The Academic Information Technologies Newsletter

PREV | CONTENTS | NEXT

The Age of Digital Learning: A Copernican Revolution

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> **This revolution will fundamentally change how we learn, abolishing 'all former educational paradigms that have dominated in the past.'**

In a recent article[1], Carl Raschke of the University of Denver describes a revolution in learning as significant as the Copernican revolution in astronomy. "Just as Copernicus redefined astronomy by positing that the earth circles the sun, and not the other way around, so the new educational theory suggests that the generation of knowledge must be pegged to the conditions of the learner, rather than the genius of the instructor," says Raschke. This revolution will fundamentally change how we learn, abolishing "all former educational paradigms that have dominated in the past." Ominously for some, Raschke asserts, this will signify "the end of education as the word has been used historically."

Is this "revolution" really going to happen and when? Where is Iowa State in this revolution? What does this have to do with me, as a learner or teacher or mentor? Is this good or bad? What does this have to do with Academic Information Technologies?

There is not sufficient space here to answer all these questions, nor do I have the wisdom to do so. But, let me highlight a few important items.

While the Copernican revolution changed our world, it appears so obvious to us now that we can scarcely imagine what it was like beforehand. This new revolution will be no different. Like the steam engine that fueled the Industrial Revolution, information technologies often appear to be pushing us (sometimes faster than we'd like to go) into new directions. Electronic commerce, Web-based courses, chat rooms, Internet video, and e-mail greetings from grandma and grandpa, all seem to be important and exciting, but are they revolutionary? So far, we see the changes from so close up that many of us don't recognize yet just how fundamental the changes are.

But what happened to the steam engine will happen here as well. The new technologies will become so mainstream, so familiar, that we will stop paying attention to the technologies (when was the last time you saw a steam engine?). Soon, when the personal computer, the modem, and even the Internet fade into oblivion, we won't care—but the real revolution will continue.

The revolution began in universities. Universities have a real opportunity to continue to lead in this revolution. But what is our role beyond creating cool software and inventing even faster, cheaper technologies?

Our role, of course, is to foster *learning*. While in the past, we emphasized the primacy of *classroom teaching*, we now recognize the importance of *learning communities*, of

mentoring (we always knew this was important), and the notion that different students have different *learning strategies*.

Where does Information Technology (or IT) fit in? Not an end in and of itself, information technology is "just" another awesome tool (perhaps the most power ful tool since the printing press) in sharing knowledge, information, ideas, and even hopes and dreams among people.

IT has some special properties. It allows sharing anywhere in the world at remarkably low cost (you can share a paper with a buddy in the Ukraine at the same cost as one across Ames) and asynchronously (you can share ideas this afternoon and your buddy can respond while you are sleeping).

These properties allow us to learn very differently. We can create learning communities across vast distances. We can seek the advice of a mentor even when they are travelling. We can imagine ourselves as students of Iowa State University *for life.* Can we really?

When you get your first "real" job and you know ceramics, but the company needs an expert in plastics, what do you do? Within the next five years, if not sooner, you will bring up the ISU Web page, click on the *lifelong learning* Web page, select the new Masters program, choose the required courses, present your Visa card, and start learning. Perhaps your company requires you to develop your skills after hours, so you do this from home over your multi-megabit cable modem. Perhaps your company considers this part of the job and you take Friday afternoons to sit at your company workstation, sharing ideas with your fellow students in a video-based study session over the Web.

But what about now? How will this revolution change how we learn *on* campus? There are several areas that will dramatically change over the next several years in universities around the nation:

◆ Students will use portable computers and even pocket Web browsers to surf the Web from anywhere on campus using wireless technology.
◆ More and more classes will be digitally "taped" so you can use a "virtual VCR" to review and study the lectures as you prepare for exams.
◆ More and more quizzes will be administered on the Web, with instant feedback on how you are doing, so you know where you need to work harder (or when you can relax).
◆ Groupware will be a common tool for group studying, much as e-mail is used today. Unlike e-mail, groupware will allow students, faculty, and teaching assistants to create, track, and participate in class discussions in the evening over the Internet.
◆ The Electronic Library will provide access to course materials on "reserve" as well as Web information organized into knowledge you can depend on. Most exciting, with a click of a button, you will be able to access a reference librarian, who can help you find the material you need in real time.
◆ Learningware modules will let you learn your way. They will be interactive, customizable, and dynamic. Rather than just reading about that industrial process, you will build your own production facility using computer simulation tools. If you make a mistake, you will see it immediately. (For an example of a 3D river simulation, refer to `http://www.public.iastate.edu/~abc/java/river/riversim.html`.)

Of course, some important things need to happen for this revolution to occur. Some significant steps are already under way:

◆   High-speed digital service from the phone company is already available to 40 percent of Ames' residents; megabit-speed cable modems promise (knock on fiber optics) to cover the area this year, allowing video and high-quality sound in real time.

◆   Computers that were supercomputers ten years ago can be had for well under $2,000, including the video camera.

◆   Instructional technologies are in use in hundreds of courses and by several thousand students at Iowa State and the tools promise to get better and better (the two major tools, WebCT and ClassNet, have major enhancements promised for summer or fall).

◆   The ISU Library is on the move with its Undergraduate Commons (check it out at `http://www.lib.iastate.edu/commons/excerpts.html`).

◆   Many faculty use Web-based information as an integral part of their courses, but even more are working very hard to understand just where this revolution is going and how best to participate without compromising excellence.

In ten years, we will all be asked: "Where were you during the revolution?" What will *your* answer be? ❐

[1] Carl Raschke, "The Age of Transaction and the Scene of Digital Learning," *Syllabus: New Directions in Technology*, 13:4, November/December 1999.

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TOP