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## *To Use or Not to Use?*

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*In the first half of our century many writers of every political persuasion published books on the technique of revolution; today books and articles on the revolution of technique are published every day.*

*Octavio Paz, "The Channel and the Signs" (1967)*

For students interested in writing about computers and education the dearth of scholarly studies often comes as an unfortunately pleasant surprise. Although a variety of manifestos and prognostications written in the last twenty years have forecast imminent revolutions in education, the truth is that very few educational technology projects have been sustained long enough to be seriously studied, and of these fewer still have received independent evaluation or assessment. Indeed, for such students the most worthwhile study of technology in schools remains the small monograph, *Teachers and Machines: The Classroom Use of Technology Since 1920* (1986), by the historian of education Larry Cuban.

Cuban showed that the introduction of each new classroom technology, from radio through television, not only failed to significantly reform schooling, but also failed in remarkably similar ways. Briefly, he identified a pattern in which new technologies: 1) were introduced "from above" by enthusiastic school administrators, public officials and scientists as having revolutionary promise; 2) were further promoted by "research" that claimed to confirm their educational power; 3) were never widely used by large numbers of teachers or students in schools; and 4) generally bypassed the school, ending up well-integrated (one might say too well-integrated) in the home. Cuban's analysis of this situation suggested that while they were usually blamed for the failure of classroom

technologies to realize their alleged promise, teachers were rarely given the access, education, or professional autonomy to make use of those technologies.

*Teachers and Machines* concluded with a chapter about computers, but of course there was no data in 1986 analogous to that which Cuban had used to investigate earlier classroom technologies. Thus, readers were left with a speculation that, while offering a critical perspective, seemed easily dismissed and overwhelmed by the enthusiasms and seductions of computer scientists and computer manufacturers turning their attentions to the possibilities of the personal computer at school. Cuban's 1993 article, "Computer Meets Classroom: Classroom Wins," was a similarly data-less and highly rhetorical speculation about the future of education. Cuban offers two scenarios for comparison, the "traditional" and the "futuristic", but most of the students who have read this article with me, as part of the Educational Software Seminar, have found the latter too fantastic for the comparison to be taken seriously.

Fortunately, Cuban has now published *Oversold and Underused: Computers in the Classroom* (Harvard University Press, 2001), a book that provides a much better ending to *Teachers and Machines* than was possible in 1986. Cuban analyzes the results of a study of the use of computers by teachers and students in Silicon Valley secondary schools, and by teachers at Stanford University, and the title appears to capture the conclusions rather well.

Most surprising to readers of Cuban's earlier book may be that, even when one removes the obstacles to technology use that seemed primarily responsible for teachers' under-utilizing classroom technologies in the past (e.g. reliable access), "less than 5% of teachers integrated the new technology into the regular curriculum and instructional routines" (p. 133). Cuban also reports finding "no clear and substantial evidence of students increasing their academic achievement as a result of using information technologies" (p. 133). Another apparent surprise is the finding that "even when a small percentage of computer-using teachers do become serious or occasional users they -- contrary to expectations -- largely maintain existing classroom practices rather than alter customary practices" (p. 171). This even as "the primary reason given by university boards of trustees and presidents for investing money and time in an expensive technological infrastructure ... is to 'revolutionize' teaching and learning" (p. 130)

In his analysis, Cuban asks not only how teachers' responses to computers compare with the patterns he found in the study of earlier classroom technologies (he finds the

patterns similar), but how these responses compare with other professionals facing the introduction of new technologies. Drawing on studies of the responses of engineers and primary-care physicians to technological innovations in the workplace, Cuban finds that they, no less than teachers, "have been very selective in their daily uses of technology, picking and choosing among those new ones that they can adapt most easily to traditional practices" (p. 151).

In this light, the title of Cuban's chapter about his findings at Stanford, "New Technologies in Old Universities," is probably more insightful than the title of his book. If we reflect on the nature of undergraduate university education, and look below the fashions of *what* is studied to the details of *how* it is studied, we find a set of traditional and remarkably robust teaching and learning practices. The stability of many of these practices over many generations suggests that they are not merely incidental to the institutions in which they take place. Thus, we cannot be terribly surprised by Cuban's findings, knowing what we do about the traditions that have given rise to what we recognize as an academic course, a liberal arts curriculum, or even a formal education generally.

The modern liberal arts course, for example, owes the details of its construction to Gutenberg. In addition to the historical connections between the growth of universities, the demand for manuscripts, and the rise of the book trade (see e.g. Thomas 1976), there is a remarkable symmetry between the way information or knowledge is organized in such courses, and in books. This may seem incidental at first, but on inspection one recognizes the various ways that the temporal qualities of courses, their fundamentally narrative structure, the division of labor established between teachers and students, and the nature of course assignments, exercises and examinations all reflect (and are reflected by) the organization of knowledge we have and use in print. Furthermore, as liberal arts teachers we know not only how the success of courses can depend on students having access to the right texts at the right time, but also how difficult it can be to find materials that can contribute to courses as powerfully as the right text used in the right way.

That the exceptions to the traditional course (e.g. technical or production courses) only prove the rule, is not to say that the rule(s) should not change, or could not change with the introduction of new technologies. But an answer to the question of whether and how to make use of the networked computer in university education, for example, ought to begin with our recognizing the remarkable "fit" between the rise of the university course and the development of print, and our asking what sorts of educational experiences or "neo-courses" could exemplify the same sort of fit with the computer. It may take some

time before we come up with non-trivial examples throughout the humanities and sciences, and perhaps we'll find that the computer requires a very different institutional setting for its powers to be put to obviously good and preferable educational effect.

New technologies test our commitments. The cultures and economics of print favored certain sorts of educational arrangements, and it's likely that the cultures and economics of the computer favor others. This is one way to read the results of *Oversold and Underused*, and it has the merit of recognizing teachers as decision-makers rather than mere creatures of habit. Indeed, it suggests that, more useful than a researcher's or university's concern with the number of teachers using computers per se, would be attentions paid to experiments in alternative course structures, and other educational arrangements, that seem to fit with the computer the way our best traditional courses fit with the book.

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