Preface

This is the first international handbook on the topic of metacognition and learning technologies. We are proud to have been invited by Springer to coedit such an important two-volume international handbook. The handbook represents the best cutting-edge interdisciplinary research from leading scholars across the globe. The ubiquity and widespread use of learning technologies across various settings (e.g., classrooms, informal settings, and research laboratories) necessitate a theoretically guided and empirical basis for their use for learning and instruction. It has become clear in recent years that learners' self-regulatory and metacognitive processes are a key influence on their learning outcomes with computer-based learning environments. A deep understanding of the relations between self-regulation, metacognition, the design of learning environment, and learning outcomes is therefore highly desirable from both a scientific and a practical perspective. This fundamental requirement has led dozens of interdisciplinary researchers to focus on understanding, measuring, supporting, and fostering metacognition and self-regulated learning in individual and collaborative groups. As such, the timely publication of this handbook is critical since it is the first to document the most influential interdisciplinary research on the topic from researchers in the fields of educational psychology, learning sciences, computing sciences, artificial intelligence (AI), cognitive psychology, human–computer interaction (HCI), educational technology, educational data mining, engineering, mathematics education, science education, teacher education, and literacy.

We hope that the handbook will be viewed as a standard of scholarship for conceptual, theoretical, empirical, and applied research in the several areas related to learning technologies and metacognition. This handbook is targeted as a resource; as such it should appeal to a broad interdisciplinary audience, including researchers, professors, graduate and upper-level undergraduate students, instructional designers, curriculum developers, teachers, and anyone else interested in learning about learning technologies and metacognition. Our handbook can be used as the primary textbook for a graduate-level course in metacognition and learning technologies. It can also be used as a supplement for graduate courses on cognition, metacognition, learning, learning sciences, theories of learning and instruction, human–computer interaction, artificial intelligence (AI) in education, educational technology, and measuring complex cognitive, metacognitive, motivational, and affective processes prior to, during, and following learning and problem solving.

The *International Handbook of Metacognition and Learning Technologies* has 46 chapters thematically structured across seven sections: Models and Components of Metacognition, Assessing and Modeling Metacognitive Knowledge and Skills, Scaffolding Metacognition and Learning with Hypermedia and Hypertext, Intelligent Tutoring Systems and Tutorial Dialogue Systems, Multi-Agent Systems to Measure and Foster Metacognition and Self-Regulated Learning, Individual and Collaborative Learning in Classroom Settings, and Motivation and Affect: Key Processes in Metacognition and Self-Regulated Learning. Each section contains a varying number of chapters, ranging from four to nine, written by leading scholars in each topic area. The difference in the number of chapters across each section is representative of the focus of research in the area of metacognition and learning technologies. For example, there are nine chapters in the section on scaffolding metacognition and learning with hypermedia and hypertext because this area has traditionally been a dominant area of research. By contrast, there are only five chapters in the motivation and affect section because this area of research has been emerging more recently; it is our opinion that it stands to contribute immensely to our understanding of the role of metacognition and learning technologies.

Our greatest challenge was assembling the finest collection of contributors to the handbook. We as editors are extremely impressed with the quality and diversity of the chapters that are collected in this handbook. It is our profound hope that the readers of this handbook will find the chapters as stimulating and gratifying as we found them when assembling the handbook. Happy reading! Please don't forget to monitor as you read.

Montreal, QC, Canada   Roger Azevedo
Pittsburg, PA, USA   Vincent Aleven

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