

## Learning, Goals, and Learning Goals: A Perspective on Goal-Driven Learning

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**Abstract.** In cognitive science, artificial intelligence, psychology, and education, a growing body of research supports the view that the learning process is strongly influenced by the learner's goals. The fundamental tenet of *goal-driven learning* is that learning is largely an active and strategic process in which the learner, human or machine, attempts to identify and satisfy its information needs in the context of its tasks and goals, its prior knowledge, its capabilities, and environmental opportunities for learning. This article examines the motivations for adopting a goal-driven model of learning, the relationship between task goals and learning goals, the influences goals can have on learning, and the pragmatic implications of the goal-driven learning model. It presents a new integrative framework for understanding the goal-driven learning process and applies this framework to characterizing research on goal-driven learning.

**Key words:** machine learning, cognitive modeling, metacognition, active learning, multistrategy learning, utility of learning

### 1. WHY GOALS?

In cognitive science, artificial intelligence, psychology, and education, a growing body of research supports the view that learning is largely a goal-directed process. Experimental studies show that people with different goals process information differently; work in machine learning presents functional arguments for goal-based focusing of learner effort. Recent work in these fields has focused on issues of how learning goals arise, how they affect learner decisions of when and what to learn, and how they guide the learning process. It is increasingly evident that investigation of goal-driven learning can benefit from bringing these perspectives together in a multidisciplinary effort (Leake and Ram 1993).

The central idea underlying goal-driven learning is that, because the value of learning depends on how well the learning contributes to achieving the learner's goals, the learning process should be guided by reasoning about the information that is needed to serve those goals. The effectiveness of goal-driven learning depends on being able to make good decisions about when and what to learn, on selecting appropriate strategies for achieving the desired learning, and on guiding the application of the chosen strategies. Research into such topics includes