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Computers and the collaborative experience of learning

Review of *Computers and the Collaborative Experience of Learning*, by Charles Crook (Routledge, 1994)

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The “newness” of new technologies presents a challenge to our perception. To the extent that we exult in the potential for change we risk failing to understand the connections between the new technology and what came before. We also become susceptible to hyperbolic claims about how our lives will be revolutionized once we adopt the new machine. On the other hand, when we try to encompass the new technology within existing categories we risk failing to understand the potential it does have.

This challenge places a special demand on the role of theory in accounting for and making sense of technological change. The absence of an articulated theoretical framework does not mean that we see in some untrammeled way, but rather that we accept too easily the theory presupposed by the technology. But any theory we select colors our perception, constraining what we see. A poorly-developed theory makes our perception of the technology and its implications less fruitful than it might otherwise be.

This problem can be clearly seen in Gail Hawisher’s (1994) historical analysis of classification schemes for software for literacy instruction. These schemes reflect significantly major theoretical trends, such of the shift form cognitive to social concerns. The insights of one era become the blinders of the next. These problems are far from unique to technology studies, but they become more salient when we examine new tools, new media, and new artifacts that appear to alter familiar practices in undetermined ways.

In the book *Computers and the Collaborative Experience of Learning*, Charles Crook takes on this challenge in a far-reaching critical review of computers in education. This is neither a celebration of computers nor a condemnation. Nor is it simply a cataloguing of studies and software. Instead, Crook frames an analysis of computer use in education in terms of a well-developed theory of collaboration in learning. Using this theoretical framework, he considers a broad survey of approaches, with an emphasis on the use of computers for primary schooling in the UK.

Considering the title of the book and the chapter titles, many readers might expect computer software to be highlighted throughout. This is not the case. Several chapters explicitly address only general psychological concerns, and even those that do discuss computer use do so in a sometimes cursory way, returning to general themes at every opportunity. Moreover, some of the software that is discussed is dated, and major areas of new computer use are scarcely covered at all. Thus, I suspect that some readers could be disappointed.

Nevertheless, I would argue that the balance here is appropriate and is in fact one of the strengths of the book. By building a detailed theoretical model and linking it to current concerns in the area of computer use in education, Crook is able to show one way that an articulated theory can help us perceive what is happening in this new field. Moreover, the emphasis on cooperative experience provides a much richer framework than many alternatives that have been proposed.

Crook begins his theoretical analysis by laying out two pervasive metaphors within psychology. One is information processing, which is at the core of the cognitive science approach. This metaphor highlights issues such as complexity, problem solving, knowledge representation, and language. It links conveniently to computer use in education, both in terms of learning theory and in terms of computer design. Thus it finds its home in areas such as intelligent tutoring systems. A second metaphor is constructivism, in essence, the idea that knowledge is constructed by learners in active engagement with the environment. It corresponds well to the computer-as-pupil notion as embodied in many approaches using the programming language Logo.

These metaphors share an emphasis on the active learner, an important facet of computer use in Crook's view. But they ultimately seem too limited to explain either the potential for computer use or the problems that so often occur when teachers attempt to adopt some innovation. As he points out, how a computer "is assimilated into the surrounding frame of educational activity" (p. 9) is a key to measuring its real impact on learning. Without understanding this assimilation, results of studies of computer use appear contradictory and show limited overall impact.

This also accounts in part for the fact that the "deployment of computers in education is a venture not greatly influenced by theories of cognition" (p. 30). In fact, I would argue that the social dimensions Crook has identified account more for this lack of influence than that psychologists have simply chosen not to "make computer-based learning a topic of special empirical interest" (Ibid). Psychologists and educational researchers have studied computer-based learning in great detail. But these studies have often had limited value because of the lack of theories of the kind Crook is proposing.

This analysis leads Crook to see the need for a sociocultural perspective on learning with computers. But unlike many who have adopted a sociocultural perspective, he does not see the greatest potential in terms of direct tutoring or scaffolding. Instead he sees that a cultural analysis of cognition points toward an

understanding of situations and the cooperative experience of learning. This view is summarized well in a passage at the end of Chapter 4, in which he discusses more traditional approaches to interaction with computers:

I would encourage a move away from design strategies based exclusively upon interacting with computers, towards solutions that consider computers as a context for social interaction. Our aims ... would be more concerned to establish how computer activities can serve as an occasion for classroom discourse; a setting in which certain kinds of potent socially organized experience can be arranged. (p. 98)

The book expands on this perspective by looking at collaborative interactions in various forms. These occur with computers when the social situation is constructed so that the learner engages directly with the machine, attempting “to reproduce the social character of a face-to-face tutorial dialogue” (P. 119). They may occur in relation to computers when teachers interact with students in the context of computer work. The concrete nature of the problems posed may provide a resource for collaboration at computers. And finally, collaborative interactions occur around and through computers when students work in a shared problem-solving environment, but are not necessarily co-present.

By centering his arguments on collaborative experiences, Crook effectively shifts the focus of the discourse about computer use away from technology characteristics or narrow curricular concerns. This addresses weaknesses that have plagued many other discussions of computers in education. In so doing, he lays the groundwork for a theory of computer use that goes well beyond many competing accounts. Such a theory inverts the conventional view of computer use in which the isolated user at a single machine is the canonical case. Under that view, collaboration is treated as a special case, a deviation from the norm, if it is mentioned at all. Crook would instead begin with the collaborative situation. The isolated user case is then a special sort of collaboration in which the computer is used to artificially reproduce traditional tutoring.

In the book, Crook persuasively develops this argument. But there are several ways in which I felt he did not carry the force of his own position far enough. In the remainder of this review, I would like to just mention five such areas.

First, although I applaud the effort to keep the discussion of computer use within the larger context of learning, I would have liked to see the collaborative experience approach extended to consider a wider range of new technologies. Some of the discussion seems to be arguing old issues without acknowledging new technological potentials. In most cases, these new potentials would seem to support the overall argument, but they’re barely mentioned.

This criticism is a bit unfair, given the rapidly changing terrain in this field. Nevertheless, there are some major categories that received little attention, which would have provided interesting points of comparison. Chapter 8, for example, focuses on electronic mail and conferencing systems. But the range of computer-mediated

communication has been extended greatly beyond these forms in recent years. Local area networks permitting collaborative problem-solving and conversational writing; group decision support systems; MUDs (multiuser dimensions), MOOs (MUD object-oriented), MUSHs (multiuser shared hallucinations) in which participants engage in interactive play; new systems for computer-supported cooperative work; and the World Wide Web, which is realizing the global hypertext, are just a few of these new forms that would provide interesting test cases. Similarly, the entire realm of virtual reality, which provides both richer human-computer interaction as well as new opportunities for human-human interaction through such devices as telepresence would have been interesting to explore.

Second, in the discussion of artifacts in Chapter 3, Crook opens the door to a large area of technology studies, but does not go through that door in addressing crucial questions such as: What is the relation of the artifact to our constructions of meaning? How do we understand materiality in relation to cognition, as Haas (1995) discusses in her new book on the materiality of writing? How can we understand the ways in which technologies not only shape social relations, but are themselves products of those relations, both in their design and in our perception of them?

Third, although the focus in on children's learning, I would have liked more on related collaborative experience. How does computer use affect relations between children outside of school or between children and parents? How do teachers change in their views of technology, of children, of learning? How does the school as institution change? Obviously, addressing all of these questions would have unreasonably expanded the scope of the book, but we need to go beyond immediate instructional interactions if we are to understand the impact of technology on the educational experience.

Fourth, Crook makes important contributions regarding the evaluation of computer programs. He rejects the input/output designs in which an innovation is introduced and outcome measures are applied. He points out many ways that integration into the broader context of computer learning is the essence of understanding what role the computer can best play. But I would have liked this analysis to go one step further to consider the proposition that the dichotomy between the computer and its use may have outlived its usefulness. Doing so would have us ask not only what is "the impact of technology on the social quality of the educational experience"? (p. 10), which implies a causal relation between the technology and the social situation, but something like "what is the educational experience that emerges from the transaction involving people, discourse, technological artifacts?" The latter would see the technology as itself socially-constructed, as much an effect as a cause. Our goal as researchers would shift toward seeking to understand how the technology was realized within a given setting and what that process could tell us about social relations therein (Bruce, Peyton, & Batson, 1993).

Finally, just as Crook asks us to move beyond the scaffolding notion to consider collaborative experiences in general, I would have liked the analysis to move to consider communities of practice. There is some of this in Chapter 8, but in general, the

book devotes considerable energy to arguing against simplistic tutoring models, limited conceptions of cognitive apprenticeship, and asocial conceptions of computing. As a result, it does not explore some of the larger social issues that are implied by its own framework. Moreover, such a move would provide a place for discussing all-important issues such as equity of access, gender issues, cultural and institutional conceptions of computer use, and others that strongly shape what does occur at the classroom level.

But these omissions do not detract from the valuable contribution that the book does make. It provides a systematic framework for thinking about computer in education, and methodological tools for those who wish to conduct research in this area. Perhaps most importantly, it asks us to stop to think: Beyond just helping children learn to use computers, what should we do to help children use computers to learn? Any answer to that will have to address the role of computers in collaborative experiences.

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