



Instructional Technology: Use and Assessment by Brown Faculty

QUESTIONS:

- [1.](#) How have you used instructional technology to enhance your teaching?
- [2.](#) How do you feel instructional technology has enhanced/altered student learning? How do you assess that change?
- [3.](#) What advice do you have for colleagues who are considering using instructional technology in their courses?

The use of computer technology to assist with instruction and learning in higher education is highly individualized at Brown. Many faculty across the University have developed innovative ways to put technology to work in both their research and teaching. Other colleagues are not sure how it might work best for them and their students. To help faculty who are on the fence about whether or not they should invest the time and energy in adapting technology to their needs, the Sheridan Center asked a small group of faculty to respond to three questions on this issue. We were interested in how faculty perceived the degree to which instructional technology does or does not enhance teaching and student learning in their courses. The term instructional technology may include a variety of media: use of the web, paper-less courses, threaded discussions, list-serves, e-mail, etc. We would like to thank those faculty members who kindly interrupted precious summer research time to contribute to this "interview": Professors Thomas **Banchoff** (Mathematics), William **Beeman** (Anthropology), R. Burr **Litchfield** (History), Robert **Scholes** (Modern Culture and Media), Brian **Sheldon** (Engineering), Kerry **Smith** (History), Victoria **Smith** (Hispanic Studies), and Terry **Tullis** (Geological Sciences).

1. How have you used instructional technology to enhance your teaching?

Banchoff: I have been doing so since 1968, through a number of different "technological revolutions."

Beeman: I have used a course web-page with multiple links to off-campus source material, course bulletin board for off-line discussion, and a course folder in the cluster server for storage of course materials and for students to deposit papers.

I communicate regularly with students via email. This last semester I tried to teach a paperless course, AN80 with mixed results. The CIT was not prepared to handle the technical questions and glitches, but the student products: using multi-media presentations, web links and images, were impressive. I will try it again next year. I have always used lower-tech technology such as video presentations, overhead projections and the like.

Litchfield: I have taught an undergraduate seminar called "Comparative Cities" (History 197—section 25) for the last 20 years in which students use a data base consisting of census samples from four cities in the process of industrialization in the 19th century: Pisa (Italy), Amiens (France), Stockport (England), and Providence R.I. c. 1840-1900. The students do general readings about the social effects of industrialization on cities in the nineteenth century, changing work patterns, migration, ethnic groups, the family, urban social geography, demography. Then in the second part of the seminar they learn about how the census data files are structured (they are used through SPSS on the Brown main computer), do experiments using the data (they use their own copies of Excel at home to prepare charts, tables, maps, etc. from individually arranged SPSS print-outs that tabulate the data to permit them to address specific questions), and choose a topic for a final paper using the data. The papers are structured to have them present over-view of current writing about their topic and then try to show something that contributes to this discussion using the census data. The papers are often quite good. The aim of the seminar is to have students use prepared data that can be approached from different points of view and for different potentially interesting topics so that they can focus on problems of analysis and interpretation rather than data collection. They learn some simple statistical methods, and how to present tables, charts, etc., in a paper. Thus they are able to do an "original" paper based on primary sources without difficulty in the time allowed for the seminar. After this initial experience, a few students have gone on to write good honors theses based in part on the census material.

Scholes: Many ways: Conferencing software for discussion, material on server for assignments, email in many ways.

Sheldon: During the spring semester, I taught a graduate special topics course (EN292, section 6). The students in this class had a range of different backgrounds. Most were graduate students (1st to 5th year), but there were also two seniors. Two of the graduate students were studying another branch of Engineering (i.e., not Materials Science).

Typically, these courses are taught with no formal exams, and the students are asked to do problem sets and write a paper on a subject related to the course material. With the help of a "Sheridan Center consultant" (Engineering Prof. Janet Rankin), I used a course Web page and e-mail to revise the students assignments. Over the semester, I gave the students a large number of questions, which they answered electronically (roughly one every two lectures). For the most part, these were general, somewhat open-ended questions. These questions were designed to get the students to think about the material that would be covered in the next class, and the students were required to submit their responses by e-mail the night before the next lecture. After reviewing their preliminary responses, I passed out an anonymous brief summary of the answers that I received, and these were discussed in class.

Each student was also required to work on a more detailed, final answer to one of every four questions. These were prepared in small groups (typically two students working together), and the final answers were posted on the course Web Page. I selected the groups, so that a senior student was typically working on the answer with a younger student. After these answers were posted, the entire class was asked to read through the final response, and they were then required to send me one final question about the posted answer. These final questions from the students were distributed in class (anonymously), and discussed. Grades for the course were based primarily on the final answers that they submitted — the grades also reflected whether students submitted their preliminary answers and questions on time.

Kerry Smith: In at least three ways. First, I've developed on-line web sites specific to each course I teach. At one level these sites replicate class handouts and other paper-based information strategies, in that they include syllabi, course announcements, reading lists and so on. At the same time, however, they move beyond the standard handout format by providing topic-specific research tools (linked to Brown's resources as well as off-campus sources), more general writing and analytical tools, and connections to reliable on-line

sources in and about Japan. When they work, these course sites facilitate new directions in research and inquiry. I don't rely on Course Publisher.

The second approach is tangential to what I normally think of as instructional technology, but maybe it belongs here anyway. I've been encouraging (but never requiring) students to submit drafts and final versions of papers, thesis chapters and the like as digital files. For lack of a better alternative this usually means working with Word documents. The advantage of this is that it allows me to offer suggestions and corrections and commentary embedded within the document. The author then has the opportunity to deal with those comments/corrections in a variety of ways, accepting some, rejecting others and modifying the rest. I like it because I find I work more efficiently on student papers in this format, and because in the end I suspect it is easier for students to deal with as well.

The third way I use instructional technology is through the adaptation of a traditional pedagogical tool (the research paper) to a new presentation and organizational format (HTML/browser-friendly multi-media). Over the past three years I have worked closely with CIS staff in an effort to integrate new technologies into my teaching, and more importantly into students' experiences with historical analysis. The collaborative projects produced by students in History 157: Japan's Pacific Wars are one result of these efforts. With the support of CIS instructors, students in the course learned how to apply their research skills and interests to create multi-media, HTML-formatted documents in place of the traditional end-of-the-semester research paper. These student projects, submitted on digital media, could be viewed using any of the commonly available web browsers (of which Netscape is an example), and eventually loaded onto the web for viewing by other members of the class. While this is not an approach I would use with every class, I found that, in this particular context, allowing students to pursue research projects in formats that encourage the use of visual and moving images (several students included short film clips as part of their presentations; one student included audio alone), as well as the construction of alternative narrative strategies was both successful and productive.

Tori Smith: Primarily as an ancillary support; students work with various technologies outside of class for listening practice, cultural study, writing practice, etc.

Tullis: I use instructional technology in two ways. First I give all my lectures from PowerPoint in a room well equipped for doing so (MacMillan 115). Related to this, I hand out thumbnail summaries of most of the material that I project in PowerPoint. Second, I have authored a web site using Microsoft Front Page 2000. Having the material in digital form for the PowerPoint lectures makes preparing the web pages much easier.

2. How do you feel instructional technology has enhanced/altered student learning? How do you assess that change?

Banchoff: Students learn better, I contend, when they get feedback from the instructors so they have an ongoing idea of what they are getting out of the lectures, the readings, and the exercises. Traditionally we have done that in math by assigning weekly homeworks, to be graded often by undergraduate graders, and handed back at best several days after they were submitted. Other less formal work was handed in at class time and returned with comments to the individual student at some subsequent class.

Now, the Internet makes it possible for students to get response to questions and informal assignments between class meetings. Homework assignments handed in online can be responded to much more quickly by instructors, and by assistants. That not only helps the student directly, but it gives feedback to the instructor who can then adapt upcoming lectures to reflect that greater awareness of student understanding or confusion. Better lectures enhance student understanding.

Beeman: The world is changing. Students will never be working with just black print on white paper, and people just talking at them in the future. It is our obligation as teachers and academics to work with them using new technological means. My students have really experienced a new freedom of expression using multi-media electronic technology to do research and produce their intellectual products. This does not replace expository prose and standard research techniques, but it teaches them the differences between different discursive forms that they will have to command in the future.

Litchfield: It would be impossible to teach this seminar without use of the census material (in fact it was thought up and initially funded by the NEH) as a way to introduce students to topics involving some use of quantitative social analysis and computers. The seminar generally has a rather small enrollment (6-8 students).

I think that potential students are sometimes intimidated by the unusual approach (it is not like writing a more 'literary' seminar paper), but the students who take the seminar seem to like it.

Scholes: It is another form of contact with students and among students; a way of exchanging written work.

Sheldon: With the approach described above, the students were much more engaged during lecture. In particular, they asked more questions and better questions about the lecture material. This certainly suggests that the procedure used with these questions was successful. Midway through the semester I also gave the students a survey about this methodology (also designed with the help of Janet Rankin). The student responses were overwhelmingly positive.

It is important to note that this procedure could have been implemented without the Web page and e-mail (i.e., by handing out and collecting pieces of paper). The big advantage of electronic communication is that it allowed me to receive the students responses more quickly. Thus, when I handed out the question in Monday's lecture, the students typically responded on Tuesday night. On Wednesday morning, I read through their responses and prepared the handout which summarizes their responses. This allowed me discuss the question in class, less than 24 hours after the students wrote out their preliminary responses. With a more traditional paper-based approach, I probably could not have discussed the material until Friday's class, when the question was not as fresh in their heads.

Posting their responses on the Web page is not that much different than circulating written versions of the final answers. I think that circulating responses to classmates made some of the students put more effort into their answers, but this probably applies equally to a Web posting or to handing out paper. Posting the answers on the Web is just more convenient, and it also saves paper.

I think that the approach that I used was particularly well suited for this type of class. There was a lot of variability in the student's prior coursework and knowledge, and this approach allowed them a lot of flexibility in applying their existing knowledge. Next year, I will try to integrate this method into a more typical Engineering course (i.e., one with exams and problem sets).

Kerry Smith: If the web or my laptop vanished tomorrow I wouldn't have to fundamentally rethink how I teach, or what I expect from students. Having said that, I don't believe I shouldn't continue to use technologies in the classroom or in my own work. In my case these tools have enhanced rather than transformed an approach to learning and teaching.

The variants of what we are already familiar with in the classroom are the downside of deploying these technologies. One sometimes finds that novice researchers take for granted what they encounter on-line, when they would be better off approaching all sources with a certain degree of skepticism. But those same researchers tend to have similar problems with printed sources; the medium has changed, not the core issues.

Similarly, access to on-line resources has made plagiarism easier in some contexts, but I doubt very much that it has created a larger population of plagiarizers.

Tori Smith: It can provide many wonderful things but must be used with care. i.e., On the Internet, discriminating between what's useful and what's chaff can be difficult for learners. Faculty have to guide students carefully.

Students get inured to the slickness of materials and might dismiss some very useful low-tech materials (i.e., lab audiotapes) simply because they aren't sparkly enough. I worry about the dependency on amusement/entertainment that I've seen growing in students over the last couple of decades.

Tullis: I believe that using instructional technology has improved my teaching in Geo 1, an introductory course for non-science majors. The class has quite a few students (80 this past year) and their interest in the subject is initially somewhat equivocal. For these two reasons I think that what I have done helps connect with them and makes it easier for them to learn. I'm not sure for a class of 10-20 majors it would be so good; I've not tried it in Geo 145 yet, and am not sure I will.

Student feedback, both verbal and in several types of review forms, on the PowerPoint presentations has been positive. I haven't taken the time to see how many hits the various parts of my web page have had, so I don't have so much of an idea about how well that has worked. The only thing I am sure of about that is that most of them look at past year's exams on the web prior to their own exams. That way of providing the old exams has been very convenient for me, compared to how I used to try to do it. Perhaps the most valuable part of doing the lectures via PowerPoint from both my and the students' point of view is that it forces me to have everything well organized and prepared in advance, so the lectures go smoothly and are clear. The thumbnail summaries of the material that I hand out helps those who would rather listen than take notes end up with a good-quality permanent record of what went on in class, and this is clearly used by them a lot when they study for the exams. I was afraid that handing these out might deter some students from attending class, since they could get copies from friends or go to the web page. However, as far as I can tell from an informal assessment, about the same proportion of students attend class with or without my using the handouts and web page.

3. What advice do you have for colleagues who are considering using instructional technology in their courses?

Banchoff: First see how using technology, especially interactive technology, can enhance feedback opportunities already in place. Then be open to the possibility of changing in response to unexpected feedback, especially as the time scale of comment and response is altered. Also, talk to others who are using these new approaches and see how some aspects might be good for other courses. Even more than before, it is clear that there is no one way to improve teaching and learning, and that the many new ways are worth exploring.

Beeman: Everyone should get on the stick. It is easiest to lecture and give written exams in blue books. This kind of teaching does not in any way represent today's world, and people who are stuck in this older mode of teaching are damaging their students. However, Brown does not support the preparation needed for instructors to retool their courses. As long as there is no support for this, only the most dedicated volunteers will do it, and be frustrated when they are not rewarded. Some faculty received salary increases of 20 percent last year, none for anything done to improve their teaching. Course release time, summer money, serious consideration in promotion and salary increases for successful implementation of new innovations is essential if we are to make progress in this area.

Litchfield: Well, I think this is an example of a kind of seminar that can involve students in an area of ongoing scholarly research. I would advise colleagues considering using instructional technology in a course to think about how computer usage actually furthers their own research (beyond text editing and looking up bibliography in on-line library catalogues), and to focus on the use of computers as a way to involve students in computer usage as a valid tool for furthering current directions of investigation and research

Scholes: Try things, talk to those who have done it, don't be afraid to experiment, look around at what has been done and is being done, consider conferencing software. (Ed. For example, see his web site <http://www.brown.edu/Departments/MCM/people/scholes/default.html>)

Sheldon: Posting materials on the Web is not particularly difficult, although this may depend on your Departmental computer support people (Jim Scheuerman and Laurenz Hermann in Engineering were very helpful, and they made it easy for me to do everything that I needed to do from my office).

There are clearly some students who feel more comfortable asking questions via e-mail than they do in person. Formalizing e-mail submissions to certain questions can help these students get over their shyness.

Kerry Smith: It is worth noting that bringing these technologies into the classroom usually involves asking students to master new skills in addition to those we already demand they develop. We can therefore find ourselves adding to the student workload to an extent entirely out of proportion to the potential return. Instructors would do well to think carefully about whether incorporating instructional technology makes sense in a given class and context. Just because it can be done doesn't mean it should be. On a related note, it strikes me as a mistake at this point to demand technological sophistication across the board, and certainly not of students in a gateway or mandatory course. The last thing I want is to let the technology get in the way of the instruction or the learning.

A final piece of advice. Talk to CIS; Bill Dennen and his colleagues are tremendously supportive and are happy to work with faculty.

Tori Smith: It can be a horrendous time-sink — be careful. Don't try to do it all yourself.

Tullis: It is a lot of work to prepare everything electronically, both for the lectures and to make the web site. However, once the initial investment is made, something that in my experience takes two years, then subsequent years will hopefully go much easier (that will be next year, so I'll see!). Ideally, then things can be modified to make improvements without having to make everything from scratch. There is a great danger in using PowerPoint in class that the class can become somehow too cut-and-dried and boring and not an interactive experience. One has to work hard to avoid this. I believe I have done so by encouraging lots of questions and discussion, especially in the first few days of class when the tone for the entire semester is set. I also do quite a few in-class demonstrations and show lots of slides of interesting geological features from around the country, all of which keep the classroom experience a dynamic one.

We hope that you find these responses thought provoking, and that you will contribute your own views on this subject to the Center for inclusion in the next issues of *The Teaching Exchange*.

Please send your submission to Sheridan.Center@brown.edu