

MetaMentor: An Interactive System That Uses Visualizations of Students' Real-Time Cognitive, Affective, Metacognitive, and Motivational Self-Regulatory Processes to Study Human Tutors' Decision Making

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Abstract

In this chapter, we argue that the new generation of intelligent tutoring systems (ITSs) will need to detect, model, and respond to all of a student's cognitive, affective, metacognitive, and motivational (CAMM) processes in real time to successfully foster their self-regulated learning (SRL) with these systems. Additionally, we argue that multimodal, multichannel process data (i.e., log files, eye tracking, facial expressions of emotion, and electrodermal activity) is needed to identify behavioral signatures of a student's real-time CAMM SRL processes *during* learning. As such, we have designed a new system called MetaMentor to investigate how a student's CAMM SRL processes unfold and interact in real-time. In this chapter, we outline the development of MetaMentor by presenting a brief review of traditional ITS research, our past research with MetaTutor, and the theoretical underpinnings of the design of MetaMentor. We discuss how we can use our findings from research with MetaMentor to design intelligent, adaptive, CAMM-sensitive ITSs, and how our findings can be applied to other advanced learning technologies to augment conceptual and theoretical frameworks of CAMM SRL processes.

Keywords: cognition, affect, metacognition, motivation, self-regulated learning, intelligent tutoring systems, multimodal, multichannel process data, data visualizations

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