# Can We Design Artificial Pedagogical Agents to Be Intelligent Enough to Detect, Model, and Foster Regulatory Learning Processes?

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**Abstract.** Self-regulated learning (SRL) involves a complex set of interactions between cognitive, metacognitive, motivational and affective processes. The key to understanding the influence of these self-regulatory processes on learning with open-ended, non-linear learning computer-based environments involves detecting, capturing, identifying, and classifying these processes as they temporally unfold during learning. Understanding the complex nature of these processes is key to building intelligent learning environments that are capable of adapting to the inherent fluctuations in learners' SRL processes and emerging understanding of the embedded educational content and related disciplinary knowledge. Recent developments in the use of and advances in the design of artificial pedagogical agents have begun to address these issues. However, we are still experiencing major theoretical, conceptual, methodological, and analytical challenges that may impede our ability to design more intelligent agents that are effectively and reliably able to detect, model, and foster learners SRL processes during learning. As such, the foci of this presentation are to: (1) introduce the complexity of SRL with current intelligent agent systems, (2) briefly present a hybrid theoretical model of SRL and describe how it can be used to analyze the temporally, unfolding sequences of processes during learning, (3) present and describe sample data to illustrate the nature and complexity of these processes and the various challenges they pose for designers and learners, and (4) present challenges for future research that combines several techniques and methods to design pedagogical agents and intelligent learning environments that effectively and reliably trace, model, and foster SRL.

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