and to support knowledge systems that are current, accessible, and interactive. In Chapter XX, "Strategic Planning for E-Learning in the Workplace," Berge and Giles discuss strategic planning in terms of the necessary organizational elements and the e-learning requirements to build a framework for sustaining e-learning as a core business process. In this chapter, the process of developing a strategic plan originally posited was augmented with an examination of the internal and external environments that help an organization determine its current situation prospects for business in the future. The chapter examines the two components that guide the future activities of the organization: a mission statement and vision statement. Once this strategic foundation is laid, the organization can go about the business of transforming itself into a learning culture that maximizes the use of technology with an investment in learning that produces outcomes to further business processes and goals.

Summary

Information technology makes it possible for faculty and trainers to improve the manner in which they present materials in both a traditional, face-to-face classroom or via technology-enhanced online teaching. When used properly, technology increases the frequency and quality of instructor-student interac-

tion and, consequently, learner outcomes. *Adapting Information and Communication Technologies for Effective Education* offers its best papers from 2006 categorized as models, educational initiatives, and assessment issues.

The TUI model for faculty development will introduce a three-step staff development program for linking technology training with theory. A blended ICT model adds a developmental framework for use in higher education. The KARPE model will differentiate learning objectives using technology. The ADDIE model will provide the framework for designing both traditional and online instruction. And, the chapter discussing the TRAKS model will synthesize various ideas related to change management, training needs analysis and technology adoption.

A wide range of educational initiatives will be introduced in this text. The development of technology-assisted problem solving packages for engineering will suggest to the reader how interactive multimedia might assist in helping students solve complex engineering dynamics problems. Increasing demands for basic computer skills were examined in light of student perceptions of a required laptop program and will be shared. Benefits for business schools, their students, and faculty from the adoption of geographic information system technology are covered later. The use of a Java-based decision tree algorithm library will report on its successes when integrated into a programming laboratory for junior computer science students. An educational strategy that has the potential to foster the interest and persistence of middle school girls in science, technology, engineering, and mathematics (STEM) careers will be offered. The use of vignettes as a teaching strategy and learning activity in a hybrid online course is exposed. The business plan model is recommended as a viable means for addressing the challenges of diversity and the currency of subjects covered in modern e-commerce courses. Strategies appropriate to meet the needs of students with exceptionalities in today's cyber schools are to be examined along with six dominant themes including communication, student interests, learner focus, the special education label, comparison to other learning methods, and cyber shortcomings. The use of game modifications to deliver new knowledge and fresh information is highlighted. The project management principles explained in one chapter remain applicable after additional investigation; the experience of applying knowledge to real or simulated projects will continue to make important contributions. The shortcomings of the lecture method of instructional delivery are explored and the use of practical exercises found to produce positive student feedback and improve student test results.

Finally, issues of assessment were introduced. The first such chapter will offer an insight into factors of faculty affiliation and teaching experience with respect to the use of the Internet. Another will evaluate the content of required MIS courses using factor analysis, a global measure of satisfaction, and a regression analysis. Electronic portfolios, and how they support mastery of technology-related knowledge and promote critical thinking and problem-solving skills, will be presented to readers. And, the last chapter will discuss strategic planning in terms of the necessary organizational elements and the e-learning requirements to build a framework for sustaining e-learning as a core business process.

As you begin your journey into *Adapting Information and Communication Technologies for Effective Education,* consider how the models, educational initiatives, and assessment issues presented impact your personal understanding of information technology education.

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