Essays on Teaching Excellence

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The Nature of Expertise: Implication for Teachers and Teaching

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How do teachers become experts at teaching-at helping their students become experts? In a culture dependent on high performance, teachers need to understand the nature of the expertise that their students want to acquire as well as the nature of their own expertise. How we view expertise determines the goals we set for our students, as well as the standards we use to inform and measure our own development as experts in teaching.

Expertise as Knowledge

The bedrock view of expertise is that is based on special knowledge, skills, or talent. (See Figure.) For generations our institutions and teaching methods have been in tune with this view-the better learners were those who memorized more material and recalled more of it on exams; the better teachers transmitted more information to their students.

Expertise as Intuition

Current theories of expertise do not reject the central role of information in expertise, but add to it. They distinguish high performers from others by the way they think and solve problems rather than simply by their knowledge (Anderson, 1985; Dreyfus & Dreyfus, 1986). After a great deal of experience, the way people solve problems appears to change. Experienced problem-solvers deal

with issues with hardly any thought or effort. They recognize recurring patterns in their work and develop learned procedures to deal with these.This kind of efficient, intuitive problem solving is an important addition to the old concept of expertise. The new view of expertise (the second bar of our figure) has become the most popular among cognitive theorists. Highly experienced teachers have their information organized into packages consisting of examples, explanations and questions designed to overcome student misconceptions for particular learning objectives. These packages or "scripts" (Putnam, 1987; Shulman, 1987) enhance efficiency because they give teachers the flexibility to teach interactively in response to students' questions. Highly experienced teachers can sense whether to use another example or to move on after asking a few questions or pausing to gather information. In contrast, novice teachers are often rigidly focused on their notes. They cover the material as if they were dictating. When asked a question that is out of sequence, they might answer, "I'll be getting to that later." There is a downside to intuitive expertise. Experienced teachers, characterized by instant recognition of problem situations and efficient actions, tend to make decisions without deliberation, without being aware of the rules, or without having rules. Such teachers often have difficulty explaining to students their thoughts or actions that constitute expert practice. They make decisions on the basis of subtle, contextual features of the situation, features that are unavailable to the novice.

Expertise as Progressive Problem Solving

Recently a third layer has been added to the growing concept of "expertise." Bereiter and Scardamalia (1993) argue that not all experience leads to expertise. The kind of efficient, intuitive approach to problems that we have been discussing happens to everyone after a sufficient amount of experience, whether they are successful at what they do or not. Despite having had lots of experience, some performers do not achieve expertise. Not all senior faculty are expert teachers!

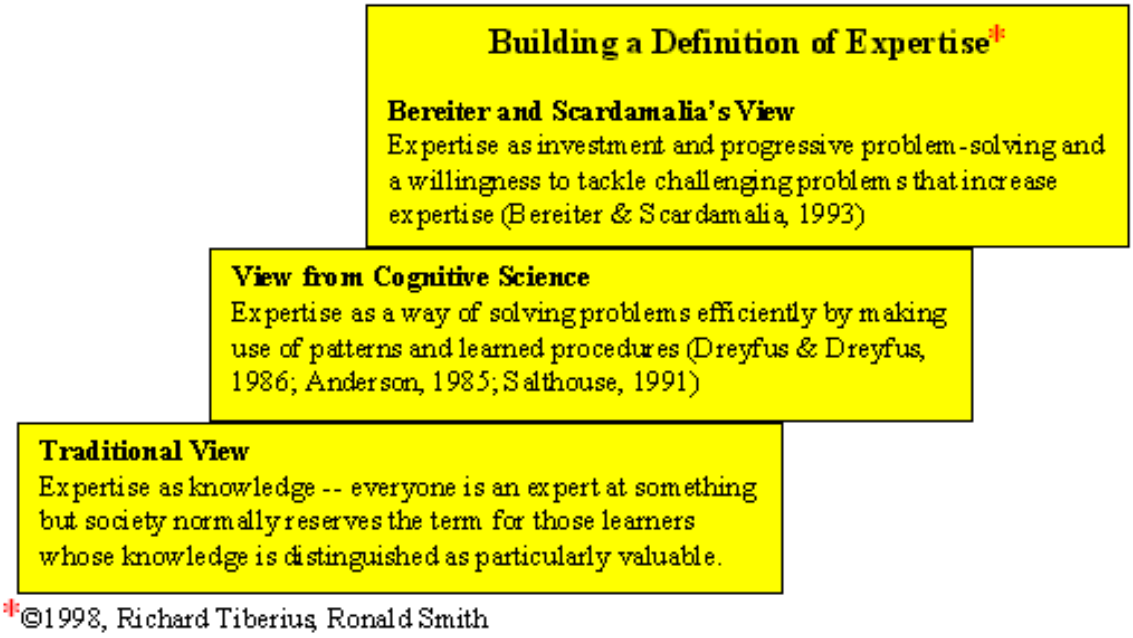
Bereiter and Scardamalia (p. 109) argue that, although experience can lead to intuitive expertise through routinizing, it may also lead to a deepening rut. Teachers can become resistant to new ways of doing things and may disengage from the course and the class. Such teachers fail to accommodate to the students, the subject, or the

context. The extra time and energy that they gain from having their teaching "organized" is invested in research. In some institutions these teachers are normative and supported by the institutional values. True expertise, it is argued, is not a static feature, to be achieved once and then abandoned, but a continual process over time, an approach toward one's career.

Of course, some routines are useful. Who wants to reflect continually on taking out the garbage or brushing one's teeth? These are tasks we would rather do by routine, reserving our energy and attention for more important things. But in higher education, teaching can rarely be "canned." The current situation requires a high level of expertise in the sense that Bereiter and Scardamalia mean it: reinvesting time and energy and continually learning to meet new challenges.

Teachers who are progressive problem-solvers become more efficient in carrying out their tasks; they tend to shift their focus to new aspects of their environment. First they focus mainly on content. With more experience they begin to focus on delivery, that is, teaching performance. Eventually, when both the content and the delivery become second nature, they begin to notice the social and personal aspects of their students. This is the good news. Efficiency in one component of teaching provides extra time and energy that allows the teacher to move on toward mastery of another component.

The true test of an expert, according to Bereiter and Scardamalia, goes beyond knowledge and beyond intuitive problem solving. The feature that really distinguishes experts from others is their approach to new problems. The pattern recognition and learned procedures that lead to intuitive problem solving are only the beginning. Pattern recognition and learned procedures increase one's efficiency. The key to expert behavior is what the expert does with this bonus of time and energy. The expert invests it in what Bereiter and Scardamalia call progressive problem solving, that is, tackling problems that increase expertise rather than reducing problems to previously learned routines. (See Figure).



Those who wish to become professional teachers must engage in progressive problem solving. They need to think of their automated skills as building blocks of new skills that are not automated. For example, the experienced chess player acquires many learned patterns and procedures, but for the expert they do not become stereotyped, predictable, moves that restrict thinking. Instead, they are used as building blocks for increasingly sophisticated analyses. Experienced teachers recognize familiar patterns in the classroom or in interaction with students or in grading papers, but resist responding in stereotypic fashion. Instead they continually redefine the classroom situation and reinterpret the individual student. Teachers learn about students and about teaching as students are learning about the material.

Suggested Strategies

How can teachers and developers become more expert in this third aspect of the concept? We have drawn from Bereiter and Scardamalia's (1993) suggestions for building an environment that would encourage reinvestment and progressive problem solving.

- Use Classroom Research methods (Angelo and Cross, 1993) to investigate the impact of their own actions on their students in their classroom.

- Organize departmental pedagogical colloquia to make conversations about teaching a regular part of departmental life.
- Arrange reflective practica (Donald Schön, 1987) where practitioners, students and teachers, can share their thinking about real problems. The key is to require "explanations" in addition to solving problems-to develop theories to account for facts and to criticize others' theories by confronting them with facts.
- Use teaching dossiers not only for assessment, but for reflection and growth as well. They encourage us to think deeply about our ork with a view toward learning from colleagues.
- Develop ways to connect with novices. Teachers might connect with novice students by using classroom assessment techniques such as reviewing student notes or interviewing students. Teachers should encourage students to respond to one another's work and teach them how to do so in helpful, supportive ways.
- Engage in discussions aimed at changing the reward structure to recognize and encourage the development of the various aspects of expertise as we have described it. The current system seems to encourage faculty to "satisfice" on teaching, to get it so that it is good enough, then move all their attention to research.

Conclusion

Our concepts of expertise influence what we do to become experts, as well as how we try to help others develop their expertise. In this essay we have argued that teachers need to engage in progressive problem solving at the edge of our competence and that we need to encourage our students to do the same.

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