Preface

Exploring the New Era of Technology-Infused Education is the latest offering in the Advances in Information and Communication Technology Education (AICTE) Series. This volume is a compilation of the best papers from the International Journal of Information and Communication Technology Education (IJCITE) now in its thirteenth year of publication. Volume 8 contains two years of the best ICT-focused manuscripts from 2013 through 2014. Authors of the original works have revised their previous contributions updating the technologies investigated and explored, adding to the research and literature, and sharing improved best practices. This volume is parsed into the theories and applications of technology-infused education.

THEORIES OF TECHNOLOGY-INFUSED EDUCATION

The first section of the text looks at technology from the perspective of its theoretical underpinnings. Focusing on empirical case studies and pivotal theoretical possibilities of technology within education and technology-infused education, this comprehensive book will serve as an essential reference source for advanced-level educators, researchers, practitioners, and academicians interested in the changing quickly-changing landscape of technology theory in the classroom. Contributors explore the role of educational technology theories in current practice. They review a range of works originally constructed earlier and contributed in final manuscripts during 2013-2014 regarding the nature of educational technology research and updated with the technologies of 2016. They discuss influences on learning from the related fields of general higher education, transformative learning, adaptive hypermedia learning systems, adaptive technologies, and authentic learning, to name a few. In these chapters, authors draw on their own experiences as educational technologists with the expressed purpose to encourage other colleagues and peers to join with them in reflecting on their own uses of technology-related theories for teaching and learning.

Chapter Overviews

Chapter 1, The (Revised List of) Top 10 Technologies for 21st Century Instruction, persists in seeking answers to the important questions of “How does technology fit into my teaching?” How can I teach my students to become technologically literate?” and “How do I infuse technology into as many levels of my curriculum as possible?” The chapter examines more contemporary technologies and, for the first time, rank orders those technologies according to their relevance across the curriculum. As before, each
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technology introduced offers a priority for how important these technologies might be in the classroom. A description of the technology, its primary features, advantages and disadvantages, and additional resources are introduced.

Chapter 2, *ICT in Chinese Higher Education: Opportunities and Challenges*, provides an overview of how the development of Information and Communications Technology (ICT) in China has influenced higher education, what opportunities ICT offers for higher education, and what challenges Chinese face in further developing higher education with ICT. A recent report from the China Internet Network Information Center places China as the country with the most Internet users in the world. As more Chinese come online, the Internet has been integrated into Chinese education, especially with learners ages 20 to 29. Many of these youth are higher education students. With 34.6 million college students, the Chinese higher education system is the largest in the world. A significant proportion of whom are directly impacted by information and communication technology.

Chapter 3, *Transformative Learning and Technology in Adult and Vocational Education*, suggests that adult learners often fear that they will be unable to find work without the requisite technological skills. The media seems to emphasize the importance of technology in the workplace advising that, without adequate skills in the use of appropriate technologies, adult workers may face challenges in finding employment. This chapter addresses technology in vocational and adult education as advancing from different perspectives. Technology has the potential to support transformative learning. Technology, along with the vital role of adult educators, helps learners grow, change, and develop.

Chapter 4, *Scale to Measure Attitudes toward Information Technology*, offers a scale that may be used by educators at the senior high school and college levels to evaluate the effectiveness of different teaching and learning strategies in promoting positive student attitudes toward IT, and in improving learning among students. The Scale proposed in Chapter Four is unique in that it includes attitudes toward gender equality of opportunity in IT. The scale is grounded on the author’s study that developed an “Attitude toward IT Scale” with a gender subtext to measure certain attitudes toward IT held by college students. Pursuit of information technology (IT) majors depends, to a great extent, on student attitudes toward IT. Results of data analyses found that overall reliability is high (0.85), revealing five orthogonal factors with high coefficient alphas—factors that represented relevant attitude constructs.

Chapter 5, *A Model for an Adaptive Hypermedia Learning System Based on Data Mining Technique*, purports that, since the learning style of each learner is different, adaptive hypermedia learning system (AHLS) must be developed to fit different learner’s needs. This chapter proposes an AHLS model based on learning styles and learning performance. The prototype developed offers to assist learners in accessing and using learning resources which are adapted according to personal characteristics (in this case, individual learning styles and levels of knowledge). It will also facilitate learning content in the creation of appropriate learning objects and their application to suitable pedagogical strategies.

Chapter 6, *Teachers’ Use of Assistive Technologies in Education*, reports specifically on business educators’ knowledge, use, training and preparation related to teaching students with a disability. But the conclusions and recommendations of the authors have implications for every academic discipline. Findings indicated that, while technology continues to develop geometrically while advancing the quality and scope of instructional methods, additional education in the availability and use of technology and assistive technology is needed. Inclusive education, with the aid of assistive technologies, in general education classrooms has become a world-wide initiative, yet access for students with a disability to assistive technologies remains limited.
Chapter 7, *Assessing Impact of ICT Intercultural Work: the Dissolving Boundaries Program*, reports on a school-based ICT initiative that links primary (pupils aged 5-11), post-primary (pupils aged 12-18), and special schools (pupils aged 5-18) in partnerships between Northern Ireland and the Republic of Ireland. The research study investigated increased awareness and understanding of life on the other side of the often-called “artificial” political border between the two countries and one people. The ICT skills of pupils were also probed. Two cohorts of pupils took part in the Dissolving Boundaries program during an academic year; another cohort of similar age in the same schools was the comparison group and did not take part in the program. Findings suggest that participation in the program contributed to student knowledge and awareness in general of the other jurisdiction. A large majority of Dissolving Boundaries pupils agreed that they could learn something new from working with another school. Participating pupils showed much higher competence in those ICT skills associated with communication and collaboration than their non-participant peers.

In Chapter 8, *Pre-Service Teachers’ Motivation to Use Technology and the Impact of Authentic Learning Exercises*, the authors explore the impact of authentic learning exercises on pre-service teachers’ motivational beliefs to integrate technology, as well as the ability of those beliefs to predict intentions to integrate technology in the classroom. This quasi-experimental study employed a questionnaire to assess 104 pre-service teachers’ motivational beliefs, namely intrinsic and extrinsic goal orientations, task value, self-efficacy, and control of learning in relation to technology integration. Results indicated authentic learning exercises might have enhanced motivational beliefs, particularly self-efficacy and intrinsic goal-orientation. Also, motivational beliefs predicted their intentions to integrate technology into future instruction, with task value predicting significantly.

Chapter 9, *Collaborative Learning on Decentralized Ubiquitous Environments*, discusses collaborative learning and proposes the integration between two models dedicated to support ubiquitous learning environments. One such model presented is an infrastructure designed to create ubiquitous learning environments, providing software agents that perform tasks common to ubiquitous learning processes. The second model is a more generic collaboration paradigm for decentralized environments. By extending these agents or adding new ones, a system can be specialized to support ubiquitous learning environments. The results of the study show the potential of deploying the environment in real situations.

Chapter 10, *The Influence of Clickers Use on Metacognition and Learning Outcomes in College English Classroom*, shares the growing popularity of handheld response technologies in classroom teaching and learning. This study presents its findings as to whether use of clickers in college English class can improve learners’ English proficiency and enhance their awareness of metacognition compared with traditional multimedia-aided pedagogy. By comparing the data obtained from three questionnaires and an International English Language Testing System (ILTS) test instructed using clickers and traditional multimedia at the end of corresponding semesters, it was found that clicker-based pedagogy can give rise to better learning outcomes and higher metacognitive levels than traditional multimedia.

**APPLICATIONS OF TECHNOLOGY-INFUSED EDUCATION**

Technology-infused education is the ubiquitous use of the latest technology resources—computers, mobile devices like smartphones and tablets, digital cameras, social media platforms and networks, software applications, the Internet, etc.—in daily classroom teaching. Successful technology integration is achieved when the use of technology is routine and expected, readily available for the learning
outcomes at hand, supportive of curricular goals, and brought to bear on a variety of student learning styles to help them effectively reach their goals. The chapters in the second section of this book show applications where faculty and students are not only using technology daily, but have access to a variety of tools that match their instructional goals and learning outcomes to build a deeper understanding of content. The contributing authors address a host of applications from textual story-telling and e-books to the more virtual worlds of instructional video, social media, and online course environments.

**Chapter Overviews**

Chapter 11, *Transmedia Storytelling Edutainment and the Contemporary Textbook in Higher E-Education*, focuses on web-based Transmedia Storytelling Edutainment as a pedagogical practice in higher education. In the digital age, the textbook is being replaced by newer forms of learning technologies such as a story-based screen text. In the era of media convergence, transmedia (cross-media/cross-platform/multi-platform) narratives are catering to users who are willing to immerse themselves in their favorite entertainment content. The inherent interactivity of the Internet and the emotional engagement of story can lead to innovative pedagogies in media rich environments.

Chapter 12, *Adoptability of e-Textbooks Featuring Educational Online Games*, shares how the South Korean government is in the process of transforming school textbooks from paper-based to a computer-based digital platform. Along with this effort, interactive online educational games (edu-games) have been examined as a potential component of the digital textbooks. This study examined how fourth, fifth, and sixth grade students perceive an interactive online edu-game and whether or not their communication attributes predict their willingness to diffuse the game. Four perceptions of the innovation: relevant advantage, complexity, compatibility, and observability were statistically significant predictors of students’ willingness to diffuse an online edu-game as indicated by the theory of diffusion of innovations, while only trial-ability was not. Based on these results, this study provides some implications for the diffusion of interactive online educational games as a potential component of the digital textbook.

Chapter 13, *Perceptions of Professors and Students towards Moodle: A Case Study*. Moodle is designed to help instructors deliver course materials to their students built and delivered from a social constructivist perspective. This study evaluated the acceptance and use of Moodle as an open source application from the viewpoint of both professors and students at the American University of Beirut. The participants were professors and students who completed an online survey evaluating a set of thirty items as they applied to Moodle. An exploratory factor analysis was employed and generated five factors: community influence, satisfaction, service quality, learnability and technical quality. Results showed the impact of community influence ranked as highest participants, followed by satisfaction, service quality, learnability and technical quality. Also, comments were solicited from users about various features that should be integrated into this free open source application.

Chapter 14, *Technology-Infused Education: The Influence of Course Environment Factors*, seeks to better understand the factors of the online course environment and examines the impact that various online environmental factors have on student satisfaction. This study identifies factors that affect student satisfaction toward online classes. However, student perceptions of online classes will not be the same as they complete the course remotely rather than interacting with other students and the instructor in a traditional classroom. These findings should help instructors teaching online classes concentrate more on factors important to their students.
Chapter 15, *Technology-Infused Education and Academic Integrity: Are They Compatible?*, explores the challenges of maintaining academic integrity in a technology-rich learning environment. The authors review recent findings from a qualitative study of student views of academic integrity and the effect of technology on their perceptions of ethical behavior in the online environment within the context of the earlier study which forms the core of the chapter. Of those students participating in the qualitative study, all responded that ethical behavior should be equal if not higher in the online environment. These students also felt that while technology could facilitate dishonest behavior, it could also provide instructors with the tools to mitigate such behavior. These results are in contrast with those from the earlier studies in which students accepted that the differences in the two learning environments allowed for a more fluid, if not a lower, standard of behavior in the online environment.

Chapter 16, *E-Learning 2.0: A Case Study Exploring the Integration of Social Media into Online Courses*, presents a case study involving the design, development, and teaching of two online courses based on e-learning 2.0 concepts and use of social web tools and technologies. Guided by the connectivism theory of learning, the courses were designed to integrate e-learning through social media. Blogs, podcasts, social networking, social bookmarking, and Wikis were utilized as fundamental course components. Participants included students in two graduate-level online courses in instructional technology. Results show that students’ experiences were very positive and that an e-learning 2.0 approach in online courses can enhance learner-to-instructor and learner-to-learner interaction, and increase students’ perception of classroom community.

Chapter 17, *Virtual Worlds Applications for Management Education*, examines the role of information technology as a key resource to support teaching and learning processes. In this chapter, the authors explore the current applications of Three Dimensional Virtual Worlds (3DVW) for management education. The research focused on selected educational institutions who subscribed to Second Life (SL), one of the most popular open 3DVW available worldwide. The results reveal that only 31 percent of the responding institutions actually use SL in management education. Regarding the acceptance of SL in management education, one third of the 15 institutions using it claim that it has been well received and accepted both by students and lecturers/professors. These results lead to several questions for further research and development of practices concerning the use of 3DVW for management education.

Chapter 18, *Social E-Learning Tools: What to Use When? A Theoretical Framework*, found that the growth of technology and the inclusion of “digital natives” as students in the education world have created a demand for the use of Social learning technologies in education. Dominant among these tools have been wikis, blogs and discussion boards. Distance education experts view the use of these tools as differentiators when compared to traditional education methods. However, the research in this area has yet to provide clear guidelines on their usage. In this chapter, the aim is to provide a theory-driven model to outline the application and impact of these technologies in education. The focus is on the education tasks and technology characteristics to evaluate the underlying fit. The chapter relates the extant research to substantiate their model and provide practitioner guidelines for practicing educators.

Chapter 19, *Instructional Videos as ICT for Teacher Professional Development: Transitioning from the Traditional Classroom to YouTube*, discusses how YouTube is making a major impact in education today. Various ICT tools have been used to produce very favorable outcomes in terms of student learning. YouTube has had a dynamic influence on teaching and learning and is widely used by teachers in the classroom. The focus of this study is to examine how teachers would respond to the use of ICT tools as a form of delivery for their own staff development training. The authors surveyed teachers to assess their feelings on this form of training and produced findings that showed a favorable response to this form of training and demonstrated a rationale supported by a list of themes related to their rationale for favoring this choice.
TRANSITION

We are entering into a new era of technology in education, one in which schools and educators must remain current to survive – especially at the post-secondary level. For the last decade, education has been in a “wait and see” phase where technology has been basically viewed as a “nice-to-have” component of teaching and learning.

However, while education and teachers have watched technology become infused in the everyday life of their students, they have been content to remain in a transition mode. There is a need to shift theory and application into an active phase with more dynamic, ongoing use of technology to keep abreast of mainstream adoption by learners.

Technology must be considered an essential component of the educational environment to achieve instructional goals and to ensure productive and cost-effective operations. The explosive growth of personal devices and use of the Internet as the chief source of information underscores the fact that society is rushing into technology-infused education. K-12 education (and in parallel, higher education as well) remains the last major social institution to make a transition to a technology-enriched operational environment. If K-12 and, by extension, colleges and universities, fail to rapidly embraced technology they will rapidly become out of touch with their clients and unable to fulfill their critically important mission of preparing students for future success in life and work.

This book offers some of the very best research on the theories and applications that will keep readers abreast of this rapidly changing perspective.