



## Prior Knowledge and Student Learning

After spending six weeks helping your students develop deep understandings of ideas in your discipline, did you find students reverting to naïve assumptions under the pressure of mid-term exams and papers? You may have discovered one of the critical challenges to student learning—the power of prior knowledge. On the one hand, accurate prior knowledge provides a needed scaffold on which to build new ideas and understandings. On the other hand, what we think we know can be more of an impediment to learning than our ignorance. The simplistic mental models and explanations we build early on to make meaning of the world can be very entrenched. Students may simply layer new ideas onto old and discard new knowledge when information demands become too great. So how do we get students to incorporate new ideas more facily into what they already know or to think in new ways about old ideas?

- ◆ **Find out what students already know about a topic.** Before starting a new topic in class, engage students in discussion in lab or precept, asking them to explain and apply what they know, or think they know, about the topic. In some cases a diagnostic test (such as for needed math skills in a science course) or a probing essay might be useful in uncovering this information.
- ◆ **Connect their prior knowledge to new topics.** Reviewing earlier concepts or underlying foundational knowledge before beginning a new area helps stimulate applicable prior knowledge. Also, help students see how new ideas tie into areas that they know well. Having the students themselves draw comparisons between new and old knowledge can be particularly effective (e.g. asking them to delineate common themes between texts, or uncover common principles between various reaction mechanisms or pathways). The richer the set of neural pathways we have to connect to a new idea, the more likely we are to remember and use that new knowledge.
- ◆ **Use analogies or common examples to help students organize new information.** Prior knowledge often determines how students organize new information (e.g. naïvely focusing on chronology in history or algorithmic problem-solving in science). Thus, if you can draw on a meaningful analogy to illustrate a concept or process this provides an organizational structure for new material that may be more appropriate to deep understanding than the students' prior constructs.
- ◆ **Check regularly for faulty prior knowledge.** Student learning is conditioned by what they already think they know. Routinely checking on their understanding of ideas in class can circumvent future disappointing performance on exams or papers. One technique that is useful for this purpose is the one-minute paper. At the end of a class, have students write down the one idea they learned in class or the point they found most confusing. Reviewing these before the next class can inform your thinking about how effectively students are learning. A technology-enhanced version of this technique includes using classroom response systems (or “clickers”) to ask probing questions during class and collect and view student answers.

None of us come to a new subject as a blank slate, nor can we have someone else's ideas transferred to us intact and unchanged. Recognizing the power of prior knowledge in shaping students' understandings of new ideas can help us be more effective, efficient teachers.

### Resource:

Adapted from “What they don't know can hurt them: the role of prior knowledge in learning” by Marilla Svinicki, University of Texas. On-line at  
<http://www1.umn.edu/ohr/teachlearn/resources/guides/dontknow.html>.