Preface

Volume 6 in the AICTE series is actually two books in one. First, it is an examination of how teaching and learning has been advanced in the previous millennium and how it is likely to evolve into the 21st century. Second, this work will offer its readers a look at how new trends in pedagogy and technology have been influenced by recent advances in information and communications. Consider the following equation for successful student learning outcomes:

Teaching + Learning = Pedagogy + Technology

Effective teaching is inextricably linked to successful learning and is the result of an uncommon blend of two critical components: pedagogy – the study of teaching, and technology – the study of technical applications in the real world. Ignoring any of these four elements of the equation diminishes the others and ultimately places at risk the overall educational process.

So, let’s look at each piece of this equation separately.

TEACHING

Effective teaching has consistently been associated with four elements: knowledge of the academic content, good organizational skills, interpersonal (including small and large group) skills, and passionate presentation. First and foremost, a teacher must meet the objectives of the curriculum and that calls for an unequivocal personal mastery of the content area. Stated objectives, modeled activities, guided practice, and assessment all hinge on the teacher’s thorough understanding of the material. Knowledge of the subject and mastery of the teaching resources (including technology) are critical to effective teaching.

Good organization skills aid the teacher in planning effectively for instruction, designing materials that support the lesson, promoting interaction, and integrating appropriate methodologies appropriate for the context. Teachers must constantly acquire new techniques and keep abreast of the applied research that guarantees success.

Interpersonal skills allow teachers to monitor student progress, check student understanding, devote appropriate time to task, and scaffold lessons to previously learned material. Skilled teachers also establish and enforce consistent class rules, keep their class on target while avoiding departures from the subject, control potentially disruptive behavior, manage group work effectively, and, overall, make the best use of very limited time on task.
Finally, a passionate presentation is not restricted to a “fire and brimstone” delivery. The best teaching occurs when lessons are adjusted to fit the learning objectives, when they stimulate and encourage higher-order thinking, and when they simply communicate effectively with the learner. Great presentations offer content at a developmentally appropriate level and encourage student participation – especially in older children and adults. Often, technology integrated into instruction stimulates both the teacher and the learner – but not always. Sometimes it can be distracting, diverting the student’s attention from essential content and established learning outcomes.

Effective teaching embraces a wide range of pedagogical abilities and technological skills that lead to an environment where all students can be successful, both academically and personally. This complex combination of abilities and skills is further integrated into a body of professional teaching standards that also include essential knowledge, dispositions, and commitments that allow educators to practice at a high level. (NBPTS, 1998)

**LEARNING**

The sum and substance of most educational psychology text books define learning in basic terms as a change in behavior. Certainly, earlier authors (at least prior to the 1990’s) viewed learning in light of observable and measurable outcomes. Most, however, argued for their own brand of methodologies for producing the change whether it was in the real world or in the classroom. Often, learning was narrowly defined as a measure of capacity: for example, the amount of knowledge acquired, the quantity of information memorized that could be repeated, or the sum of facts and skills that could be demonstrated in practice. Too, a definition of learning was oftentimes relegated to the more abstract: articulating how interrelated parts affect the whole or expressing new knowledge (e.g., music) to produce wholly different results.

With the advent of more contemporary theories of learning, the focus shifted from discernible and quantifiable outcomes typically attributed to the teacher to schemata and personalization with the spotlight now on the learner. Under the later schools of educational thought, the student is actively involved and encouraged to participate in the learning process. The emphasis turns from the instruction and its delivery to the student. Learning is viewed from the perspective of the learner rather than the teachers. It does not occur only in classroom and it is not confined to the time frame of a lesson. Rather, learning is less formal, likely to occur anywhere, at any time (the eventual basis for distance education advocates).

Because students are actively involved in creating their own learning patterns and connections and because learning is just as likely to occur in informal settings outside the classroom, self-reflection is necessary to secure deeper learning and to ensure this learning is available in future situations; either in practice or as the scaffolding for even more knowledge.

**PEDAGOGY**

Pedagogy refers to a distinct set of skills used to impart content knowledge of a target subject matter area. Taken from the Latin, pedagogy is parsed to expose “peda” referring to children and “gogy” as the study of or process of teaching. In most contemporary educational applications, pedagogy most often refers to the general context of teaching and learning by adults as well as children, although the term “andragogy” has been expressly coined by Knowles and others to focus on adult learning.
On the other hand, technology has many references including, for our purposes here, a collection of tools and techniques for solving a particular problem, fulfill a specific need, or overcome a definitive challenge.

Pedagogy-based training begins by helping teachers understand the role of learning theory in the design and development of various classroom activities, and in the selection and use of appropriate instructional technologies. By far, a lack of (or deficiency in) pedagogical training is the most common cause of unsuccessful learning outcomes. To effectively use pedagogy, teachers must remain aware of the host of learning styles and corresponding instructional strategies.

Three so-called schools of educational psychology have evolved modern thinking and practice about how learning occurs and how instruction in the classroom ultimately affects that learning. Each has its own merits and shortcomings that may make them rewarding or inappropriate in certain learning situations. A basic understanding of the principles and assumptions of Behaviorism, Cognitivism, and Humanism is critical to any successful approach to classroom teaching.

**Behaviorism**

This oldest school of educational psychology (that remains viable in today’s educational setting) focuses on the observable and measurable elements of the environment rather than mental or cognitive processes (which we will deal with later). According to the Behaviorist viewpoint, the environment provides the necessary stimulation to cause the learner to respond; and learner response is the behaviorist’s definition of “learning.” The environment changes the response in ways that increase or decrease the likelihood of its recurrence in the future. The Behaviorist view offers suggestions for managing the learning activities of students – suggestions that open the door to the infusion of technology in many cases.

Figure 1 represents, in its simplicity, the psychology of education that most clearly defines, for educators, several critical concepts of behavioral learning. For example,

- **Reinforcement** refers to consequences of responses that establish and maintain desirable behavior.
- **Behavior** comprises an immense body of activities; for the Behaviorist, the term includes only observable behaviors.
- **Environment** and environmental conditions are responsible for behavioral outcomes. By applying this view to learning, learners determine whether a particular behavior in a particular situation is appropriate or inappropriate.
- **Interaction** is the key: the interaction of the environment and behavior is a strong determinant of the appropriateness of a behavior.

Contemporary behaviorists view the environment as key to learning. Environment factors are seen in terms of stimuli and its resultant behavior or response. Teachers who claim a behaviorist bent view student behavior in light of external reward or reinforcement which they provide and their students with links to the stimuli presented. Teachers who accept the behavioral perspective of pioneers such as B. F. Skinner assume that the behavior of their students is a response to their past and present environment and that all behavior is learned. The ultimate teacher responsibility, according to the behaviorist, is to construct an environment in which the probability of reinforcing “correct” or proper student behavior is maximized; a goal best attained by careful organization and presentation of information in a designed sequence.
In practice, the behaviorist is defined by the traditional, teacher-centered, theory called instructivism that purports that knowledge is mastered passively by information transfer from an authority figure (i.e., the teacher) to a principally reflexive learner. Knowledge exists independent of, and external to, the learner; thus, an instructivist teacher assumes the responsibility for gathering knowledge and managing the distribution process in the classroom. Instructivism clearly places the burden for learning on the distributor of knowledge (i.e., teacher) and on choosing the most successful methods for dispensing learning. Traditionally, instructivists advocate for the lecture format; however, it takes very little imagination to see how technology has come to be embraced by the behaviorist teacher with its propensity to support the stimulus, response, reinforcement mandate. Several of the chapters in this volume of *Advancing Education with Information Communication Technologies* will fall within the behavioral pattern of pedagogy.

**Cognitivism**

Sprouting its roots from the behavioral perspective, Cognitivists perceive the student as an active participant in the learning process. They became interested in how people think, discover concepts, and solve problems and arrived at two conjoined perspectives: one emphasizes the acquisition of new knowledge; the second stresses its construction. The points of view advocate similar basic principles for example, both:

- Stress helping students become independent learners by processing information in meaningful ways.
- Insist that less able students master appropriate learning strategies in an effort to become more successful in the classroom.
- Plan and implement lessons based on declarative and procedural learning tasks.

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*Figure 1. The Behavioral Model*
Those comfortable with the acquisition of knowledge bent embrace a model of learning depicted in Figure 2. Acquisition proponents employ the often-used information processing model to depict how learning occurs and how it can be enhanced.

Advocates of constructivism regard scaffolding as the prototype for explaining learning as a series of building blocks, as shown in Figure 3.

Adherents to cognitive psychology believe that effective teachers are those who seek out prior knowledge, knowledge that students already possess, and come to realize how each learner processes information and organize that knowledge in their own memory. Cognitive teachers use instructional strategies to help the learner acquire knowledge more effectively. They stress tools and techniques that include teaching students how to learn, remember, think, and motivate themselves.

**Humanism**

Humanists are concerned with making learning more responsive to the needs of their students; specifically, to the student’s emotions, feelings, values, and attitudes. They are more accepting of the learner’s needs and purposes for engaging in educational experiences and encourage programs that develop the learner’s unique potential. Humanists view their role as one of facilitating the learner’s sense of self-actualization (i.e., realizing one’s full potential) and feelings of personal adequacy. Other characteristics of humanistic psychology include fostering the acquisition of basic skills and competencies (e.g., academic, personal, interpersonal, communicative, and economic) for living in a multicultural society; personalizing educational decisions and practice; and, recognizing the importance of human feelings, values, and perceptions in the educational process.

*Figure 2. The Information Processing (Cognitive) Model*
Humanistic teachers believe that how a person feels about learning is as important as how the person thinks or even behaves. Developing a learning climate that is challenging, understanding, supportive, exciting, and free from threat is of paramount importance in the classroom. They describe behavior not from the viewpoint of the teacher as do behaviorists but rather from the vantage point of the student who is performing the activity. Of highest regards is the development in learners of a genuine concern and respect for the worth of others and skill in resolving conflicts.

Of course, the preeminent model for humanism in the classroom (as well as the corporate office) is Maslow’s hierarchy of human needs (Figure 4).

Figure 3. The Constructivist (Cognitive) Model

Figure 4. Maslow’s Hierarchy of Human Needs (Cherry, 2011)
TECHNOLOGY

In 1996, Chickering and Ehrmann re-focused their highly successful work, *Seven Principles of Good Practice* created in 1987, to encompass the world of communication and information technologies – especially ICT resources for teaching and learning in higher education. Their premise was simple: “If the power of the new technologies is to be fully realized, they should be employed in ways consistent with the Seven Principles.” Here they are:

**Good Practice Encourages Contacts between Students and Faculty**

Clear communication is one of the acknowledged keys to success in school. As the millennium advances, parents and students will continue to rely on technology to communicate with educators at all levels, but most importantly with teachers. Both students and parents have come to expect (some say demand) to be kept informed and involved in their child’s education via some of the example technologies that follow.

- **Social networking sites:** Currently there are more than 650 million active Facebook users with Twitter, LinkedIn, and Skype adding millions more to the social networking milieu providing for so many possibilities for enhanced interpersonal communications venues using technology. Chances are good that the parents of children in elementary, secondary, and certainly post-secondary classrooms are online Facebook users who log in each day. With more than 250 million mobile device users, they probably retrieve messages on a real-time basis. Facebook is a quick and easy way to update parents on upcoming events or daily classroom happenings. Absences and tardiness can be reported instantly. Class activities and classroom celebrations are posted as they occur. Facebook can become a teaching tool for upper grade children in the hands of an effective teacher. Students can pose questions about homework and solicit help and assistance from other students, the teacher, or online tutoring sites. Students can even share their thoughts on an assignment and collaborate on a project – under the watchful eye of the teacher and following the rules of fair use and copyright.

- **Class Web Sites:** (teacher-made and commercial off-the-shelf). Scholastic’s classroom web site builder is but one example of a simple and fantastic way to start communicating online. In minutes you can have a professional looking classroom Web page that parents and students can visit to get information as well as link to online activities. Using office productivity tools available on Window and Mac platforms, teachers can readily design and publish their own classroom web sites with little experience.

- **Synchronous and Asynchronous platforms:** A common, traditional visualization of a synchronous discussion entails students sitting in a classroom together examining the issues at hand. Using technology, students utilize conferencing systems (video, telephone, web-based conferencing tools) to receive instruction and interact with their teacher and peers at a distance. Some learning management systems (e.g., Blackboard and e-College) integrate synchronous environments and tools within their delivery platforms providing a traditional “feel” to the online classroom environment despite the participants being located remotely.
Asynchronous communication is by far the more popular technology-based communications model; barriers to implementation tend to be much lower as asynchronous tools typically demand minimal hardware and software expertise. For many applications, asynchronous technologies provide the desirable flexibility; access to the teaching material can occur at any time and any place. The educational uses of this technology allow the learner time to deliberate, seek additional references, refer to other materials, and prepare more thoughtful comments. Finally, it is cost-effective; asynchronous tools are typically free. Electronic mail, discussion groups, wikis and blogs, and social networking sites are currently the most popular implementations of asynchronous communications.

Good Practice Develops Reciprocity and Cooperation among Students

The increased opportunities for communication with faculty apply equally to student-student interaction. Group projects, study sessions, collaborative learning exercises, and group problem solving can be dramatically strengthened through technology-based communication tools that facilitate such activity. In order to increase student satisfaction and learning effectiveness, students should be supported in both the development of collaborative technology tool use and their competencies as a collaborative group member. Some of the technologies reported in this volume explore ways in which students can participate in activities that require cooperation; assess the challenges and benefits of student cooperation using technological tools; discuss the role of group projects learning and how can technology can support the teacher; and, discuss technology-rich peer review process and how it can enhance student-student and student-teacher cooperation. They include:

- **Collaboration Suites**: Several companies have developed applications that address a range of collaborative needs encompassing tools that may be used autonomously as well as those that are optimized for group work. Collaboration tools include a host of applications (perhaps the widest scope of any of the technologies) ranging from traditional desktop applications for word processing, spreadsheets, communication, or calendaring to course management systems that offer work spaces for their students that embrace discussion boards, file sharing, and peer evaluation tools.

- **Project management solutions**: are multipurpose systems that often tools for collaborative aids for such project-related tasks as critical path, task management and scheduling, time tracking, resource allocation, collaborative writing or editing, communication, file sharing, and process documentation. Such tools are particularly useful for longer term projects where the teacher intends to track group interactions beyond the classroom and develop their students’ work processes and communication skills.

- **Real-Time Communications**: Technologies in this category include web-based presentation tools, screen sharing applications, web, video or audio conferencing tools, and internet-based telecommunications (often called VoIP, or Voice over Internet Protocol. These tools are especially useful for project teams that are geographically separated or who are conducting a significant portion of their assignment at a distance. They allow teams to share work in progress, discuss concepts with the help of rich media, and exchange information and ideas in a manner that more closely approximates the face-to-face experience than traditional text-only communications. (Creative Commons, 2009).
**Good Practice Uses Active Learning Techniques**

Nothing speaks louder to active learning than the integration of instructional technology into the curriculum. The range of technologies that support active learning has increased geometrically over the past decade. The literature offers three categories of active learning technologies. They include tools and resources that encourage: learning by doing, learning by imitation, and learning by modeling. Digitized music is an excellent example of learning by doing. Software-based chemistry and biology lessons demonstrate learning by imitation, and simulation villages and communities allow students to create model cities and societies.

**Good Practice Gives Prompt Feedback**

Feedback is the name of the game when it comes to technology. The ways in which new technologies can provide feedback are limited only by one’s imagination. For example, in this volume of *Advancing Education with Information Communication Technologies*, several chapters deal with such behavioral-oriented disciplines such as math education, engineering, problem-solving, and problem-based learning – each of which provide testimony to the value of prompt feedback and the proper use of technology to foster its application to ensure successful student learning outcomes.

Most distance learning environments promote feedback through the use of such tools as online assessment, grading, and results reporting; a grading center that summarizes each evaluated component of the course and provides a running tally of student progress toward established goals throughout the term; and, authentic assessment tools (e.g., electronic portfolios) that encourage students to critically self-evaluate their own progress, that of their peers, and accept the constructive comments of the teacher. Promptness is oftentimes built into the tools being used for feedback; feedback from an online examination, for example, occurs as soon as the testing period is over. Grades, correct answers, and item responses are made available to students immediately. Other times, prompt feedback is in the hands of the instructor. The tools may be available but the effectiveness of those tools remains in human hands.

**Good Practice Emphasizes Time on Task**

New technologies can dramatically improve time on task for faculty as well as students. Here are just a few examples.

- Turning in homework by electronic files to a file server that can be accessed from any location by either student or teacher.
- E-mailing assignments from a student’s home provides more rapid distribution of assignments. Plus, going paperless allows teachers and students to use the computer to search for documents and files previously handled in filing cabinets and desk drawers.
- Posting assignments on the web or class site allows students to download materials just-in-time and prevents delays caused when students attempt to phone (or even email) their instructors regarding lost assignments and confusing written instructions.
- Utilizing available research materials now more prevalent in on-line and electronic databases than hard-copy library resources. Certainly, access to the Internet has changed the way students from elementary school through post-doctoral conduct research.
• Encouraging students to spend more time on-line in discussions or chats
• Limiting the need for students who live off campus to drive onto university grounds for classes and/or appointments or to work in small or large groups.
• Using calendaring software promotes better planning by students and faculty and allows both to review their appointments and personal commitments in an effort to better control their most precious commodity: time.
• Offering technology (e.g., laptops) to students (or encouraging personal ownership with reduced purchase plans) promotes better use of time. For example, the time between classes on campus encourages students or faculty to check email, work on assignments, take notes in class, etc. Also, personal laptops reduce the learning curve that always comes into play when moving from one machine to another – even if they are the same make and model, the desktop, applications, and network connectivity are always unique.
• Finally, on the administrative side of instructional technology to enhance time on task, using an institution’s web site to check transcripts, registration possibilities, and answer frequently asked questions has proven to be an impressive time on task saver.

Good Practice Communicates High Expectations

Under the general heading of “you get what you pay for,” the use of new technologies often communicates higher expectations. Innovators in schools and companies are often the first to receive the latest technology not just so much in the veiled hope that the technologies will be accepted by the less inspired, but also as a means of confirming the anticipation that increases in productivity, quality, and overall academic excellence will be forthcoming. Working with students produces the same self-fulfilling prophecy. Technology can help establish and model high expectations by employing a variety of tools such as a well-written syllabus, a duly appointed calendar, or real-time assignment posts and grades found in most course management systems. High expectations necessitate setting high standards and learning goals grounded in realistic opportunities for the instructor, students, and the use of technology.

Good Practice Respects Diverse Talents and Ways of Learning

By some counts, there are at least four recognized schools of educational psychology that focus on how we teach and learn. There are another five educational philosophies concerned more with what we teach. Add these combinations to the diverse populations of learners (answering the who we are teaching question) and place all of this in the context of the history (i.e., the when question) of education and you have a considerable number of permutations and combinations of talents to consider. Technology, fortunately, offers modalities for teaching and learning that have come to address more distinct factions of learners than any other apparatus in the annals of educational practice. That said, technology resources are also limited by teachers and their personal preparation in its use. Powerful visuals and well-organized print are common in today’s classroom; unfortunately, so are examples of how presentations have gone awry because the designer did not understand the pitfalls of using too many slides, constructed the text poorly, or violated artistic principles known to even the most novice media arts student.

Educational theory has advanced throughout the 20th century and will, most certainly, continue as we move soundly into the core of the new millennium.
Teaching + Learning = Pedagogy + Technology

Returning to the equation above, 7 chapters in *Advancing Education with Information Communication Technologies* focus on teaching; 8 chapters on learning; pedagogy is the key focus for 6 chapters; and, technology, appropriately, encompasses 8 chapters. Here is a recap of the 29 chapters.

*Teaching* is explored in the first series of chapters.

In **Chapter 3**, Ololube, Ubogu, Egbezor, and Nwachukwu seek to evaluate the tools appropriate for *Evaluating Faculty Teaching of Research Methodology to Undergraduate Geography Students in a Nigerian University*. Their chapter explores the competencies (and therefore the precise tools themselves) required to teach research methods.

**Chapter 4**, *Teachers and Technology: Enhancing Technology Competencies for Preservice Teachers* (Blankson, Keengwe, and Kyei-Blankson), reviews the content knowledge required for students to use appropriate technology. The chapter identifies the critical content subject matter and compares the related technology competencies with standards offered by the International Society for Technology in Education (ISTE).

**Chapter 5**, *Information and Communication Technology Training among Lecturers in the South-South Zone in Nigeria by the Nigerian Communication Commission* (Aghwotu, Emiri, and Tiemo) uncovered the ICT literacy skills required of lecturers and gathers them in a proposed training program that could be offered to higher education instructors.

**Chapter 6**, *Perceived Importance and Resource Constraints of Graduate Information Systems Courses in Turkey* (Balaban, Kirlidog, and Ayvaz-Reis) examines master’s level information systems courses and the technology-based teaching resources used by faculty in one country. Authors consider the importance of these tools and offer a unique perspective into the strengths and limitations of technologies for teaching.

**Chapter 13**, *Improving Teachers’ Self-Confidence in Learning Technology Skills and Math Education through Professional Development* (Hartsell, Herron, Fang, and Rathod). In this chapter, the authors spotlight math teachers and their use of technology for their own professional development for classroom instruction. As such, the chapter was placed under Teaching. Also discussed, however, was their examination of how technology helps students develop their problem-solving skills and math comprehension.

In **Faculty Training Strategies to Enhance Pedagogy-Technology Integration** (Keengwe, Georgina, and Wachira), **Chapter 16** focuses on faculty technology literacy and the integration of technology into traditional classroom instruction. A two-tier training program is introduced for your consideration.

**Chapter 24**, *Problem-Based Learning in a Technical Course in Computing: A Case Study* (Correia & Watson), outlines how problem-based learning is used in teaching technical computing courses; another example of the teaching with technology at work.

*Learning*. With its focus on the student, the next series of chapters examine a set of aptitudes that includes a host of technology based tools that were inconceivable just a decade ago.

In **Chapter 7**, *Enhancing Students’ Loyalty to the Information Systems Major*, Hunsinger, Land, and Chen identify four factors leading to student retention in the IS major and investigate how collaborative tools impact of the success of these factors to recruit and retain top-notch candidates.
In Chapter 9, Technology and Teacher Education: Student Evaluation of Faculty Instructional Quality, by Akyeampong, Franklin, and Keengwe tie together technology-based tools and learning. The chapter excellently depicts various technologies for learning and how presentation and productivity tools can be used by students (as well as faculty) to promote successful learning outcomes.

In Chapter 10, Facilitating Students to Earn Computing Certificates via Blended Learning in Online Problem-Solving Environment: A Cross-Course Orientation Comparison, Tsai regards professional certifications in the country of Taiwan – a country where online courses are not yet permitted. Offering the reader some initial considerations of the effects of applying blended learning methodologies with various references on student computing skills, the author explored the most likely combinations of methodologies for learning computing content. The results are as might be expected: the addition of blended learning resulted in significantly higher grades. How they obtained those increases mark the truly important contributions of this paper.

Chapter 12, A Cross-Cultural Validation of the Selwyn’s Computer Attitude Scale, written by Timothy Teo, scrutinizes the use of a widely accepted scale to discern attitudes toward the use of technology among students.

Student Nurses’ Perception on the Impact of Information Technology on Teaching and Learning, Chapter 19, (Kandeel & Ibrahim) delves into the impact of an information technology-enhanced curriculum on critical care nursing. Candidate nurses found the need for more technology training using the Internet and presentation tools along with IT resources in their classrooms.

Chapter 21, Evaluating Student Perceptions of Using Blogs in an Online Course (Gullet & Bhanda) is a must read depiction of an online MBA program and its use of blogs to support student learning. The results of the study accompanying this chapter brings the reader a host of student perceptions that indicate their openness to the use of blogs coupled with serious concerns regarding their suitability as replacements for discussion groups and online discussion boards.

Chapter 23, An Empirical Study to Validate the Technology Acceptance Model in Explaining the Intention to Use Technology among Educational Users, also written by Timothy Teo, employs the TAM model to predict pre-service teacher’s use of technology; in this case, predicting how, as learners in an educational preparation program, these students accept the adoption of technology as a viable instructional strategy.

Investigation into Gender Perception toward Computing: A Comparison between the US and India, Chapter 25 (Laosethakul, Leingpibul, and Coe), probes the impact of computer anxiety and computer self-efficacy on gender decisions to pursue computing as an avocation. Females in particular are prone to increased participation in the discipline as a result of implementing some of the recommendations and suggestions found in this chapter.

Pedagogy. A look at pedagogy centers on identifying appropriate technology-based resources for the classroom from among the growing cache of computer hardware, educational software, electronic journals and publications, and Internet sites already available.

Chapter 1, Instructor Satisfaction with Teaching Business Law: Online vs. Onground (Swartz, Cole, and Shelley) offers the reader the results of an exhaustive survey of business law instructors who have taught online and on-ground, examining the level of instructor satisfaction against pedagogical, social, technical and managerial benchmarks. Here is one academic discipline that did not fare as well online than it did with the more traditional modality of classroom delivery.
Chapter 8, *User Interface Design Pedagogy: A Constructionist Approach*, by Khoo introduces the pedagogy associated with designing human interfaces and provides a solid argument that learning is best accomplished when students construct their own learning experiences. The chapter suggests technologies for teaching, taking such traditional, teacher-made tools as text and visual-based materials and preparing students to develop their own learning resources.

An Examination of the *Effectiveness of International Distance Education in High School Between Thailand and Japan* by Pavarajjanant deliberates on the value of courses using ICT and based on sound educational theory and student feedback. In *Chapter 17*, the author shares a review of a distance learning project based in these two countries integrated with traditional lecture, self-learning exercises, and collaborative learning pedagogies.

*Chapter 18* by Sankar & Clayton, *An Evaluation of Use of Multimedia Case Studies to Improve an Introduction to an Information Technology Course*, looks at the integration of certain technologies, applications, data, and business activities to help non-IT students realize the benefits of technologies in their chosen career fields.

Closely akin to the research is *Chapter 20*, *Technology Integration and Urban Schools: Implications for Instructional Practices* (Kidd & Keengwe). In this chapter, readers will reflect on the inequities and disparities between various classes of schools with respect to technology-based practices, resources, training, and professional development.

*Emerging Trends and Technologies for Enhancing Engineering Education: An Overview* reveals some new technologies that can enhance pedagogy in the field of engineering (that also apply to many other hard science-related disciplines). In *Chapter 26*, Sidhu & Kang share some excellent examples of the problems faced by engineering faculty and students and some ways in which technology can help overcome those barriers to learning.

Technology. In his book, *The Age of Spiritual Machines,* Ray Kurzweil (1999) purports how trends affecting humanity throughout the millenniums advanced arithmetically – at least initially, with new and evolving features doubling and tripling at first. After some time, nearly all trends take on geometric advances as they continue to grow and mature at a faster and faster rate. This theorem has been proven time and time again – the most prevailing trend, of course, being technology. Technology continues to advance at a now-geometric rate supported by the evolution of the Advances in Information and Communication Technology Education Series as it, too, has moved from Volume 1 to this newest body of work. It makes perfect sense that the majority of chapters accompanying this edition concern themselves with technology for teaching.

*Chapter 2*, *Digital Video Presentation and Student Performance: A Task Technology Fit Perspective*, explores today’s video technologies in light of their task match (appropriateness to the classroom situation), ease of use (by teachers and students), and ease of learning (and, therefore, teaching as well). Research conducted by Raven, Leeds, and Park demonstrate a relationship between the effective use of digital video tools and improved oral presentation skills and, thereby, student performance in the classroom.

Serving as a “bridge” to our discussion of distance education, Giotopoulos, Alexakos, Beligiannis, and Stefani present *Bringing AI to E-Learning: The Case of a Modular, Highly Adaptive System* in *Chapter 11*. The chapter describes in detail the innovative contributions that artificial intelligence can make to distance education; in effect, making it more “intelligent” for the teacher and the learner.

Chapter 15, *Enhancing Teaching and Learning with Digital Storytelling*, explains the fruits of integrating digital storytelling into the curriculum. In their chapter, Want & Zhan present the benefits and challenges of this media as a means of winning students over to a program of reflective, active and personally meaningful study.

Chapter 22, *Applications of Mobile Learning in Higher Education*, employs an empirical study to survey the current uses of mobile technologies in higher education and their potential in e-learning environments.

In Chapter 27, Negash’s research on *Accessing ICT Enabled Content in Low-Income Countries: Think Big, Start Small, and Scale Up*, examines how low-income countries can harness technology to tackle a host of issues including, but not limited to, a lack of access to knowledge and learning and sustainability.

The next chapter investigates *The Role of Computer-Mediated Communication: A Look at Methods for Delivering and Facilitating Training in Academic and Organizational Settings*. Chapter 28 discusses how technological advances continue to alter the various ways in which educational and corporate training is conducted. CMC’s theoretical approaches, types and roles, benefits and shortcomings, and contributions are explored.

Podcasting is spotlighted in Chapter 29, *Faculty Adopters of Podcasting: Satisfaction, University Support and Belief in Podcasting (Yang)*. In this chapter, the author examines the growing use of iPods for academic purposes. As an educational tool, podcasting is a fairly straightforward process providing ubiquitous benefits to students not unlike the printed text book.

**CONCLUSION**

Arguably, technology has already impacted the discipline of education to an extent not witnessed since the 15th century invention of the printing press. Technology is a literacy — a set of skills and competencies much like reading, writing, and grammar. It has become perhaps the most ubiquitous media for collaboration exceeded (at least for now) only by the printed text. We use technology to introduce the fundamentals of decision-making to our students in the hopes that they will apply these lower order skills to infuse technology-based resources into their own personal learning styles.

For teachers, technology has advanced our “bag of tricks;” the host of instructional teaching strategies used to address the various ways our students learn. Technology for teaching encourages faculty to stretch their inventory of tools used in the classroom, adding visual presentations, pre-selected text-based materials, web-enhanced content, and a plethora of media-rich resources.

Technology can also be considered its own academic discipline. Ponder for a moment how instructional technology has opened so many doors (while perhaps, closing others); destroyed former barriers to learning for many (while constructing impediments to others); and, created a culture that is certainly more inclusive than any we have experienced in prior generations (while leaving still others even further behind).

Books such as our *Advances in Information and Communication Technology Education Series* are imperative to the literature, providing readers with access to the latest trends and newest applications
demanded in today’s educational environment. In this Volume 6, we explored the fundamentals of teaching and learning on one side of our equation and key pedagogies and technologies on the other. The equation provides an organizational tool (an advanced organizer, if you will) for the discussions in the remainder of the book. Learn more about a host of instructional technology in the chapters that follow.

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