Interactivity with Response Technology:

Connecting Students, Instructors, and Content

In the early 1990's (!), a research article in the *Ed Journal*, published by the USDLA, convincingly presented the frustration of students at a distance who felt, and in many cases were, ignored. The authors had formed focus groups of students, all of whom had taken two or more videoconference telecourses, and together they addressed several problem areas in distance learning. When questions turned to interaction, students consistently responded with negative remarks about both the length of time instructors took to report test results and the quality of those responses. Many oral and written comments revealed similar complaints from students about not being able to see or discuss what they had missed on the tests. One typical complaint sums it up: "... we wouldn't even get the results back and we'd be expected to take the next test. So I found that really frustrating because you didn't know how well you were doing already." (Egan, Ferraris, Jones, and Sebastian, 1993, j-4)

It appeared that though the environment in which these students were learning had changed dramatically, some of their instructors were still doing business as usual, albeit in front of a camera, and had made no instructional adjustments to bridge the distances or to let students know how they were doing. Learning theory has long told us that the need to know how you are doing is common for most learners, whether in the traditional contained classroom or at a distance. In addition, the development of distance learning has created a second need, the need to know classmates. Isolation turned out to be a significant concern for the focus group students. One said, for example, that she felt as if she were alone and did not have a chance to interact with anybody else in her classes. Several said they had stumbled on another student by accident and suddenly felt better when they could talk together about the class and some of the assignments. The irony here is that rather than create a sense of isolation, well designed distance learning can actually create connections where none may have existed before. In a 1993 study of Hawaii's distance learning situation, students on separate islands discovered to their surprise and delight that they were not alone, that peers on other islands also enrolled in an Educational Administration course faced similar problems and found similar solutions.

Increasingly, designers of distance learning in both corporate training and formal education honor each student's need to know by establishing immediate and responsive interaction that checks understanding of content and supports inclusiveness.

The WICHE Project and Good Practice

In 1993 a project was initiated by the Western Cooperative for Educational Telecommunications, a division of the Western Interstate Cooperative for Higher Education (WICHE), to create a regulatory environment that would support the electronic delivery of higher education programs from out-of-state institutions. One of the three tasks guiding the first phase of the work was consideration of what constitutes good practice for electronically delivered academic degree and certificate programs.

The two characteristics of good practice mentioned most often were access to library resources and interaction between faculty members and students and among students. With steadily increasing data connectivity over the past few years, faculty and student access to on-line library resources has mushroomed. More recently, with the introduction of keypad response technology to connect students and instructors for real time give and take, personal communication can be lively, responsive, and immediate. In addition, data collection through a keypad response system sets the stage for timely course correction. For an effective instructor who can consistently check on what the students understand, what works, and what doesn't work, improvement of practice is inevitable.

Benefits of Intentional Interactivity

In a 1993 article defining interactivity, Patti Baker-Albaugh listed six benefits of interactive teaching processes: increased student interest, higher cognitive processing, development of cooperative learning skills, teacher involvement, curriculum integration, and teacher/student collaboration (Baker-Albaugh, 1993, p.36-37). Effective teachers at all levels would agree with her; the best of Malcom Knowles' work

on adult learning theory assumes interaction, feedback, and recognition. While it is true that productive interactivity does not depend upon technology, the explosive growth in instructional technology provides an array of powerful tools for us to do better what we may have always done well. Verl Dennis, a former manager of educational technology for Arthur Anderson, points out: "We learn quickest when we have frequent opportunities to test our understanding of the content, make mistakes, and learn from those mistakes." (Dennis, 1994, p.27) Whether a course or a single session, instruction designed to incorporate frequent interaction will satisfy both students' and instructors' need to know how they are doing and provide the platform for doing better.

The Changing Nature of Interactivity: Adding Data Response

We have voice, sometimes video, and data at our fingertips, with opportunities to mix and match them in an intriguing variety of ways that will increase productivity for students and teachers. All too often, however, even with creative examples all around us, educators and trainers who are struggling to increase interactivity believe they are locked into either one-way video with two way-audio or two-way video and voice. Education conferences feature session after session on increasing student success by increasing interactivity, but few offer solutions beyond voice/video configurations. There is another solution. As early as 1991, in several satellite-delivered corporate video-training networks, data response technology put a keypad in the hands of each student and delivered immediate student responses whenever the instructor asks a question. In the case of the ONE TOUCH Viewer Response System, a microphone is built into each keypad, allowing the instructor to manage all incoming audio. For over 10years, Ford Motor Company has delivered highly effective interactive training via satellite to over 7,500 dealerships in North America and Australia in this manner.

In many cases, system planners either do not know about data response technologies or do not understand the learning power they could provide by incorporating a response solution for each student. In addition, many long-time classroom instructors making the transition to on-camera or online Internet teaching (also called virtual training) believing that they won't be able to do it well unless they can see their students; consequently, many systems have incorporated two-way video simply to make instructors comfortable. While two-way video is indeed a plus, the truth is that designing instruction for interactivity is the key ingredient to student success, not the instructor's ability to see the students or their ability to see one another. Students in a distance learning class rarely care if the instructor can see them; in fact, many prefer not to be seen on-camera.

Richard Hezel's research confirms this. At the 1995 Association for Education Communications Technology (AECT) National Convention, Hezel reported that in evaluating the Satellite Education Resources Consortium (SERC) under the terms of the 1992-1994 Star Schools grant, he found that SERC students wanted to be known by name, recognized for accomplishments, and acknowledged as valuable participants, but felt it was not necessary for instructors to see them. Thoughtful instructional design that solicits and builds on the experiences of all students, that constantly checks on their understanding and provides appropriate feedback to them and that allow them to present and exchange ideas among themselves will produce success for both students and instructors.

The response technology to do this is not only available, but is producing successful students and instructors across the country. Besides the hardware solutions for satellite delivered training, several Internet platforms are available as well – all with ASP offering to circumvent onsite installation and maintenance expenses.

Case Studies and Response Technology

Improved Learning for Wayne State Students

A 1993 article by Margaret Chambers on interactivity and instructional change focused on several distance learning degree courses via closed-circuit television from Wayne State University to Ford Motors workers gathered in a classroom at the Ford worksite. Beginning in 1991, each student used a ONE TOUCH student response keypad for data and voice connection to the instructor. The element that

makes this initiative unusual is the degree to which the instructors used the data compiled during each class to evaluate their own performance and to improve it.

Many of us are now searching for ways to assure continuous improvement of our practice; these instructors found it. By the second academic year, the Ford employees had, on average, covered their courses in only 80% of the time previously required to finish the material in the traditional setting. In addition, their achievement scores had gone up by 17-19%. By **the '94-95 academic year, one professor, who had initially been reluctant to try the keypad/distance learning experiment, had begun to cover about 40-50% more material in the course of a regular semester and was reaching six times more students**. By all indications, achievement and content gains appear to be holding steady for all classes.

This success depended upon dedication to improve instruction. Dr. Frank Westervelt, professor of electrical and computer engineering, makes a compelling case for redesign of existing courses before they are used for distance learning, particularly if keypad response technology is available. Wayne State professors are expected to poll lecture students for answers at least every 7 to 10 minutes, something few do in a traditional setting.

Dr. Jerry Steele, formerly responsible for the Ford training initiative and now President of Michigan Information Technology Network (MITN), concurs with Westervelt's view. He maintains that if an instructor reviews the data from student responses after class and discovers a pattern of confusion for only a few students, he can counsel them privately to discover the source of the problem. If more than a few students failed to understand, it is a clear signal that a change in information delivery is called for. Steele also advocates the inclusion of guest experts either in the studio or on the telephone for a three-way conversation with one or two students at a time while the rest listen in. Since the ONE TOUCH system lets the instructor see the name and location of callers and gives control of student audio to the instructor, this sort of interaction can be orchestrated easily.

Traditionally, higher education institutions measure only two things directly related to a course: how satisfied the students are with the various elements of the course, and how well they achieve. Putting these courses into a corporate setting automatically allows two additional levels of evaluation: application of content to performance on the job, and corporate return on investment. That Ford saw a huge return on investment based on improved performance has led to a very large additional investment for Ford as it incorporates this response technology into FORDSTAR, a new global, satellite-based, live, interactive training system for automobile dealerships. And Ford is just one example of a corporation benefiting from this technology.

Learner Perceptions of Interaction

In a paper presented at the 10th annual Conference on Distance Teaching and Learning held in Madison, Wisconsin, in August, 1994, Farhad Saba and Rick Shearer described research undertaken in two kinds of distance learning settings, both of which had real-time video, voice, and data interaction. Neither setting used a keypad response system. In one, instruction was delivered for only 30 minutes to 30 students, each using a simulated desktop video system. In the other, which was made up of a series of nine month-long courses, instruction was delivered between two classrooms via compressed video.

Among other things, students were asked if they felt there had been adequate interaction with the instructor and if they were satisfied, overall, with the course. Students in the desktop video group felt connected and comfortable. In the compression video classroom, only 45% said interaction had been adequate, and there was a high correlation between this answer and general satisfaction with the course. Many, however, "felt isolated from the main class and saw themselves as passive observers." (Saba and Shearer, 1994, p. 130)

These findings contrast sharply with those of the Chrysler Corporation in a 1995 20-session pilot using a ONE TOUCH keypad system. At Chrysler, 83% agreed or strongly agreed that student/instructor interaction was adequate; 88% felt fully able to participate; 93% liked the 2-way audio arrangement; and 98% said the keypad was easy to understand and operate. In both studies, the more a course used keypad interactivity, the higher the praise.

Saba and Shearer note the need for "private" real-time communication and interaction when students do not want to be recognized by others in the class. They also recommend a system for cueing the instructor that a distant student wants to speak. Third, they address audio as critical to interaction and call for classroom protocols. All three of their concerns are eliminated when students use ONE TOUCH response technology. A "flag key" allows anonymous responses; when any student touches his or her "call key," the instructor's computer touch screen displays a bright red visual cue and the name and location of the student calling in; and finally, student microphones, built into the keypads, are turned on and off by a touch to the instructor's screen.

Both common sense and the experience of those who use response technologies tell us that we have a dynamic and powerful tool to bridge the distance and improve the practice of teaching in live, video-based systems. And when practice improves, so does learning.

Transition to the 21st Century: Many using the wrong tools

Since the initial studies using video conference or satellite delivery, "distance learning" evolved to the Internet, a much cheaper delivery solution but with all the same challenges. More confusing for the distance learning instructor, many Internet "collaborative" solutions vendors claim to offer the ideal training platform as well, but fall quite short when it comes to offering response abilities. For the distance learning managers, there has been considerable pressure to implement an Internet delivery format as more and more people have been resisting traveling to the instructor's location.

Whether in a university or corporate training setting, adult learning studies over the years have consistently demonstrated that learners retain more when we have frequent opportunities to test our understanding of the content. Test results show that lectures with no interactivity are much less effective. So, if that is the case, why do so many educational and corporate distance learning training events using Internet platform that do not support even basic interactive events (beyond simple chat)? Have the training event managers fallen victim to the marketing hype?

Several well-known corporate networks have fallen when forced to use a "collaborate" platform as opposed to a true interactive "training" platform, perhaps assuming that there would be no impact. However, in every case, flourishing and rapidly growing virtual training programs were forced to scale back because students and instructors could not realize the results they were achieving with response technologies.

Designers, and manager, in both corporate training and formal education must honor each student's need to know by establishing immediate and responsive interaction that checks understanding of content and supports inclusiveness. Only then is the student, the instructor and the content connected.

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