Technological advances in telecommunications combined with Web-enabled technologies have created a new technology known as “Internet Communications Technologies (ICT) & Teaching Technologies.” This new technology has changed the concepts of education. Asynchronous Network Learning (ANL), Web-based education (WBE), and eLearning are different names for education on the Web. WBE is becoming so popular that many for-profit colleges and universities are emerging, providing stiff competition to traditional universities. Public and private colleges and universities, from all over the world, are facing the many challenges and opportunities offered by this new technology-based concept. WBE is diffusing across disciplines, curriculums, levels, and even national boundaries. WBE is not limited to the privileged few. Like any emerging technology, “ICT and Teaching Technologies” is not free from problems, controversies, and challenges. There are proponents and opponents of Web-based education, generating anxiety but also some interesting discussions. As many new universities are joining WBE, many old ones are failing. It is important for educators to be aware of the discussions and learn from the successes and failures of the early adopters. The first wave of WBE concentrated on the “what” of WBE, and the next generation is focusing on the “how.”

**WHY THE BOOK?**

Like any new merchandise or service, WBE is going through its own “product” life cycle. In the first stage of WBE, emphasis was focused on the “newness” of the technology, and there were few early adopters. WBE was being pressed into what marketers have called “technology push.” However, this is changing. As the number of online students keeps increasing, many for-profit universities are emerging and forcing traditional universities to focus more on the student. Like e-commerce, e-education is becoming “customer” oriented. The customers in this case, of course, are the students. In the second phase of WBE, we are seeing more of a “customer pull.” Students are demanding quality education on their terms, often with the desire for online convenience. The education pedagogy is changing from “brick-and-mortar” to “click-and-click.” Institutions are taking instruction to the customers, with education becoming time, place, language, distance, and status independent. This pedagogy is creating a completely new and unfamiliar learning environment. Roles, expectations, and interaction among students, faculty, and administration are suddenly different and experimental. Lines of communications are changing. Many early adopters have learned valuable lessons in institutionalizing WBE.

The main objective of this book is to assist the reader in better understanding the practices of the early adopters and to address issues such as, trends, opportunities, and problems facing colleges and universities in effectively utilizing and managing ICT and teaching technologies. The chapters of this book are a compilation of the experiences, knowledge, and research findings of the early adopters of WBE.
BOOK AUDIENCE

This book is intended for anyone interested in developing and institutionalizing WBE. Issues, technology, and how WBE is evolving, both locally and globally, are discussed. And, the factors involved in moving from a synchronous to an asynchronous learning environment are addressed. Greatly beneficial are the authors’ descriptions of their experiences, presented with the many questions raised in the first phase of WBE, which provides guidance for individuals and institutions interested in developing, offering, and managing Web programs. This book is also meant for researchers already conducting or looking for new research topics in WBE. With new, challenging ideas presented, further research is encouraged. In many of the chapters, recommendations for further research in specific areas are presented.

BOOK STRUCTURE

Any emerging technology must be defined, the issues must be addressed, and the theories must be tested and validated. I used the same concept in dividing this book into five sections. In the first section, questions around what we have learned from our experiences, where we are, and what can be expected in the future are answered. In the second section, technology and ways it can enhance Web teaching are identified. In the third section, design issues in the development of WBE are discussed. In the fourth section, Web diffusion across disciplines is discussed, and experiences of researchers in various classroom settings are provided. In the final section, diffusion across boundaries is discussed, and insights into ongoing experiments in WBE are provided.

- WBE: An Overview, Current and Future
- WBE: Enhancing Technologies
- WBE: Design Issues
- WBE: Diffusion Across Disciplines and Communities
- WBE: Diffusion Across Boundaries (Case Studies)

These sections are created for the reader’s convenience only. The issues discussed are not isolated, and there are overlapping ideas and concepts among each of the sections.

The first section, “WBE: An Overview, Current and Future,” consists of five chapters. In these chapters, currency and potential issues based on authors’ experiences are discussed. In several chapters, the currency of WBE in the second stage of its life cycle and how WBE needs to be institutionalized to survive and to move into its next stage are discussed. Aggarwal discusses the institutionalization of WBE. He argues that virtual students are opting for a “complete” online education and are demanding virtual convenience from admission to graduation. Aggarwal discusses each of the steps involved in institutionalizing Web education from the perspectives of the three major stakeholders—the faculty, the student, and the technical personnel—and talks about ways of providing online conveniences based on his experiences. Huerta, Ryan, and Igbaria present a theoretical framework for understanding the Web-based learning (WBL) phenomenon, based on disciplines other than education. From the organizational communication field, the authors propose media richness and social influence models to assist in understanding the factors affecting media communication choice in WBL. From the managerial discipline, they propose the theory of knowledge reuse to understand the managerial challenges that instruc-
tors face when creating knowledge repositories for WBL. Finally, from the information literature perspective, they offer the information structure framework to assess the adequacy of the information for a particular situation. Klassen and Vogel discuss the sound pillars of ethics for the mass production of e-education. They talk about ethical issues regarding student–student and student–faculty interactions, and discuss assessment of learning, the potential problems and possible solutions. Clulow and Brace-Govan provide perspectives from students and staff who have experienced learning and teaching in a Web-based environment. Based on their experience, they discuss a number of indicators for improving WBL, including development of faculty and preparation of students for an online learning environment and for student-centered Web-based design. Raisinghani discusses the WBE strategy for academia from a global perspective. He presents a transnational model for Web-based education and draws the parallels between industry and academia with respect to virtual organizations. In addition, he takes a closer look at some predictors of teaching and learning issues as extrapolations of current trends.

The second section, “WBE: Enhancing Technologies,” consists of four chapters that look at various current technologies and their usage in WBE. In this section, the authors’ experiences with Web-enabling hardware and software technologies are discussed, and guidance to their seamless integration in WBE is provided. Klassen discusses design of autonomous language learning courseware based on the constructivist view, where learners only learn how to learn when they are actively involved in the educational process. Her focus is on producing an interactive multimedia package, Virtual Language University, for English-language learning in the context of the general format, coding, and creation of templates, graphics and animation, video specifications, and task interaction. Roldan argues that handheld devices are attractive for educational settings because they are inexpensive, portable, and customizable. He also suggests that the information management and connectivity features of these handheld devices make them ideal for the WBE learning environment. Parikh argues that the Web is only one of many Internet technologies and goes beyond the Web to leverage multiple Internet technologies to support in-class education. She discusses common problems in Web-based education, presents an experiment in developing and implementing a framework that seamlessly integrates various Internet technologies, and describes the increase in learning effectiveness yielded by the new methodology. Sauter reports on an action research project using the Theory of Planned Behavior (TPB) to help manage the process of encouraging faculty to utilize Internet tools in the implementation of their classes. Her research provides an in-depth examination of an innovative experiment to impact the process of faculty website development, faculty training, and faculty support, reflected in terms of the TPB framework.

The third section, “WBE: Design Issues,” consists of five chapters. WBE is changing the educational pedagogy, requiring new ways of assessing, mentoring, and facilitating education. Self-centered learning is becoming the norm. Roles are changing, faculty is facilitating instead of delivering lectures, and students are self-learning instead of listening to in-class lectures. Moving from traditional teaching to the WBE requires mapping (not necessarily 1:1) or transformation from one medium to another. Student assessment is probably one of the most important issues in teaching. Traditional exams and classroom monitoring are not feasible or even desirable in WBE. New creative methods need to be developed to assess student learning. In addition, faculty, students, and administrators need support and training for this new WBE environment. Bento and Schuster propose taxonomy for classifying different types of participation in online courses and discuss the pedagogical issues involved. Born examines ways of evaluating students in a Web-based
teaching and learning environment. Two techniques, summative and formative, are introduced and discussed, together with related issues including delivery and submission, evaluation and feedback, and dealing with cheating. She also provides guidelines and recommendations for developing and delivering effective Web-based student assessment. Neville, Adam, and McCormack provide an example of a university and an organization collaborating to implement successful training and learning programs. This joint partnership is formed in order to develop employee skills and knowledge in IT and managerial issues, such as knowledge management. The case provides guidance for developing an appropriate platform with which to design an interactive learning environment to mentor distance learners, with the potential to eliminate the barriers imposed by the traditional classroom. Beuschel, Gaiser, and Draheim provide an assessment of the formal and informal aspects of communication in Web-based learning environments. They stress the importance of organizational and technical support of informal communication as an important issue in Web-based education. Baker, Schihl, and Aggarwal propose the development of an integrated educational support system infrastructure to assist WBE students from application to graduation. They argue that such support systems should address the many aspects of the teaching and learning processes.

The fourth section, “WBE: Diffusion Across Disciplines and Communities,” consists of four chapters. WBE is moving into its second stage and spreading at an unprecedented pace. It is diffusing across disciplines from business to law, and across educational levels from universities to high schools. The authors’ experiences in different course settings are presented. Pareja-Flores and Velázquez-Iturbide discuss WBE diffusion in a programming course. They contend that programming is a demanding task that requires education with the assistance of complex tools, such as programming environments, algorithm animators, problem graders, etc. They provide a comprehensive presentation of the tools for program execution and visualization on the Web. The authors also discuss the technical evolution of these tools, describe educational uses, report on lessons learned, and look at formal evaluations of their educational effectiveness. Benrud discusses WBE diffusion in a finance course. He explores how characteristics of individual students and each section of students can be determinants of student success in a Web-based finance course. He developed a statistical model that has significant explanatory power for variation in performance on individual grade components, such as quizzes, tests, and projects. His findings suggest that developing online discussion skills prior to the start of the course will enhance student performance in other areas of a Web-based finance course. Speaker and Kleist discuss diffusion in an electronic commerce and MIS class. They cover a technical description of a multilocation, top-of-the-line distance-learning facility, and they introduce research that explores critical success factors for technology-assisted use in learning for MBA students. Their results, from a study of 2898 student responses across 117 classes, indicate that certain aspects of information technology may facilitate and enhance perceptions of student learning, despite the challenges of the location disconnect. In addition, they describe a specific case of a mass customization-style educational IT, deployed in a face-to-face environment for a highly compressed MBA class on electronic commerce and MIS. Drinka and Yi-Miin Yen discuss diffusion in a capstone project-based course. They discuss a variety of Web-based technologies that were used to support students in their project development efforts, thereby realizing the benefits of project-based courses, while ensuring project success. They demonstrate how students in a project-based capstone course used technology to assist them in developing community-based information systems. Tan Wee Hi and Subramaniam discuss diffusion in nonformal educational environments. They
reason that the virtual annexes by many science centers have given rise to a new genre of
learning in Web-based education. They argue that to enhance the outreach effectiveness
of nonformal science education initiatives among students and the public, these virtual
science centers fulfill a useful role in promoting the public understanding of science. They
use the Singapore Science Center as an example with which to explore the topic in detail.

The fifth section, “WBE: Diffusion Across Boundaries (Case Studies),” consists of
six chapters. WBE is not only diffusing in the United States, but it is also gaining popularity
worldwide. The case studies provide insights into experiments being conducted in many
areas, across disciplines, all over the world. Kamel and Wahba discuss their experience of
the Global Campus (GC) project, a collaboration between the Regional IT Institute (Egypt)
and Middlesex University (United Kingdom). The project’s aim was to deliver postgraduate
education to the communities in Egypt, Hong Kong, and the United Kingdom, while capital-
izing on cutting-edge information and communication technology. They demonstrate the
lessons learned from managing a model for a globally extended enterprise in the education
sector, through a partnership agreement between the different parties that capitalizes on the
opportunities enabled by the Internet. Wong, Gerber, and Toh examine and compare the
diffusion of WBE in Singapore and Australia. Their analysis reveals that although Singapore
and Australia are different in their approaches and policies to education and technology,
they share similar trends and achievements in the development of WBE. Tertiary institu-
tions in both countries have generally achieved all the characteristics of Generations 4 and
5 of the development model of Distance Education as described by Taylor’s model. Valenti,
Panti, and Leo discuss how Web-based Instructional Systems (WbIS) models could be
used to implement “real-life” examples of instructional systems. They discuss each phase
of the Instructional Systems Design (ISD) with respect to the implementation of a WbIS for
training specialists in Motor Disability Assessment (MODASPECTRA). Klein, Sommer,
and Stucky argue for an integration of Web-based and classical education, and present
WeBCEIS—our blended learning scenario for integrating Web-based education into classi-
cal education—looking at the organizational and the technological aspects of teaching and
learning, and our strategy for the implementation of WeBCEIS. Klobas and Renzi discuss a
project at Bocconi University. The project is presented as organizational innovation and
provides comparison with the stages of the Rogers’ model of diffusion of innovations.
They argue that the key conditions for success are top management commitment and
involvement. In addition, they suggest other important requirements, such as an environ-
ment that supports innovation and change, an appropriate ICT infrastructure, and appro-
priate use of innovation, flexibility, and teacher preparedness. Lammintakanen and Rissanen
discuss an evaluation of the experiences of two student partners and their teachers with
Web-based education at a university in Finland. Finnish national education policy and
some crucial issues concerning Web-based education were used in the framework for the
evaluation. Their results indicate that the students’ and teachers’ experiences were largely
positive and correlated with the results of other international research in this field.