

The National Teaching & Learning FORUM



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Do I Dare? Is It Prudent?

Tom Rocklin
University of Iowa

. . . in the winter of 1813-1814 . . . I attended a mathematical school kept in Boston . . . on entering his room, we were struck at the appearance of an ample Blackboard suspended on the wall, with lumps of chalk on a ledge below, and cloths hanging at either side. I had never heard of such a thing before.

—May, 1866, cited in
Anderson, 1962

As it turned out, Mr. May went on to introduce the blackboard into wide use throughout the Common Schools of Massachusetts. But how did he, or any teacher, decide that a blackboard was a worthwhile piece of new technology to incorporate into the teaching/learning process? I don't know the answer to that specific question, and so far as I have found, the debates (if there were any) about the adoption of the blackboard have been lost to history.

Today's generation of faculty members faces decisions about a different set of technologies. Many of us are still making decisions about the role that computers and the Internet will play in our teaching and our students' learning. How can we make those decisions wisely?

You Say You Want a Revolution?

If I had a quarter for every time I've read about how the Internet is revolutionizing an industry, I'd be able to buy a Power Mac G4 Cube and a 22-inch Apple Cinema display. If I only got a quarter for every time I've read about how the Internet is revolutionizing *higher education*, I could probably still buy a Cube, but maybe with the 15-inch display.

It's true. The Internet *is* revolutionizing higher education. But that's not the same thing as saying that the Internet is revolutionizing *learning*. It isn't.

I imagine that the Internet may have profound effects on who learns, who teaches, where teaching and learning take place, how much higher education costs and a host of other issues. Those changes are probably profound, and thus, it is entirely possible that the Internet will radically reshape higher education.

What the Internet won't change is the nature of human cognition and social interaction—and therefore of learning. Study after study (see Clark, 1983, for examples) has demonstrated that the medium of instruction has little if any effect on the nature or amount of learning that takes place.

So, the Internet will, on the one hand, change everything and, on the

other hand, change nothing. I think faculty members have to hold both of these perspectives, though not necessarily at the same time.

When we are thinking about (and worrying about) the future of higher education, or when we are working to shape that future, the fact that the Internet may change everything should be uppermost on our minds. Those changes are likely to be gradual, structural, and systemic, and it would be a shame if faculty members defaulted on their role in shaping them. On the other hand, we faculty members teach within today's system, and the structural changes that *may* come offer little guidance in deciding how to use technology *today* to help our students learn.

When Is a Non-revolution a Revolution?

So I don't think that faculty members should try to make decisions about technology adoptions based on expectations about the ways a particular technology may revolutionize learning. Instead, I suggest we direct our attention to a much more mundane perspective: How can a candidate technology increase the efficiency with which I and my students do what we need to do to promote learning right now? Though I've labeled the question mundane, the answer may be revolutionary—revolutionary at the scale we faculty members usually live: the individual course or chunk of the curriculum.

"Efficiency" carries with it ugly connotations of industrialization and "bean counting." Generically, though, efficiency refers to the ratio of output to input, and in the context of teaching and learning, I'm using the word to refer to how much learning we can provoke from a given level of

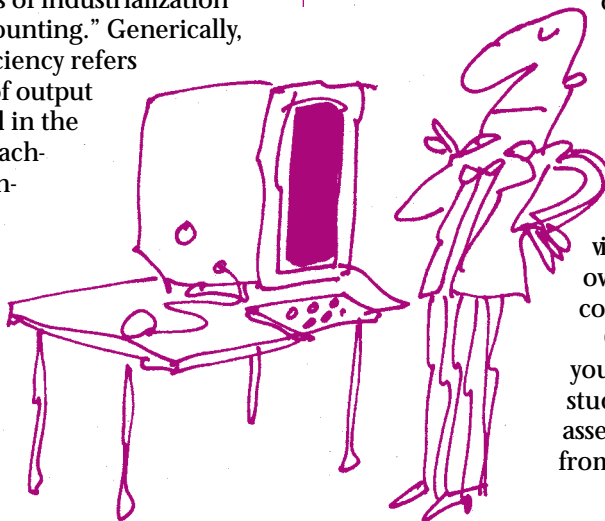
effort on the part of the teacher and the learner.

Here's why efficiency is so important. Over the long haul, we are not likely to see extravagantly more effort on the part of our students. Neither are we, their teachers, likely to be able to devote a lot more effort to our teaching than we already are. If effort is a relatively fixed quantity, the only route to improved learning is efficiency.

The value of efficiency is even greater than the value found in working smarter at what we already do. It also lies in being able to do new things without much additional effort. All along there have been learning activities we would like to have seen our students engage in, but they simply weren't feasible with the amount of effort available. A technology that makes them possible with an achievable level of effort spells the difference between the presence of those features in our classes and their absence. And that's where the revolution comes in. Suddenly, we are able to offer our students learning opportunities that we couldn't offer before.

Suppose, for example, that you had always wanted students to experience some sort of guided conversation with students in a far-off land who are enrolled in a similar course. Before the Internet was widely available this was theoretically possible, but for most of us it was, as a practical matter, impossible (telephone? fly to the far-off land?). On the other hand, ex-

changing email or participating in a chat room now seems straightforward, and videoconferencing over IP will be common soon. Or perhaps you wanted students to assemble data from public



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Editor's Note:

So many hopes hang on the possibilities for change, one wonders how that peg of longing keeps from breaking off the wall of human consciousness. Some things do not seem to change and resistance to change, one hears it argued, has a healthy influence on what eventually happens. At the moment, teaching and learning look up at a tidal wave called technology, knowing it will change the landscape—indeed, that it already has—and wondering with some irritation and some fear what the change means and whether it is a good thing. This issue of the *Forum* will offer encouragement to skeptics and advocates of technology alike by doing what we like to do best—highlighting the high, common ground where fundamental values endure and improvement can always be made.

The *Forum* receives more books than we have staff to review, and reviews per se have never been a big part of what we do. At times, however, a book or article or piece of software demands attention. Robert Boice's *First Principles* cited by **Craig Nelson** in his CARNEGIE CHRONICLE in this issue was one such (cf. V6 N4). **George Collison, et al.**'s *Facilitating Online Learning* is another. In a way, the story and sidebar on *Facilitating Online Learning* bridge the divide between the positions found in the rest of the issue's contents. The Collison, et al., book is about teaching online, and yet on a more basic level, it's about teaching anywhere, anytime. It isn't concerned with technology. It's concerned with the strategies of communication that lead to learning.

Skeptical reactions to the adoption of new technologies in teaching range from the neo-Luddite, which I received in response to an inquiry about technology adoption in my old department—I was told, "We're satisfied with books, thank you"—to the University of Phoenix recently profiled on *60 Minutes* where they're looking forward to turning teachers into holograms. **Tom Rocklin**'s TECHPED column takes a more reasonable approach to the critical questions we all need to put before the avalanche of hype. Look for an **expanded colloquy** in response to Tom's column under **Supplemental Materials** on the *Forum*'s Web site (www.ntlf.com). (You'll also find **Chapter 7** on Critical-Thinking Strategies from the Collison, et al., book there.)

Back in the average classroom, teachers continue to wrestle with such mundane problems as getting students to come to class prepared and helping them learn to study for exams. We'll address the preparation problem in our next issue. Meanwhile, in these pages **Sally Sommers Smith** offers some practical advice on coaching students in how to study effectively for exams and spend less time doing it.

Craig Nelson's CARNEGIE CHRONICLE examines the challenge of moving from "good enough" to "better than that." The books that are helping him in his quest to have his teaching make a lasting difference in students' lives offer a well-vetted reading list for all teachers restless and ready to get even better at what they do.

Finally, faculty have always known that teaching was hard work. **Linc. Fisch**'s AD REM . . . on "Warming Up" highlights its physical aspect, our need to limber up before taking on a class. In a way, Linc.'s piece takes us back to *Facilitating Online Learning*. Linc. compares getting ready to meet a class to an actor preparing to go on stage or a singer warming up before a concert. Collison, et al., as you'll discover, see effective teaching as a kind of effective casting, sending the best persona into the drama of teaching and learning as they unfold. It's improvisational to be sure, but as Linc. points out, preparation has many dimensions.

—James Rhem

sources and analyze those data in order to address a course-related question. Again, it was theoretically possible, but so logistically difficult (copy out of a printed volume and analyze with a desk calculator?) that it wasn't going to happen. Again, the Internet (download data from a well-documented web site and analyze them in a spreadsheet) makes the assignment feasible.

Time on the Real Task

Efficiency, by the way, is important even when it doesn't create a new opportunity. Good practice in undergraduate education emphasizes time on task (Chickering and Gamson, 1987). But what task? Back in the days when students drafted papers with pens on paper and

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then typed them up, the typing was not a component of the assignment that led to much in the way of learning. Similarly, walking to the library and searching through volume after volume of some printed periodical index had little to do with learning (however character building it may have been). Nevertheless, the time spent typing, walking, and (inefficiently) searching all consumed time from a fixed pool of time a student could allocate to the project. Today's technologies can increase students' effective time on task by reducing the amount of time they spend on

task components from which they learn little or nothing.

Efficiency at What?

Doing low value activities efficiently isn't a particularly worthy goal. To adopt a technology wisely we have to have reasonable expectation that the technology will facilitate an important learning activity. One straightforward way to think about the issue is in terms of the triads that the Flashlight model of the TLT group (e.g., Ehrman, 2000) uses. A triad consists of an education goal (in this context, I would say a desired learning outcome), an activity (what students will do) and a technology that facilitates that activity.

“We faculty have a lot more experimenting to do before we know as much about how to use the Internet as we do about how to use blackboards.”

Consider a simple and rather traditional case. The instructor of a survey course wants students to be able to use appropriate terminology and apply each of several theories to the analysis of particular problems. Students will read a textbook to learn the terms and theories. In order to both monitor and encourage textbook reading, the instructor may want to administer low stakes weekly quizzes. If the class is large, administering even a brief quiz may take as much as 20 minutes, or something like 13% of the week's class time for a course meeting three hours a week.

I know some teachers who, faced with this situation, have chosen to administer the quiz on computers. Students take the quiz outside of class, and those 20 minutes in class

can be used for other purposes. Equally important, because the scores are generated, recorded, and reported automatically, the teacher saves considerable time each week. That time can be put to more productive use.

Fools Rush In

Even when we identify a worthwhile learning goal, a student activity that will support that goal, and a technology that will increase the efficiency of its pursuit, questions remain—let's call them *economic questions*. Before implementing an attractive technology in our teaching, we need to consider costs in two broad categories.

First we need to ask what it will “cost” to get started with a particular technological innovation. Some of these costs might be monetary (buying software or hardware, for example) and those will often be both obvious and difficult to fund. Sometimes a true “off the shelf” solution is available and these monetary costs are the main costs of the project.

Much, much more commonly though, the main costs will be someone's—usually the faculty member's—time. These costs are often unaccounted for and overlooked. I don't fill out a time sheet showing how many hours of my work are to be billed, for example, to each class I teach (and I don't want to!), but the fact of the matter is that my time is usually the limiting factor in what I can accomplish as a teacher. Assigning a monetary value to my time doesn't do much to help my decision-making. I can, however, consider the *opportunity cost* associated with implementing a particular learning technology. That is, I can, and should, ask what else I could be doing with my time if I weren't implementing this learning technology.

These up-front costs are only part of the cost side of the equation. I also need to think about the *continuing costs* associated with the project. Again, some of these may be monetary (e.g., license renewals), but

usually the opportunity cost associated with my time will be the deciding factor. If maintaining a web site takes so much time that I can't give students prompt feedback on their work, that web site may not be a good idea.

These two categories of costs (initial and ongoing) interact. I may tolerate very substantial start-up costs if the ongoing costs will be low. This is akin to paying more for a high-efficiency furnace because of the ongoing savings I expect.

Still, my habit of continually tweaking and tinkering with a new solution is an ongoing cost. Does it have any justification? Some. We faculty have a lot more experimenting to do before we know as much about how to use the Internet as we do about how to use blackboards. Even if my tweaking isn't justified by the learning of my current students it might be valuable (particularly if I share my experience with others), in shaping our future as teachers and learners.

Summing Up

I know of a number of ways in which blackboards can make my teaching and my students' learning more efficient, so the blackboard is a candidate technology. In today's environment, the cost of adoption of the blackboard is pretty low. They're relatively inexpensive to install and last a long time. My investment in developing instruction that uses a blackboard isn't at serious risk from changing standards. Although I have to be a little bit concerned about the possibility that blackboards will go away, I've thought some about the migration issues to, for example, document cameras, and I think they are manageable. So next semester, I'll be using a blackboard.

If only my decisions about computers and the Internet were so straightforward.

Reference:

Clark, R. E. (1983). “Reconsidering Research on Learning from Media.” *Review of Research in Education*, 53 (4), pp. 445-459.