Preface: Meta-Cognitive Educational Systems: One Step Forward

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The AAAI Fall Symposium on Meta-Cognitive Educational Systems: One Step Forward is the second edition of the successful AAAI Fall 2009 Symposium with the same name. The idea for the first symposium stemmed from several theoretical, conceptual, empirical, and applied considerations about the role of metacognition and self-regulation when learning with computer based learning eEnvironments (CBLEs).

A related goal was the design and implementation issues associated with metacognitive educational systems. MCES implemented as CBLEs are designed to interact with users, and support their learning and decision-making processes. A critical component of good decision-making is self-regulation.

Students need to learn to regulate their learning, that is, they need to plan their learning activities, to adapt their learning strategies to meet learning goals, become aware of changing task conditions, and the dynamic aspects of the instructional context, to monitor and control their cognitive processes and behavior, and to evaluate their performance. In addition, students must also regulate their affect and motivation prior to, during, and after they have been involved in the learning environment. This is a critical aspect of being a regulating agent. Interdisciplinary research on the role of self-regulation with learning environments is emerging from the fields of cognitive, learning, educational, and computational sciences.

The debate during the 2009 Meta-Cognitive Educational Systems symposium raised the need to again provide an intellectual forum for interdisciplinary researchers from the fields of AI, psychology, education science, computer science, engineering and HCI. The main aim of the 2010 symposium was to continue the discussion on some of the previous questions and to enhance the discussions with some new ones, such as the following:

- What are the theoretical foundations and how are they articulated in CBLEs?
- Is it possible to develop a unified framework for all metacognitive educational systems?
- What are the necessary characteristics of these systems to support metacognition?
- To what extent does the educational system itself have to exhibit metacognitive behavior(s), and how are these behaviors organized and enacted to support learning?
- What are the main aspects of metacognition, self-regulation skills, emotions, and motivations that influence the learning process?
- What does it mean to be metacognitive, and how can one learn to be meta-cognitive? Can MCES actually foster learners to be self-regulating agents? How can a MCES be autonomous and increase its knowledge to match the learners evolving skills and knowledge?
- What is the role of artificial agents in supporting metacognition and self-regulated learning? MCES may not be embodied, but does it help if they act as intentional agents?

In a few words, this symposium aims to provide a comprehensive definition of meta-cognitive educational systems that is inclusive of the theoretical, architectural, and educational aspects of this field. To meet these goals, we have stimulated debate with two panel sessions, "What does it mean to be meta-cognitive, and how can one learn to be metacognitive?" and "Measurement Issues in Self-regulated Learning."

Finally, outstanding scientists in some of the research areas already mentioned, have served as keynote speakers to provide theoretical deepening ideas about the field. Some abstracts are reported in what follows.