Plumbing the Foundations of Knowledge Building: A Special Symposium

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The term "knowledge building" has come into fairly widespread use in both the knowledge management literature and education (~45,000 Google references at this writing). If we take as a starting point for discussion that something very like knowledge building does occur, at least in the sciences, if not in education, the question arises, what are the basic blocks from which this building is done? More technically, what is the ontological status of ideas/knowledge objects/conceptual artifacts and how do they come to be? Carl Bereiter (Bereiter, 2002; Bereiter & Scardamalia, 1989, 2003) has argued that we need to rethink our most cherished notions of learning, education, and, more fundamentally, of knowledge itself as we enter the "knowledge age." He has proposed a number of key concepts—"knowledge building," "intentional learning," "progressive discourse"—as constitutive of a new way of thinking about learning and education. Many of these concepts have been embraced by workers in the learning sciences community and have been employed in the design and rationalization of instructional innovations.

In *Education and Mind in the Knowledge Age*, Bereiter (2002) made a distinction between *knowledge building* and *learning*; the former of which he associates with "creating a knowledge object" (p. 68) and the latter with "knowing and helping others to know" (p. 68). Writing more technically, Bereiter describes knowledge objects as *conceptual artifacts*, of which he writes, "[They] are human constructions like other artifacts, except they are immaterial and; instead of serving purposes such as cutting, lifting, and inscribing, they serve purposes such as explaining and predicting" (p. 58). The notion of conceptual artifacts he attributes to the philosopher of science, Karl Popper. Popper (1972) described three kinds of reality: the material world, the mental world, and world of ideas. He labeled these as World 1, World 2, and World 3. Conceptual artifacts belong to World 3. Bereiter (2002), following Popper, listed the following things a scientist *S*, might do with a knowledge object/conceptual artifact *p*:

S tries to understand *p*.

S tries to think of alternatives to *p*.

S tries to think of criticisms of *p*.

S proposes an experimental test for *p*.

S tries to axiomatize *p*.

S tries to derive *p* from *q*.

S proposes a new problem *x* arising out of *p*.

S proposes a new solution for the problem *x* arising out of *p*.

S criticizes his latest solution of problem *x* arising out of *p*.

(pp. 473-474 based on pp. 140-141 in Popper [1972]).

Bereiter makes three observations with regard to this list: (1) all of the items appear to be actions, (2) the object of the action in each case does not exist in the material world (Popper's World 1), and (3) in all cases the object is the "same." These observations are offered as evidence for *p*'s existence as a real thing. The object p as it is presented here would appear to be very much like what a logician would refer to as a proposition, but Bereiter would like to extend the category of real conceptual objects to include: defined concepts, designs, histories, literary interpretations, problem formulations, and any other cultural objects "that we want to treat as knowledge" (p. 76). All share the attributes of "discussibility, modifiability, and autonomy" (p. 482).

Koschmann has suggested that some useful ideas for understanding learning in settings of collaboration could be found in the works of the American Pragmatist philosopher, John Dewey. For example, he (2001) argued that Dewey's notion of transactional inquiry offered an alternative metaphor for thinking about learning, one that overcomes the limitations of viewing it as a purely cognitive or purely social matter. Further, he (2002) has argued that meaning-making practices should be a focus of interest in educational research and that Dewey offered some clues as to how we might go about studying such practices.

Dewey's theory of knowledge would seem to run counter to Popper's. He developed what in current terms would be labeled as a "situated" view of knowledge production. Central to his theory of knowledge (and to other aspects of his philosophy as well) is his notion of inquiry. Dewey (1991/1938) defined inquiry as, "*the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole"* (p. 108). In situations that have grown problematic, inquiry is undertaken into the problematic aspects of the situation. The nature of the problem is not given, but is rather produced through the process of inquiry. In restoring the situation to a determinate state, a funding of new meanings occurs and these meanings constitute new forms of "knowing" which can be productively employed in new situations (contra critics such as Anderson, Reder, & Simon [1996]). Inquiry is for Dewey an "outdoor fact," not a mental process or psychological phenomenon (Burke, 1994). In Dewey's terms it has "existensial consequences."

As Hickman (1992) wrote, "for Dewey properly controlled inquiry exhibits the most general traits of all other types of productive skill and its artifact, knowing, exhibits the most general traits of all other successful artifacts" (p. 19). In this way, it could be said that Dewey treated knowing as a form of artifact, but we must be clear about what he meant by a "knowing." In *Knowing and the Known,* Dewey and Bentley (1991/1949) defined a *knowing* as a kind of behavioral event and argued it is studiable as such. Since a knowing is, by definition, a kind of behaving, there must be a knower for a knowing to exist. Dewey and Bentley further postulated that knowings are always part of a two-part pair, consisting of a knowing and the known. They specified that "the two are twin aspects of common fact" (p. 52).

Bereiter (following on Popper) has contended that knowledge objects (Popper's term) or conceptual artifacts (Bereiter's) do exist and have a special form of reality separate from material and mental stuff. The question is then, if conceptual artifacts are real in this special sense (sequestered in their own world), how are they created and how do we come to know them? Similar questions must be applied to Dewey's formulation of knowledge, however. Can there be knowns without knowers? The fundamental question is what is the ontological status of ideas/concepts/knowledge objects/knowns? This will be the problem taken up in the symposium.

References

Anderson, J., Reder, L., & Simon, H. (1996). Situated learning and education. *Educational Researcher, 25*(4), 5-11.

Bereiter, C. (2002). *Education and mind in the knowledge age*. Mahwah, NJ: Lawrence Erlbaum Associates.

Bereiter, C., & Scardamalia, M. (1989). Intentional learning as a goal of instruction. In L.B. Resnick (Ed.), *Knowing, learning and instruction: Essays in honor of Robert Glaser* (pp. 361–392). Hillsdale, NJ: Lawrence Erlbaum Associates.

Bereiter, C., & Scardamalia, M. (2003). Learning to work creatively with knowledge. In E. De Corte, L. Verschaffle, N. Entwhistle, & J. van Merriënboer (Eds.), *Unravelling basic components and dimensions of powerful learning environments.* (Advances in Learning and InstructionSeries). Oxford, UK: Elsevier Science.

Burke, T. (1994). *Dewey's new logic: A reply to Russell*. Chicago: U. of Chicago Press.

Dewey, J. (1991/1938). Logic: The theory of inquiry. In J. A. Boydston (Ed.), *John Dewey: The Later Works, 1925–1953, Vol. 12*. Carbondale, IL: SIU Press. [Originally published as Dewey, J. (1938). *Logic: The Theory of Inquiry*. New York: Henry Holt & Co.].

Dewey, J. & Bentley, A. (1991/1949). Knowing and the known. In J. A. Boydston (Ed.), *John Dewey: The later works, 1949–1952, Vol. 16*. Carbondale, IL: SIU Press. [Originally published as Dewey, J. & Bentley, A. (1949). *Knowing and the known*. Boston: Beacon Press].

Hickman, L. (1992). *John Dewey's pragmatic technology*. Bloomington, IN: Indiana University Press.

Koschmann, T. (2001). A third metaphor for learning: Toward a Deweyan form of transactional inquiry. In S. Carver & D. Klahr (Eds.), *Cognition and instruction: 25 years of progress* (pp. 439-454). Mahwah, NJ: Lawrence Erlbaum Associates.

Koschmann, T. (2002, January). Dewey's contribution to the foundations of CSCL research [Keynote address]. CSCL 2002, Boulder, CO. [Avail. in G. Stahl (Ed.), *Computer support for collaborative learning: Foundations for a CSCL community* (pp. 17-22). Mahwah, NJ: Lawrence Erlbaum Associates].

Popper, K. (1972). *Objective knowledge: An evolutionary approach*. Oxford, UK: Clarendon Press.