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K-12 Classrooms as models of collaborative knowledge building

Knowledge building, as defined and discussed in Chapter 2, is a concept that brings together under one umbrella the curiosity-driven inquiry of the young child and the disciplined inquiry and invention of the mature knowledge worker. The development of knowledge building as an educational approach geared to knowledge creation is currently being carried on by groups in countries worldwide. Many of these are linked through the Institute for Knowledge Innovation and Technology (<http://ikit.org>). The most compelling reason for an explicit focus on knowledge building is the need for today's students to become competent in working directly with knowledge. In addition, however, knowledge building can lead to deeper learning of subject matter, enhanced literacy, and a general sense of being part of the larger knowledge building world (Scardamalia, Bereiter, & Lamon, 1994). As early as grade one, children have shown an ability to raise authentic scientific questions, to generate explanatory theories that address the questions, to communicate and compare their theories, and to test and revise them in the light of evidence (Scardamalia, 2002).

The authenticity of students' knowledge building efforts is crucial. In traditional schools students do work. Indeed, interview studies indicate that to most students and to many teachers, doing schoolwork is basically what school is about (Bereiter & Scardamalia, 1989; Doyle, 1983). But the work only has meaning in relation to benefit gained by the worker. Thus it is analogous to the body-building work one may do in a gymnasium. In more child-centered schools, students have more freedom to pursue their own interests and curiosity and thus to take a more active part in their own mental development. But in neither case do the students gain the experience of doing productive work that

has value beyond the satisfaction of their own or teachers' needs. Producing knowledge of value to others is what essentially distinguishes knowledge building from learning. Like workers in a modern industry, students are contributing to the knowledge resources of the organization. Within a K-12 context the knowledge produced may not have much value beyond the immediate classroom group, but the Knowledge Society Network, discussed in an earlier section of this chapter, represents an effort to overcome this limitation.

But how authentic can student knowledge building be? Aren't the students in reality only pretending to be scientists, historians, mathematicians, or whatever? The answer offered by knowledge building theory is this: People are engaged in authentic knowledge building when they are advancing the frontiers of knowledge as they perceive them. Student knowledge builders, by this criterion, are no more play-acting than scientists working on a problem that it happens some other group has already solved. Scientists devote a good deal of time to trying to understand what their colleagues are up to and what they have accomplished (Dunbar, 1993). In doing so, they are reconstructing solutions rather than creating them *de novo*, just as students do who try to understand colour vision by working their way through a textbook explanation. The inventive and the reconstructive processes are so much alike and merge into one another so smoothly that participants in a lively research meeting would probably be hard put to say where reconstructing left off and working on new ideas of their own began. Similarly, students who are actively trying to solve a knowledge problem will move readily between developing ideas of their own and trying to negotiate a fit between their own ideas and information obtained from an authoritative source.

The notion that young students are able to engage in creative work with ideas, and that learning inevitably results, opens exciting new educational possibilities. The first and crucial requirement for educators is to grasp the idea of knowledge building, to distinguish it from more familiar constructivist approaches, and to be open to the belief that young students can actually do it.

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