Ten Ways Online Technology Has Transformed My Teaching

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In August 1994, I was asked by our Provost (along with six other faculty members at our university) to create what, in retrospect, was surely one of the first totally online courses in the United States, utilizing the World Wide Web. This experience led to an experimental test of the effectiveness of that venue the following year. The results were reported (Schutte, 1996). Since publishing those results, I have consulted and been critiqued, quoted and queried and generally cast as lightning rod for the subject in some 58 dissertations, 14 books and over 13,000 emails / newsgroups. That this has occurred is clear testimony to the fact that the controversy over this technology abounds.

Therefore, on the tenth anniversary of my experience with the "Cyber Seven" and the 30th anniversary of my teaching career, I felt it was appropriate to examine the effects of this, now not so new, technology on the institution of teaching in a college environment. I do so with the understanding that there may be little consensus on precisely what the definition of teaching encompasses. Moreover, I do it with the conviction that the role of online technology is neither completely understood, nor appreciated, in that environment.

With that in mind, however, I engaged the first challenge mitigating the ability to comment on the role of online technology in teaching--to reach consensus on the components that define the teaching role. I set out to test my intuitive ideas on the subject, against those of my colleagues, by devising a set of questions purporting to tap into the universe of content articulating the attributions and answers to the question: "How does one know s/he is a Teacher / Professor"

A questionnaire containing 100 closed-ended and five open-ended questions was distributed to 340 members of the faculty at CSUN. A total of 288 questionnaires were returned. The questionnaires were coded and the answers cluster analyzed. Ten dimensions were identified as relevant and, therefore, used here as an outline to describe the effects of online technology on teaching.

The dimensions resulting from the survey data can be usefully classified into three components: 1) "structural" attributes defining teaching (including the classroom, resources and students); 2) "interactional" attributes (including presentation, communication, discussion and feedback); and 3) "administrative" attributes (including testing, evaluation and reporting). Accordingly, the ten "ways" online technology has transformed my teaching, referred to in the title of this presentation, correspond to the changes I have experienced, in these ten dimensions, during my career. They are as follows:

Structural Attributes

Dimension	**Change**
1. The Classroom (Environment)	**(=>virtual & asymmetric)**

First, I am much less classroom based. The obvious implication for teaching has been the elimination of time and place (i.e. my courses are now as likely to be virtual as real and as likely asymmetric as mutually time bound). Where integrated with the traditional classroom, the trend has been to foster what has become known as "classroom sharing" (two classes meeting on alternate days in the same classroom with the "off" days held online).

That newsgroups, websites, and chat rooms are available 24 / 7, while classrooms and professors and are not, invites the concept of asymmetric learning into the university environment. That this provides flexibility for students and administration, taking and scheduling classes, should be self-evident, but is often overlooked.

It is both pedestrian and obvious to note that the condition of college funding, particularly for state supported institutions, has diminished over time. However, I believe it is more significant and less coincidental that the rise in online teaching has correspondingly elevated. At CSUN, for example, during the past five years, capital outlay for classroom construction has dropped by nearly 50% at the same time enrollment has increased nearly 28%, yet correspondingly, the number of completely online course has quadrupled.

2. Resources (Location & access) (=> archived and interactive)

My class resources and materials have morphed, to quote Negroponte (1995), from atoms to bits. I no longer reproduce syllabi, assignments, journals articles, or testing material; nor do my students. Informally, I have measured student access to resources, for use in completing class assignments, over the past several years. For the first time last Spring, students were able to complete all assignments for the class accessing all resources online, without visiting the library once (this includes access to reference material, census data, journals of all types, daily diaries culled from content analysis of other city's newspapers, reviews of videos, congressional records, etc., etc.). Out of guilt, I now physically take the class to the library during the first week of the semester, as they will

likely not visit there again, if left to their online devices. Clearly the shift has been from finding enough information to culling too much information.

Parenthetically, the traditional model of university rankings correlates prestige with faculty prominence. Yet is it spurious that it also correlates with library resources? Perhaps the resources bring more prominent facility, resulting in increased prestige. For example, it is not coincidental that Harvard has both a prominent faculty and contains the largest volume of titles in its library. If that is the case, what will accessibility to databases (e.g. ICPSR) and full text searches (e.g. JSTOR) do to this great literary divide?

3. Students (profile and motivation) (=>proactive, < role conflicts)

I engage my students less and less on campus. That CSUN is a commuter school (86%) is historically correct. That its cliental is more likely to be minority (56%), transfer students (52%) and full time workers (78%) is also a historically correct. However, that these students tend to own their own computers (93%), regularly utilize email (88%) and "surf" the web (82%), is a radical change. These statistics have more than doubled in the past five years. I no longer have to give lessons on the use of Windows, Internet Explorer, Word, Excel, the web, IRC or Hypernews. In fact, my students regularly give me instruction on the use of such techniques as pearl and java scripting, instant messaging, and the like. One latent consequence of these new found skill sets is the flattened learning curve for such topics as database and journal searches and download, SPSS manipulation and the use of interactive web forms.

Clearly the trend is toward a more diverse student population who are first in their family to attend college, who work, take longer to graduate, yet are more computer savvy then their predecessors and, therefore, are more likely to demand distance learning

technology that solves their role conflict between work, family and school. As witness to this trend, campus surveys show that students spend an average of three days or less on campus per week (Schutte, 2002).

This trend is not unique to CSUN, however. The NCES tells us that those colleges and universities most likely to adopt online instruction have a disproportionately high percentage of undergraduate, commuters who work full time and otherwise have access to computers (NCES, 2003). Ironically, those research institutions with access to more private sources of funding for technology tend to adopt online instruction less.

Interactional Attributes

Dimension	**Change**
4. Presentation (of Material)	**(=>non-linear / multimedia)**

I no longer lecture to students. This is more than just transformation from "Sage on the Stage" to "Guide on the Side". Rather, it is a re-casting of my role from "Information Repository" to "Information Guide". My Powerpoint presentations, all of which are located on the web, are as likely to contain listings of web sites and resources, for each topic, as they are to contain lecture content. In short, I don't tell the story anymore. I don't even narrate it. Nor do I organize it in one media. Rather, I am the librarian of information, delivering content in multimedia to the students who, in turn, contribute further to such databases of information in the course of learning the concepts.

A typical presentation of a learning module consists of the student hearing and seeing the material from my online presentation (AVI files, PowerPoint, etc), then exploring the same topic from a list of other websites' discussion of that material, following those leads in a non-linear fashion and finally coming full circle on the subject

by synthesizing the diverse approaches and submitting their take on the subject through a web form's input.

Parenthetically, there is a type of naïve structural equivalence modeling emerging in this process (Burt, 1983) as the ideas and discussions from diverse web and library settings tend to repeat themselves through common references and links. This exercise in gaining closure not only helps the student cull the seemingly endless links, but also allows the student to synthesize the various descriptions and discussions into coherent concepts.

5. Communication (of Objectives) (=>real time / Interactive)

I no longer repeat course objectives. In contrast to my prior teaching life, where I would constantly remind the student of the goal of a topic or chapter and then repeat it two or three times during the course of the discussion, I say it once when the topic is introduced. From that point, technology fills the void. Automatically generated e-mailings remind the student of the topic and the objective of their study, each week. If I see a student falling behind, or not getting a concept, I will email him/her and ask them to repeat the objective to me via return email. Students do the same with me through web form FAQ's. All office hours are real and virtual via both the computer and telephone.

6. Discussion (of Content) (=>collaboration / discourse)

Discussion is rarely in person. We extensively use symmetric (e.g. mIRC) and asymmetric (e.g. Hypernews) interaction technology and archive all of it, linking it to the web for further review. While conventional wisdom might argue the student would become more alienated in this environment, evaluative feedback from questionnaires at the end of the semester indicate students feel less inhibited in this context than in the classroom. Ironically, participation is, at once, relatively more anonymous and yet

simultaneously more accountable. In short, while less visual contact, there more interaction.

The latent consequence of this form of interaction is that students embrace it as a methodology for studying, as well. Instead of simply a dyad getting together in real time or virtually, groups of individuals, who would have no chance of meeting in real time, congregate to discuss class material in chat rooms and in Hypernews groups providing support mechanisms that simply cannot be duplicated in the classroom.

When there is classroom discussion, we almost always use the networked computers to first list ideas on the student's screen and then share them visually through the pull technology of our Sympodium and the LCD projector mounted overhead. This effectively simulates the anonymity of the chat room, in real time, but compels the student to be proactive in the discussion.

7. Reinforcement (of concepts) (=>personal / incremental)

The student self reinforces. What used to take hours of individual consultation and personal training is now handled by computer aided instruction programs. While not every concept lends itself to drill and practice, it is characteristic of all learning that there be incremental and consistent operant conditioning for effective learning to take place. The personal computer is particularly adept at providing this. For example, in my Methods class, I use motion screen captures to illustrate the use of each particular technique of data analysis in SPSS. The student can review these procedures over and over until they master the steps, thus freeing me to deal with more idiosyncratic problems.

Administrative Attributes

8. Testing (for Understanding) (=> collaboration)

Testing is no longer in class and no longer an individual activity. We have developed a technique for giving tests on line to track both individual and group performance with regard to feedback. Individuals are encouraged to consult with their peers in preparing for and taking tests. Feedback is instantaneous and results are forwarded to the instructor.

Moreover, these tests are cumulative. No student can move to the next until they have passed the previous. This difference of this technique from traditional CAI models is that the individual is required to collaborate in taking the test the first time. S/he is then allowed to take it individually. Thus function of the test redirects from focus on individual error to achievement. We find the synergy that stems from peer to peer interaction accelerates this process.

9. Evaluation (as Grades) (=> real time / non paper based)

Grading is no longer on paper or instructor based. The result of a cumulative learning process approximates programmed learning, but with important caveats. First, like programmed learning the evaluative feedback is immediate and in real time. But the advantage is the overlay of collaboration. More than one person is reinforced at a time, thus relieving anxiety and facilitating communication among students, yet through the process, we can maintain the individual as the unit of grading. (Significantly, these student pairings are assigned early in the semester so that those performing above average are paired with those who are slower. The net result is that the faster learners are given the

chance to tutor their new subject, while slower students are mentored during the rest of the semester).

Second, since the learning is cumulative, students (with encouragement from their peers) can pace themselves, the final evaluation being an interview with the instructor, rather than the traditional final examination. At this interview, both have the advantage of all testing recorded and available, as a database, to both the instructor and student, at the time of evaluation. The student evolves the idea that the grade is a custom evaluation without regard to arbitrary or comparative standards based on others' achievements. Yet it is, in fact, based on a seamless database of testing and feedback throughout the semester.

10. Reporting (Accounting) (=>Accountability)

Grades are no longer "turned in". With the SOLAR program from PeopleSoft at CSUN instituted this year, all administrative functions are carried out online, including registration, add/drops and, most importantly, grading. There is no more Opscan grading sheet, secretarial deadlines or handwritten non-conforming notes to be delivered to a "place". The place is virtual. All information is archived and available to the respective instructors and their students on a real time basis. Thus, a grade is available to the student as soon as the instructor enters it into the system. This has reduced the need for hardcopy storage and trips to campus for those needing help to correct incompletes and unauthorized withdrawals

Conclusion:

If the changes referred to herein were simply a matter of increased access through online database and web technology, they would be interesting, but the change would not

systemic. They would rise to no higher level than, for example, replacing a typewriter with a word processor, or an overhead with an LCD projector.

Yet I believe the changes I am observing and evolving in my own classes are systemic for three reasons. First, the 2000-year old model of professors conveying information they have accumulated, to students in a public forum, is being reversed. Today's students are coming to school with a wealth of knowledge based on exposure to ideas in real and virtual space that they were unable to access just five to ten years ago. In short, the student is now engaged in educating the professor about his own area of expertise, as much as the reverse is true.

Second, and corollary, is the observation that what instructor-student communication that does exist has been transformed. Both are recast as proactive real time learners. Decision making as to where to go in a non-linear real time world is, by definition, a proactive process systemically different from the traditional textbook and lecture materials that are internalized in a linear fashion and regurgitated, in like kind, on tests.

Third, that this process can take place on an anytime, anyplace basis, truly makes the educational experience a life-long process, less bounded by the year in school and more integrated with other life roles. The result is a seamless record of what we previously called a "class" and are now more inclined to call an "educational encounter". It is no surprise to me, therefore, that the University of Phoenix, for example, has become the largest non-four-wall university in the world, based almost exclusively on the online concept

Finally, in making the connection between online technology and teaching, it should be understood that I neither praise nor prosecute the technology. Rather, I simply

encourage you to expand your horizons and attenuate your perceptions, at least enough to recognize the path down which we are proceeding.

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