Teaching Well Online: Part II, Interaction Design

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Part I of this presentation deals with the significance of instructional design for online learning; courses and materials must be designed differently if teachers expect to achieve success in this different kind of teaching environment. Part II deals with the importance of designing the online "classroom experience" to assure an effective, interactive learning environment.

The Traditional Teacher-Centered Classroom

For centuries professors have conducted engineering classes in the same traditional manner: the professor masters all the knowledge, assigns readings and homework, and spends the class time reciting the knowledge, working problems, and/or fostering discussion. The teacher serves as the focal point for student learning, and his or her role in the classroom is that of dispenser of knowledge and arbiter of conceptual disputes. The teaching-learning model could be described as a wagon-wheel or star model, with all students (S) oriented to and dependent upon the professor (P) as the source of information and interactions.

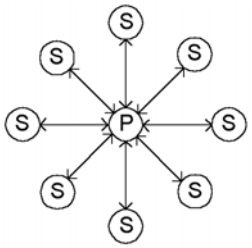

Figure 1, Teacher-Centered Learning Model

In the traditional model, students see themselves as the recipients of knowledge. Their role is to listen, absorb, obey, master, and perform the tasks associated with measuring learning—homework problems, tests, laboratory experiments, and presentations. While students may interact with each other or engage in group work, their attention and direction is focused on the professor as the center of the learning activity. Additionally, "class" means the face-to-face time spent with the teacher in charge. This traditional model usually persists into graduate or professional education.

Challenges of the Online Classroom

When professors decide to offer classes online, they must not only change the way instruction is designed, but also the way they conceive of the classroom itself. Unless they are content to model online classes after the old correspondence school pattern, they will need to rethink all the ways teachers and learners interact with each other. The interaction necessary for good student learning must be designed with a completely different paradigm. Instead of serving as the "fount of all knowledge" and directing activities from the front of the room, the teacher must learn to become the manager, leader, and motivator of learning that takes place beyond his or her control.

Some pundits have called this changing from "the Sage on the Stage" to "the Guide on the Side." The teaching-learning model changes from teacher-centric to a web-like interactive model, where the professor (P) is only one of the key elements, along with students (S).

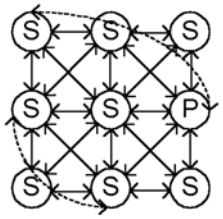

Figure 2, Interactive Teaching-Learning Model

Many teachers experience a sense of loss and a feeling of irrelevance: without face-to-face contact and deprived of the lecture, they are not sure what they are supposed to be doing. Learning to think in new ways about the learning objectives and learning to interact differently with students is indeed challenging. After mastering these challenges, however, the professor is indeed liberated and often exhilarated to experience a new kind of teaching and learning that is stimulating and fresh.

Adjusting to this interactive model of teaching and learning is as challenging to students as it is to professors. Accustomed to being guided and told what to do every class meeting, students will resist taking charge of their own learning tasks. For this reason, the online classroom model is much more successful with adult learners, especially those in graduate-level programs. Working professionals have a great deal of vested interest in keeping their day jobs, working in learning activities on the side. This asynchronous learning model (which can have synchronous components) allows them the flexibility and access to advanced knowledge in a learning environment that recognizes their maturity and expertise. These students will excel as they become co-creators of knowledge, collaborating with professor and peers to achieve the learning objectives of the online class.

Using Communication Tools for Interaction

As teachers move into the online teaching-learning environment, they must master new communication tools. Without the face-to-face component, they must develop interactions that foster mastery of the skills and concepts of the course. The communication tools are only that—tools to deliver and exchange information. The professor must conceptualize the types of interactions needed before choosing the tools.

Here are some examples of interaction, along with some tools that can be used to achieve them.

·Delivery of information 24/7

In an asynchronous learning environment, students expect to be able to access information on their own time rather than receiving it on Monday, Wednesday, and Friday at 9:00 a.m. Accordingly, teachers must design the information modules carefully (as discussed in Part I of this two-part presentation) and post them to the ***Web*** for distribution. There are many platforms designed for classes online, including WebCT and Blackboard. While expensive, these platforms can automate a number of class activities and create a sense of a true classroom online. However, if the professor has an adequate Web server, he or she is not necessarily dependent upon elaborate systems to distribute information. At the least, however, he or she will want some assurance of security (allowing access only to enrolled students) and reliability (servers robust enough to take the number of users with acceptable speed), along with technical support

(numbers students can call at any time to get help if the server goes down). Some schools who have industry sites with the equipment use ***real-time video delivery via satellite or web***, though these systems are enormously expensive and force students back into the synchronous mode (that is, they must come to a specific site at a specific time to get the information). Others use ***video or audio tapes*** for distributing lectures. While videos may be successful if professionally produced and edited, they are less than stellar if they are of home movie quality. Students become very proficient at fast-forwarding the "talking head"! It's important to consider why a student needs to hear and see the professor talking—what can be learned only in that manner?

·Contact with students

A number of tools are readily available for one-to-one student contact. ***E-mail*** is the most common and ubiquitous. There are other simple methods of contacting the entire class, also; ***listservs*** have the advantage of allowing students to subscribe from as many e-mail addresses as they choose, without the professor having to keep up with multiple accounts. Web-based ***bulletin boards*** can provide notices and reminders. ***Telephone conferences***, either individually or with smaller groups, can be very effective if done early in the term and at crucial times during the learning period. If professor and students have ***mini-cams*** on their computers, a minimally satisfactory "face-to-face" conference is possible between two individuals.

·Evaluating student learning

Professors still have need of ways to see what students are learning in the course. A number of tools can be used, depending upon the learning goals and the degree of trust developed within the class environment. ***Web-based tests*** (usually multiple-choice or short-answer) can be developed rather easily if a professor is using a classroom delivery platform such as WebCT. If seeing the student's work on problems is essential, there are inexpensive ***pen pads*** (made by Cross and others) that will allow a student to work out a problem by hand, capture it, and submit it via e-mail. Students can complete homework by hand and ***fax*** it in. Papers can be attached to ***e-mail*** and sent easily. The real issues are those that always occur in evaluation: what is it that must be measured, given this particular subject matter, these mature students, and their learning goals? While some fear that cheating can occur online, it's certainly not much different than students sending in "ringers" to take exams or copying homework from a peer. Thinking carefully about what the student must demonstrate, and devising ways to get at those higher-order cognitive skills will lead towards innovative and reliable ways of assessing knowledge.

·Simulating class interactions among students and professor

When the classes are small and telephone budgets are large, the ***teleconference*** can bridge gaps in distance. The same problems arise as in the live classroom: some people are too quiet, some talk too much, and some misunderstand tones of voice or innuendos. For classes up to about 20 students, a live text-based ***chat*** using a Web-based chat works well. For example, Netmeeting, Abbott Chat, or platforms such as WebCT or Blackboard offer chat capabilities. It is important to decide upon some simple protocols in order to facilitate discussion. Some that we have used very successfully include these:

*Type "HU" (hand up) when you wish to speak; wait for the moderator to recognize you.

*Type ellipsis (. . .) after your first short entry to indicate that you are still talking; others will wait for you to finish typing.

*Type "end" or [e] when you are finished.

*The professor or moderator sets a careful agenda with time estimates and controls the discussion to assure that the time is spent profitably for all.

Threaded discussions are a very effective way to get interaction from all class members. The professor or class member can post a topic for discussion, and each student replies to it with his or her own information. Knowing that all their peers will see their postings, the students work hard to make their postings informative and to the point. Again, such interactive tools move the focus away from the instructor as the dispenser of all knowledge towards a collaborative learning effort. Students can even be assigned the task of posting the week's discussion topic, or summarizing the threaded discussion for the whole class. It's very easy to notice students who always wait late to post and only say "Me, too." The instructor can prod individuals to make timely and substantive contributions.

Creating Assignments to Encourage Interaction

It should be obvious by now that professors must rethink traditional assignments if they expect to be successful in online course delivery. Replicating the traditional model, in which all assignments are prepared by individual students and submitted only to the professor for grading and review, only reinforces the isolation of students from fellow learners. It is entirely appropriate, of course, for assignments intended to assess individual learning be submitted directly to the professor in many cases; however, if the assignment's goal is to have students *learn*, rather than to have their learning *graded*, then alternatives may be more appropriate.

Here are some assignments that may be used to create more interaction and collaborative learning among the distance learners:

·Posting results of discovery learning for others

Students may be asked to research topics on their own, then post results to the listserv or to the bulletin board for all the class to see and use. A typical assignment might include assembling a "webliography" (bibliography of web sites) on some current technology. As students build the knowledge base together, they are far more likely to regard the assignment seriously, rather than considering it busywork. Additionally, this type of assignment creates the habit of independent learning rather than relying upon the teacher for all information.

·Peer reviews

Professionals often serve their colleagues when they act as peer reviewers. This skill, which is part of the professional duty of engineers, is a useful skill on its own; however, in a distance learning classroom situation, peer reviews can provide significant insights not only into what others are doing and thinking, but also into how one's own learning is occurring. Students nearly always report learning much about their own efforts from reviewing others' work. A typical assignment might include assigning partners who are to work problems on their own first, then submit to their partner for review; they can compile their questions or disagreements and bring those to the whole class or to the professor.

·Team projects

It is very common for engineers to work in team settings in the workplace, and teams can be just as useful in a distance learning environment. Teams can attack a more ambitious task together, bringing their individual strengths to bear upon the problems. As in the work setting, however, there will be some students who tend to coast on the efforts of others. In a typical assignment for a team project in distance learning, the professor can assign student teams a chat room for their team meetings (with the professor reviewing the chat logs); ask to be copied in the team's email messages regarding the projects; and ask for a team assessment of each individual's contributions at the termination of the assignment. Having to work together assures that students in the online class interact with others besides the professor.

Once professors begin to think of the class as a web-like grouping of students who can interact in many different ways with each other, the opportunities for interactive learning will start the creative juices flowing in creating assignments. The goal should always be to increase the individual student's learning opportunities, while increasing the sense of personal engagement with the classmates as well as the professor.

Managing the Workload

Teaching online courses is more difficult and time-consuming than teaching students face to face—there is no denying that fact. If professors can gain released time to create and offer an online course (especially the first ones), then their workload will be much more manageable. Some institutions count the single online course as the equivalent of two courses when a faculty member creates and offers an online course for the first time. Other schools provide a course release the semester prior to the offering. Just as with any teaching, once the course has been taught the content creation effort is reduced. Most faculty will prefer to have some technical support with the software and delivery mechanisms, and many universities now have offices to support instructional design, online course delivery, or both. It is wise to take advantage of all the support available. Collaborating with others to develop a course is often an unfamiliar experience for many faculty, but this process alone can have great benefits for the faculty members.

Once the faculty member has taught one or two courses online, he or she begins to feel some relief as the burden for sharing the learning tasks shifts to include students. More time is spent in designing the learning environment and guiding the students toward the learning objectives, rather than in creating all the knowledge and delivering it orally. Faculty will begin to discover that their involvement with individual students is increased and enhanced. Required to communicate in many ways, students engage with the material, with the professor, and with class members in entirely new ways. More teacher time is spent communicating with students, but less time may be spent in preparing elaborate lectures or catching students up when they miss class due to illness or work. In a similar manner, students in online courses will find that they are spending a great deal of time interacting with the professor and classmates in addition to learning the course content. They also enjoy the feeling of engagement and empowerment that comes from being independent and able to control their own investment of time and effort. The workload is almost always greater, but the satisfaction is almost always greater as well.

Conclusion

As we have gained experience since 1996 in offering graduate courses online, our perspectives have shifted a great deal. When we first began, the focus was primarily upon the technology: how can we deliver content to students who are not present on campus? As we have made changes to technology over the years and moved finally to a MS degree in technical communication management offered entirely online, we have begun to place the tools in the proper perspective. The tools are not the most important thing; rather, the design of instruction and the manner of interacting with students is far more significant. Student evaluations continually provide us with ways we can improve our online courses, and we are continually improving their quality. Overall, however, both students and professors are pleased with the online courses and proud of the students who complete the degree program. It is reassuring that employers rate the value of the MS degree very highly and recommend the program to others. Engineering faculty can learn from Mercer's experience, as well as from a multitude of others, to

assure that courses offered online will be well worth the effort for the faculty, the institution, and the students.

Selected List of Distance Education Resources Online

American Center for the Study of Distance Education, http://www.ed.psu.edu/acsde/
Asynchronous Learning Networks, http://www.aln.org/
Distance Education Online Symposium, http://www.ed.psu.edu/ACSDE/deos/deos.asp
Distance Learning Resources, http://www.outreach.washington.edu/dl/resources.asp
International Centre for Distance Learning, http://www-icdl.open.ac.uk

Biographical Information

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