

Expert's and Non-Expert's Mental Models of Studying

Charles Woodson (woodson@soe.berkeley.edu)
Cognition and Development
University of California
Berkeley, CA 94720-1670 USA

This paper examines the notion of studying from a constructivist point of view and describes the representation of studying used by students as a mental model. It describes learners as constructing mental models of the learning processes themselves as well as the phenomenon of the physical world that have typically been the focus of mental model studies.

Studying is a complex decision making task in which the learner uses a mental model that includes a repertoire of acts and a set of beliefs about these acts, to make decisions about his or her own learning. The goal of this project is to expand our understanding of how students represent the process of studying. What do they believe about studying? What do students believe about the nature of learning? To do this we seek to compare the repertoire of acts and beliefs about these acts held by expert and non-expert students.

Method

A survey instrument was used to access student knowledge and attitudes about studying and draw inferences about the mental models of studying students use.

Twenty-four behavior categories were classified in three general categories of work management (relating to studying as work or a responsibility), overt acts (traditional behaviors referred to as study skills), and cognitive acts (mental behaviors of a psychological nature related to learning).

For each behavior category, 5 to 10 individual items described specific behaviors exemplar of that category. For example, the category of transforming refers to the translation of information to be learned from one representation to another. Behavior items for transformation include: Convert the information in an outline to a diagram, Summarize a chapter in a paragraph of your own words, Speak aloud sentences using new words you wish to learn, Explain to a classmate how to use a problem solving technique, and Draw a picture to represent the ideas involved. Undergraduate students were asked to rate each item on two dimensions: use and believed effectiveness. They were divided into non-expert and expert students at approximately the median of their self reported grade point average.

Results

The conclusions reached include:

- Expert students report the use a richer repertoire of acts.
- Expert students perceive large meaningful patterns in their behaviors.

Expert students appear to use more abstract concepts in their thinking about studying.

Expert students showed a higher belief in acts that involved reflection on their own behavior, such as concentration, metacognitive monitoring, ergonomic methods, and judging comprehension.

Expert students report greater use of metacognitive monitoring acts and a stronger belief in their effectiveness.

The problem of studying behavior is ill-structured, particularly for the novice learner.

The expert student sees a variety of learning situations as instances of general descriptors. The non-expert tend to see each problem as largely unique, and their behavior is controlled by habits and a limited repertoire of actions and beliefs.

Discussion

Rather than a global strategy that views student decision making in the learning process in a very general way, the approach used here looks in more detail at the particular decisions being made in terms of the repertoire of acts considered and the beliefs students hold about these acts.

Perhaps educators can expand student studying expertise by lab demonstrations of learning phenomena and study acts like those so popular in the physical sciences. Generally, we do not examine individual study behaviors in school. We focus on the products, the papers and tests. A more careful examination of individual behaviors would likely lead to better achievement and a greater understanding of learning processes.

Perhaps students can, through better understanding of their own learning processes, expand their own study skills.

The view of studying as decisions involving a mental model with a set of acts and a set of beliefs about these acts is useful. The distinction between work management, overt behaviors, and cognitive processes was also found to be useful. The list of acts studied appears to be close to the sort of repertoire a learner needs as he or she makes practical decisions about how to learn effectively.

Reference

- Woodson, C. (1997) Expert's and Non-Expert's Mental Models of Studying. <http://socrates.berkeley.edu/~cw/studying/expert-non-expert.html>