Think Small! A Beginner's Guide to Using Technology to Promote Learning

Incremental steps toward integrating technology in teaching can pay big dividends

By **Beverly R. King**

Technology has made available to teachers and students a broader array of tools than ever before to enhance fundamental goals of education, including critical thinking, problem solving, and communication. While some educators have enthusiastically embraced these tools and continually seek ways to enhance student learning through their use, others are more hesitant. In a recent survey of California community college faculty,[1] a majority said they use e-mail and the Internet, but fewer than half reported using technology in other ways to improve teaching and learning, such as developing instructional units that require students to use the Internet, using computer tutorials, or maintaining a Web site for a class. Why don't more faculty use technology to improve teaching and learning? The two most frequently given reasons are lack of time and lack of skills.

This article targets the faculty member in higher education who is relatively inexperienced in the art of teaching with technology or who has been frustrated in previous attempts because of the overwhelming number of options available. In contrast to the common U.S. notion to think (and live) large, what I recommend is to "think small." To increase the use of technology in teaching, faculty should be given examples of successful strategies and encouraged to take incremental steps to achieve similar successes.

Planning Smart and Thinking Small

Before deciding what types of technology to use, we must first have a clear idea of what we want technology to do in our classrooms—what learning outcomes we want students to achieve. Many of us, regardless of discipline, want students to hone their computer skills while in our courses. Despite the importance of computer skills for both academic and career pursuits, a number of my students do not yet have basic information skills, such as how to save a document as different file types or how to surf the Web effectively and efficiently. As a result, computer-based assignments are part of each course I teach. One simple way of assuring that students practice computer skills is to create a course Web site where students must go to get pertinent information

about the course. Even if you are not proficient with a Web page creation tool such as Dreamweaver, it can be relatively simple to create a site for each of your courses if your school holds a license to a course-authoring system.

Instructors want students to learn content as well as critical thinking, communication, and social skills. Smart technological choices help support all of these learning objectives, and these choices don't have to involve considerable amounts of time or proficiency. Technological teaching tools should promote sound principles of learning. Psychological principles specify that learning occurs most effectively when instruction is doled out in "chunks," with time in between to process and practice; when links are made between new ideas and previous learning or experience; and when students are actively engaged with the material and with each other. To teach with technology in support of these objectives, I offer four suggestions:

- Set small goals
- Develop small chunks of content
- Conduct small(er) Internet searches
- Use small, rich cases in the classroom

Set Small, Doable Goals

To the teaching-with-technology neophyte: set reasonable goals for teaching and learning, and take small steps to meet them. Do not think in terms of all courses at once or even one entire course. Rather, focus on one or just a few learning objectives in a single course, and think about how students could better meet those objectives by using technology. Are there portions of a course that would be enhanced through the addition of simple graphic, audio, or video files? Would students in a particular course be aided by having articles available digitally (perhaps through a library's electronic course reserve system)? Is there a Web site around which an activity can be designed that would illustrate a concept in a unique and powerful way?

Bringing technology to the classroom gradually, based on how best to support existing pedagogy, allows both students and faculty time to reflect on what works and what doesn't. For help with these initial small steps, take advantage of the expertise available on most campuses in the form of systems librarians or personnel in the university information and computer systems department.

In addition to starting small, start simple. Student learning doesn't increase in direct relation to the degree of technological sophistication in the classroom. Choose a technology for its ability to promote a learning objective, not for its level of complexity. For example, one of the most useful technological tools in my repertoire is screen-capture software, which allows me to copy a screen, area, or window from my computer and save it as a graphics file. Screen capturing requires a minimum of training, practice, or technological skill, yet it allows me to explain to students such things as how to navigate an online course, how to format a research paper, and how to search a library's electronic resources. Documents containing screen captures are especially useful when instructions need to be given to students in an online course and an instructor lacks the time or the skills to create a file with an audio component. They also are handy in a classroom where ready access to the Internet is not available.

Develop Small, Multimodal Chunks

I use the term "chunks" here to refer both to segments of time within a class and the units of instruction used to fill those time slots. In terms of time, most college instructors understand that the typical attention span for uninvolved listeners is 15–20 minutes. After 15 minutes of any type of presentation, students may begin to tune out, so having course content chunked into units of this size can be beneficial for student learning.

A number of possibilities exist for filling these chunks of time, including reusable learning objects. Educators have been using learning objects of one type or another for centuries, and a key component in the new view of learning objects is that they can be delivered across the Internet. In my terminology, learning objects can be viewed as professionally developed chunks of content that include some technological component.

How might I combine the concepts of chunks of time and chunks of content? Imagine that I have a 50-minute child development class, and the topic for the day is youth violence. The first or last five minutes of any class usually covers announcements, leaving 45 minutes, which I break down into three 15-minute segments. In the first segment, I introduce the topic and encourage student discussion of recent accounts of youth violence in the United States by way of a short video clip.

During the next 15 minutes, students are placed into groups and asked to generate questions they have about youth violence. Questions typically include: How much youth violence is there? Is it increasing? Are there warning signs in children who become violent? How can parents and teachers intervene and help prevent youth violence? If students don't come up with it on their own, I will add: What is the developmental path of children who later become violent?

In the final 15-minute segment of the class, I give each group of students a handout describing an out-of-class activity in which they will find answers to their questions online. Because it is a psychology class, the answers must come from psychologists and, to the extent possible, be based on sound scientific research. I get them started by supplying the URLs of relevant Web sites to visit and ask them to find some of their own. The next class period will be devoted to a combination of discussion and presentation related to the students' findings on the topic.

Conduct Small(er), More Refined Searches

Searching the Web for course-relevant material has become something of a nightmare. Even if you use advanced search criteria to weed out some of the chaff, it takes an enormous amount of time to sift through all the pages available to find information that can be used to foster learning. Fortunately, many general academic and discipline-specific repositories and referatories have been

created where faculty can go to search through vetted materials for specific learning objects and information.

One of the more popular referratories is MERLOT (Multimedia Educational Resource for Learning and Online Teaching). Created by The California State University in 1997 and free to all users, MERLOT is supported by a variety of schools, systems, and organizations. Individual membership also is free, and any member can submit a learning object to MERLOT. Major advantages of searching for learning materials through MERLOT are that they have been submitted by faculty members who are experts in their content areas, and a peer review system is in place to make sure that the materials are of high quality.

Students also have difficulty finding appropriate academic material online. Part of their education on how to do so could be a class period devoted to locating appropriate sources in a particular discipline. For example, I tell my introductory psychology students if they are searching the Internet for information on schizophrenia, a medical doctor or psychologist who has worked extensively with people with schizophrenia would be an appropriate source; a medium who says she has channeled the spirit of an 18th-century man with schizophrenic symptoms would not. Students also can benefit from being shown how to conduct an advanced search (selecting only particular domains and using Boolean operators) and how to search your school library's Web site.

Use Small, Rich Cases

Case-based instruction is an excellent way to encourage students to tie course content to the "real world." Case-based instruction forces students to think critically about scenarios of real-world problems. This method of instruction can, of course, proceed without any technological components; however, the addition of technology increases the richness and complexity of resources available.

In the future, case-study generators may be widely available. (For a current example of an online case-study generator, see <http://homepage.powerup.com.au/~dmcgrath/>.) Individuals without programming skill will be able to use it to create their own online case studies. Until then, more innovative educators may design and develop online case studies. Others might choose to use MERLOT (or another means) of searching for ready-made case studies in their disciplines. A wonderful example of an online case study in the form of a WebQuest can be found at <http://www.kn.pacbell.com/wired/BHM/tuskegee_quest.html>. This WebQuest, titled "The Tuskegee Tragedy," revolves around unethical medical research conducted by the U.S. public health system beginning in the 1930s. It incorporates news stories and images as well as RealAudio files and information from the Centers for Disease Control and Prevention to produce a case study rich in multimedia resources.

If creating an entire Web site devoted to a case study sounds too intimidating, and if sending students on a WebQuest is not feasible, you could consider creating a case study with only selected online elements. As an illustration, in my child development courses I ask students to read about cases on the PBS Web site involving juveniles who have committed serious crimes. They are then asked to write a paper discussing whether the individuals should be tried as children or adults based on the stages outlined in Jean Piaget's theory of cognitive development.

Arrange Small Groups

Another active learning strategy is collaborative learning, in which students are grouped for the purpose of achieving an academic goal. Most instructors can think of numerous ways to use small groups in a course. One increasingly popular technique that allows students to work in collaborative groups is problem-based learning, in which students try to find solutions to ill-structured problems. Problem-based learning is similar to case-study instruction with less obvious—and perhaps multiple—solutions. Technology can be used in a variety of ways in problem-based learning situations. Most obviously, instructors can search the Internet for already-created problems relevant to their disciplines. For example, in psychology, instructors at the University of California at Irvine created a fascinating scenario based on the O. J. Simpson case titled "Remembering the Verdict: A Problem-Based Learning Approach to Studying the Effects of Emotions on Memory" (available at <http://www.pbl.uci.edu/winter2000/pblproblems.html>).

Computers also can be used by the instructor in the presentation of the problem and by the students in finding resources to use in its solution. Chat rooms, discussion boards, and e-mail can facilitate group communication, and multimedia of many types can be used when students create presentations based on their solutions. Students, given the freedom to do so, can be quite creative when they put their heads together to solve—and present the solution to—problems relevant to their lives and their careers.

Assessing Teaching with Technology

The EDUCAUSE Center for Applied Research found that students want professors to use technology, but only if it is used well, which many times it is not.[2] Some students thought that technology had made their instructors less effective than when they used lectures and the chalkboard. Specific complaints included filling PowerPoint slides with lots of verbiage and simply reading them verbatim; wasting class time fumbling with equipment and software; failing to moderate chat rooms and discussion boards; and not making good use of course management systems.

Assessment procedures are essential to make sure that teaching is more effective with a particular technological tool than without. In most ways, good classroom assessment procedures are the same with or without technology. Assessment should match the expected learning outcomes and occur throughout a course rather than just at the end. A few special concerns come into play, however, when evaluating whether technology aids student learning. One of these

is that many assessment instruments, including course evaluation forms, are outdated and include no questions pertinent to students' perception of how their learning was impacted by the use of technology. Such questions should be included along with items assessing whether they actually did learn. Additionally, comparative data from a class in which the same learning objective was taught using another method are helpful; whether a new technology aided (or detracted from) learning can be most effectively addressed if this comparison is made.

Conclusion

Students in today's classrooms are preparing to enter careers in which they will need to know not only facts but also how to retrieve new information and how to integrate this information into the construction of knowledge to solve complex, real-world problems. They need to know not only discipline-specific content but also critical thinking, communication, social, and computer skills. Instructors' efforts at incorporating technology into their classrooms to foster these types of skills will help students get ready to enter an ever-changing world as life-long learners. *e*

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Endnotes

1. California Community Colleges, *@ONE Summary Report, 2000: Faculty Instructional Technology Survey Results*, 2000, <http://www.eric.ed.gov> (accession no. 798 accessed December 10, 2006).
2. R. B. Kvavik and J. B. Caruso, *Study of Students and Information Technology: Convenience, Connection, Control, and Learning* (Boulder, Colo.: EDUCAUSE Center for Applied Research, Research Study, Vol. 6, 2005), <http://www.educause.edu/ir/library/pdf/ers0506/rs/ers0506w.pdf>.

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