As the Internet, rich media, social networking, portable devices, and other networked resources are increasingly used for e-learning, learning is expected to become increasingly interactive and flexible. Technology advancement not only opens up more affordances for interactivity but also changes the ways people interact with the media and with one another through media. Virtual space is continuing to expand with mobile computing and rich media development. People’s perception and manipulation of time and space is evolving too. More media and modes of communication are becoming available for both synchronous and asynchronous interactivity. People’s interactivity with media and with one another through media will become increasingly permeative and ubiquitous.

Interactivity can take place between human communicants mediated through an information carrier. Interactivity can also take place between a human and an information carrier without the direct involvement of another human. The former is qualitatively different from the latter primarily in terms of input and response spontaneity. In this book, interactivity is defined as mediated interaction that involves reciprocal message exchange between human communicants or between a human and an information carrier which can be any media, computer application, networked resource, and telecommunication device that carries information and can interact with a human.

Interactivity can be analyzed in terms of media attributes and affordances, distributed cognition, learner control, system adaptability, usability, spontaneity, and synchronicity. Much effort has been expended on classifying and topologizing interactivity from the perspective of media studies and information science. Empirical research work can also be found on interactivity in business website design to attract customers. Despite the efforts to categorize and classify interactivity, the concept of interactivity remains diverse and elusive. There is a lack of consolidated endeavor to put the studies of interactivity in related perspectives, to let findings from one field shed light on another, and to connect theoretical and empirical research to the practice of e-learning.

The current book addresses the issues mentioned above. The first objective of the book is to clarify the concept of interactivity, delineate its scope, and come forth with a definition and description that can be more readily applied to further research and practice in e-learning. The second objective is to propose a pragmatic framework for studying and promoting interactivity in e-learning. The third objective is to present the reader with a holistic view of interactivity, with different perspectives complementing and supplementing each other, providing a basis for conceptually and pragmatically informed design of interactive e-learning environment and boosting further research on interactivity in e-learning.

The book is intended for a broad range of audiences, including undergraduate and graduate students, instructors, professionals, and researchers working in the fields of communication and media, educa-
tional media, e-learning, and instructional technology. The book can also be a comprehensive library reference for the general audience.

**ORGANIZATION OF THE BOOK**

The book is organized into three sections: instructional design to promote interactivity, educational games, and interpersonal interactivity through media.

**Section 1** includes a collection of articles that explore important areas of interactivity design in the e-learning environment and introduce innovative attempts to promote interactivity in e-learning. In Chapter 1, Haomin Wang of Dakota State University takes an integrated approach by looking at key factors that contribute to effective interactivity in interrelated perspectives for a holistic view of interactivity, with a particular interest in connecting media attributes and system affordances with distributed cognition, cognitive process, and collaborative learning. The focus is on studying how information exchange can be shaped by media and how media can be utilized and learning sources designed to support learning in interactive manners. It is hoped that this initial framework could be expanded and improved to become a conceptually helpful and pragmatically usable guide for interactivity design in e-learning.

Varied approaches have been taken and frameworks proposed for examining interactivity. In Chapter 2, Kamran Sedig and Paul Parsons from the University of Western Ontario identify and elaborate upon 10 structural elements of interaction that affect the interactivity of information representations. Each of these has an effect on the learning and cognitive processes of learners, and the overall interactivity of an e-learning environment is an emergent property of a combination of these elements. Collectively, these elements can serve as a framework to help thinking about design and analysis of interactivity in e-learning.

Media are becoming increasingly enriched with dynamic and interactive content. Immersed in virtual reality, rich media can be a powerful tool to simulate real-life like context and facilitate authentic learning. Chapter 3, by a group of scholars from the Capella University, presents a case that shows how the use of rich media and virtual reality can enable the presentation of a real-world scenario where skills and new knowledge can be applied in a safe-to-access practice situation.

Student engagement is a key attribute of interactive learning and can be greatly enhanced by providing authentic learning environment. In Chapter 4, Deb Gearhart of Troy University offers an overview of authentic learning that includes a literature review and discussion of the benefits for online learning. The chapter also provides a model for the use of authentic learning in online course design.

Learning style matching has long been believed a good way to meet learner needs and preferences. Chapter 5, by Robert Zheng from the University of Utah, presents an interesting finding: style matching did not necessarily provide learning gains for learners with different cognitive styles. Rather, cognitive skill development could be more constructive in helping students learn. This finding is expected to encourage instructional designers and instructors to reconsider the long-held belief about learning style matching and give more attention to cognitive skill development.

Another important dimension of student engagement is maintaining an appropriate level of challenge through a learning process. If a learning process is too easy, students tend to lose interest and motivation. On the other hand, when a learning process becomes too difficult, students may get frustrated, and their cognitive performance tends to be affected. Authored by Ge, Law, and Huang from University of Oklahoma & the University of North Texas Health Science Center, Chapter 6 is an endeavor to tackle
a major challenge in maintaining an appropriate level of challenge: scaffolding, or more specifically promoting, dynamic and just-in-time help for learners in an interactive manner.

Using the Buddhist Eightfold Path as a model, Chapter 7, by Julie Shaw of the Empire State College of SUNY, explores the expert-novice paradigm as a framework for helping novice become expert in the e-learning environment, particularly through instructional design that can both scaffold novice instructors to teach to a higher level of learning, and also support experts to help students reach higher goals.

Section 2 explores an emerging field that holds great promises for promoting learner engagement and interactivity in e-learning: educational gaming. Chapter 8, by Betül Özkan Czerkawski from University of Arizona, provides a brief introduction to the basic concepts and terminology of gaming and then gives a review of the current status of educational games and simulations used in higher education institutions. Three case studies are provided to present examples. The chapter concludes with a discussion of teaching strategies, instructional design methods, and assessment issues for effective digital game incorporation in e-learning.

Following up on the instructional application aspect of educational games, In Chapter 9, Michelle Aubrecht of Ohio State University presents three approaches to using games for teaching and learning: (1) an instructor makes a game for a specific learner outcome, (2) students make a game, and (3) an instructor uses a commercial or online game. The chapter emphasizes the second and third methods. Specific examples of how games are used with students are provided to illustrate ways to teach with games.

In a digital game-based learning system (DGBLS), learners are often immersed in a large amount of stimuli that can distract or disrupt the intended learning processes. Chapter 10, by Wenhao Huang from University of Illinois at Urbana-Champaign and Dazhi Yang from Boise State University, proposes a process framework to empower learners to autonomously manage their interactivity with the DGBLS in order to stay focused on the learning tasks. The framework draws literatures on learners’ motivational processing and cognitive processing pertaining to learning in a DGBLS.

As proposed by some other authors in this volume, interactivity should be assessed and evaluated in terms of its effectiveness in promoting intended learning objectives. Authored by Jillianne R. Code from University of Victoria, Jody Clarke-Midura (Harvard University), Nick Zap (Simon Fraser University), and Chris Dede (Harvard University), Chapter 11 presents a framework for the design and validation of interactivity in serious games and virtual worlds as they are linked to learning outcomes. Illustrated through a case study, the chapter aims to provide educators, designers, and researchers with a model for how to effectively design immersive virtual and game-based learning environments for the purpose of assessing student inquiry learning.

Section 3 involves another fast-growing field in education, particularly in e-learning: social networking. Among the various modes and tools of social networking are online forums, web conferencing, blogs, wikis, and virtual community. Chapter 12, by Ruth Guo from Buffalo State College, SUNY, is a case study that presents a constructivist approach to creating an interactive learning environment for graduate students in a course designed to help students construct knowledge and skills for developing professional web sites. To make up for the lack of time for practice and tutoring, online forums are used for participants to discuss the issues important to them. The study shows that practical action research combined with social interaction can shed light on important issues of professional development through reflection on practice.

A virtual community is an essential condition for interpersonal interactivity in the e-learning environment. In Chapter 13, Terri Edwards Bubb, Denise McDonald, and Caroline M. Crawford of University of Houston at Clear Lake explore learner virtual community development in which meaningful con-
Connections enhance learner motivation and acquisition of learning objectives. The chapter focuses on the interactive activities between the instructor, learners, online environment, and larger community. Practical instructional ideas and activities for building an online learning community are presented.

Function authenticity is often a key factor that affects the productivity of a learner community. In Chapter 14, Aaron Wiatt Powell suggests that the greatest challenge to intentional Community of Practice (CoP) is a sense of interdependence among CoP members, the authenticity of the practice or purpose, and a trajectory for the CoP’s future. The chapter presents a case study with an initiative to nurture CoP with cooperative projects and with the support of an online community portal involving a cohort of practicing teachers. The chapter examines the support of social interaction in a cooperative, situated online learning environment, and the cultural barriers that hinder such intention and interactivity.

For virtual community interactivity, synchronous communication is becoming increasingly available. Chapter 15, by Sheila Bonnand and Mary Anne Hansen of Montana State University, is a report on extending library’s instructional services by adding synchronous communication to better serve its online students and faculty located across the globe. The web conferencing tool enables the librarians to provide interactive, high-touch library instruction for online students, making librarians more readily accessible to online and distance students.

Haomin Wang
Dakota State University, USA