Advances in both cognitive psychology and computing have affected the educational arena. The convergence of these two disciplines is increasing at a fast pace and affecting academia and professional practice in many ways. Paradigms such as just-in-time learning, constructivism, student-centered learning, and collaborative approaches have emerged and are being supported by technological advancements such as simulations, virtual reality, and multi-agents systems. These developments have created both opportunities and areas of serious concerns. The CELDA (Cognition and Exploratory Learning in the Digital Age) have been targeting the convergence of advances in cognitive psychology and ICT (information and communications technologies), especially with regard to the implications for learning and instruction, for the last 6 years (http://www.celda-conf.org/).

The chapters included in this edited volume were selected based on peer ratings of papers presented at the CELDA (Cognition and Exploratory Learning in the Digital Age) 2008 Conference in Freiburg, Germany, in October 2008. Only the top 30 papers were considered. The authors were invited to expand and modify their papers based on feedback received at the conference from participants and from the editors and their reviewers. Seven of the best papers ended up as a special issue in Educational Technology Research and Development (ETR&D) appearing in 2009 with Ifenthaler, Isaías, Spector, Kinshuk, and Sampson as guest editors. Nearly all of the remaining best papers are included here. These papers underwent a review process very similar to that used by ETR&D.

CELDA 2008 included the typical CELDA thematic areas such as acquisition of expertise, assessment, collaborative learning, exploratory technologies, learning communities, learning paradigms, lifelong learning, technology and learning, and virtual worlds. Of particular interest and focus at CELDA 2008 were topics such as learning in complex domains, mental models in learning, student-centered learning, and Web 2.0 in learning and instruction. Three of these themes – assessing learning in complex domains, cognition in education, and technology and mental models – formed the basis for the ETR&D special issue, which should be considered as a companion to this volume.

We organized the chapters included in this volume around five themes: (a) cognitive approaches to learning and instruction, (b) knowledge representation and
mental models, (c) technology-facilitated tools and technologies, (d) communications and methods, and (e) integrative methods and online learning. Each of the editors took lead responsibility for reviewing and editing the chapters associated with one theme. The reviewers who contributed are recognized at the end of the Contributors’ section.

This is the first edited volume to result from a CELDA conference. Every CELDA conference has resulted in a special issue of a journal, and we hope to continue that tradition. When we have so many outstanding papers as were presented in Freiburg, we will certainly seek to also have an edited volume, as this benefits the entire professional community.

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