Elements of Effective E-Learning

Three Design Methods to Minimize Side Effects of Online Courses

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Each new technology has brought its share of hype from those who would like to see its use for education. In 1922, Thomas Edison said that the motion picture was destined to revolutionize our educational system (Oppenheimer 1997). In 1945, William Levenson, director of the Cleveland public schools' radio stations, said that the time might come when a portable radio receiver would be as common in the classroom as the blackboard (Oppenheimer 1997). In 1961, the Ford Foundation claimed that educational television promises “a whole treasure-trove of new and stimulating experiences” (McKibben 1993, 204). More recently, at the National Education Computing Conference in June 1997, Bill Gates compared the computer and the Internet revolution with the California gold rush of the mid 1800s. He exhorted educators to use this new technology in the classroom to give students a better chance at success.

Researchers have long been aware of such hype and the often unfulfilled promises that educational technology has brought to education. Few are fully aware of the negative effects that these same technologies can bring to education and to our lives. Television has been in schools and in our homes for nearly half a century. During that time, extensive studies have been conducted on this medium, with some interesting results. For example, second graders from towns without television score higher on reading fluency and creative ability tests (Williams 1986). Non-TV-viewing fourth and eighth graders score higher on basic skills tests (California Department of Education 1984). Television viewing is a cause of violent or aggressive behavior (Centerwall 1993; Eron 1993). It also contributes substantially to obesity (Andersen et al. 1998; Dietz and Gortmaker 1985). Television can make you dumber, less creative, violent, and obese. What do computers have in store for us?

Todd Oppenheimer’s article “The Computer Delusion” (1997) is highly critical of school districts’ cutting programs in art, music, and physical education to add computer programs when “there is no good evidence that most uses of computers significantly improve teaching and learning” (45). ABC’s Nightline with Ted Koppel aired a segment on September 30, 1998 titled “Computers in the Classroom: The $50 Billion Gamble,” highlighting the fact that there is little, if any, research to prove that there are any learning benefits to using technology in the classroom. One month before that program, the front page of the New York Times detailed the startling findings of a $1.5 million, three-year study by Carnegie Mellon researchers. They found that the longer a person spends online, the more sad, lonely, and depressed he or she becomes (Kraut et al. 1998). These findings do not surprise critical educators. Every new technology arrives with hype, and years later we find major weaknesses. Good educational designers should not ignore these findings. They need to find ways to maximize the positive effects of technologies and minimize the weaknesses. Following are three examples of doing just that.

Lose the lecture to minimize the no-significant-difference effect

One of the most disappointing aspects of using technology in teaching is the so-called no-significant-difference phenomenon (Russell 1999). This phenomenon outlines the observation that any technology used in teaching does not make a significant difference in learning. Statistical comparisons between teaching methodologies, with or without the use of technology, have been made for nearly a century. Researchers have compared how much students learned from a teacher lecturing in a traditional classroom with how much students learned from a traditional correspondence course covering the same material. There was no significant difference (Russell 1999). Comparisons have been made between correspondence courses and radio courses, telnet courses and television courses, and traditional lecture courses and online courses, to name a few. The vast majority of the research resulted in no significant difference. In those few cases where a signifi-
cant difference was found, the most recent technology in the comparison was not always the winner (Russell 1999).

Nearly all of the no-significant-difference studies that have been conducted since 1912 have used a model of a traditional classroom with a teacher lecturing to students. Whether it was a teacher in a traditional classroom, on the radio, on television, on telnet, online, or even via correspondence, they all used the lecture format. Perhaps the hundreds of findings of "no significant difference" really headline the fact that if you use the lecture format, students will learn the material equally well no matter what media are chosen. That being the case, if you are going to lecture, why not use the cheaper format? Why spend thousands of dollars on technology when less expensive printed materials used in a correspondence course will work just as well?

Another alternative is for course designers to think outside the paradigm of the lecture format. Unext.com is creating Cardean, a "no lecture" university. The company contends that learning only happens when students "do," not when they listen passively to a lecture (Rosenfield 2000; Unext 2000). The educational content for the courses is being drawn from several eminent institutions, including Stanford and Columbia. Few schools can afford the millions of dollars being spent on developing problem-based learning courses created by expert designers working with Nobel scientists. However, there are a number of practical ways to begin to develop lecture-free courses.

Project-based activities can give students the freedom to apply learning in practical contexts that are personal and relevant to them. Step-by-step tutorials could allow them to work with applicable software tools to develop digital media for their projects. A good place to start would be to use tutorials that are already online for paint programs (i.e., Microsoft Paint, AppleWorks), Web page editors, or presentation software programs. Also, teachers could create links to structured tutorials for surfing the Internet to help students find the best "fair-use" digital materials. Other links could provide students with resources that help them learn how to evaluate sites critically to find good sources of legitimate information. Digital projects could be showcased in an online student gallery or in a student portfolio. Students could provide feedback as they previewed and learned from each other's work.

Course readings or activities could be built around real-world or theoretical problems. Teachers could follow these assignments with threaded discussion forums or live chats. Students would be expected to read and respond to comments made by those in the class. Once this dialogic process was established, students could use this same model for their own project presentations. Similarly, student groups could be assigned topics of importance to research, develop, and teach to the class. Groups could post Web pages with relevant links for class exploration before conducting formal discussions via live chat or threaded forum discussion.

Create real connections to minimize the depressed and lonely effect

Want to be depressed and lonely? Spend more time communicating on the Internet. That is the surprising conclusion of the study conducted at Carnegie Mellon University and financed by a number of technology giants including Intel, Hewlett Packard, AT&T Research, and Apple Computer (Kraut et al. 1998). Researchers found that people who spent even a few hours per week online experienced higher levels of depression and loneliness than those who used the computer network less frequently. These results completely surprised the social scientists because participants used social features such as e-mail and Internet chats more than they used passive information-gathering resources to read or watch videos. "We were shocked by the findings, because they are counterintuitive to what we know about how socially the Internet is being used," said Robert Kraut, a social psychology professor at Carnegie Mellon's Human Computer Interaction Institute. "We are not talking here about the extremes. These were normal adults and their families, and on average, for those who used the Internet most, things got worse" (Harmon 1998, 1). Teenagers, unsurprisingly, tended to spend more time online and showed a greater rate of loneliness and depression (Rosenberg 1998).

What caused this negative side effect? Here is one possibility: Those who participated in the study reported a decline in interaction with family members and friends that directly corresponded to the amount of time they spent online (Kraut et al. 1998). A recent study at Stanford University also found that the more time someone spends online, the less time he or she spends with real human beings (O'Toole 2000). Communicating with someone online apparently is not as psychologically fulfilling as is talking to someone you know. Due to the anonymity of the Internet, unless you really know the people you are chatting with, you cannot be sure that they are being honest about their profession or expertise, let alone any of their personal information.

Several things can be done to minimize the effect of student isolation. One idea is to have students and faculty create biographical pages with visual and auditory elements that briefly encapsulate each individual in an interesting way. Everyone in a class or degree program should have easy access to this password-protected information. Password protection prevents search engine spiders from cataloging this information in their databases. Without it, students would soon find their biopages listed in the directories of major search engines.

Another idea is to group students together when they begin to work on a degree online. Students could be grouped by such factors as interests, personal situations, goals, or the pace at which they plan to work through a program. If a group of six students with similar interests starts out together in a program, real friendships may be fostered on the way to a degree. To help forge a connection with the university, graduate assistants or faculty could be assigned to these groups that meet periodically online.

Another way to develop communication avenues that are valuable to students would be to enable students to establish online clubs based on interests. Dating, chess, foreign language, journalism, or even debate clubs are some possibilities. Access to online student lounges could also be valuable.
Individualize courses to minimize the number of dropouts

The Institute for Higher Education Policy conducted a review of the current research on the effectiveness of distance education. Reviewers found that in a number of studies, there was evidence that a higher percentage of students participating in a distance learning course tended to drop out before the course was completed compared to students in a conventional classroom (Phipps and Mensotis 1999, 25). They concluded that the research did "not adequately explain why the drop out rates of distance learners are higher." They also stated that this "subject mortality" was bad because of "negative consequences associated with dropping out" and also because the research was likely "excluding these drop outs—thereby tilting the student outcome findings toward those who are 'successful.' . . . If the students who had dropped out had remained in the course, the mean score of the achievement test or student survey could be significantly different."

The Corporate University Xchange (CUX) is a corporate education research and consulting firm that helps organizations with training. The company says that one of the biggest challenges of online learning programs is to "retain" e-learners. Their pilot study of e-learners from Fortune 1000 companies revealed that the number one reason that people drop out of online courses was "lack of time." Solutions for this problem were to create courses that give students: (a) the ability to start a course at any time, (b) flexible deadlines, and (c) 24-hour technical support (Corporate University Xchange 2000).

Zielinski (2000, 54) describes a number of concerns about the "design and implementation of many self-paced, asynchronous learning courses," including "higher-than-average drop-out rates or disengaged learners who don't receive the level of interaction, personalized feedback, skills practice, managerial oversight or technical support needed for quality learning experiences." It is hard to address these concerns if learning organizations are not tracking students—specifically those who drop out—to find out about their online experiences. For example, some may be what Zielinski calls "pragmatic learners," who do not finish all the modules of an online course simply because, with "grazing" learning styles, they take only the content they need, leaving superfluous material behind (Zielinski 2000). Without more detailed data like these, it is nearly impossible to address the dropout situation.

Degree programs should be collecting and developing online-accessible databases of this type of information, as well as more personalized information from students including their interests and learning styles. Instructors and developers should have access to this database. Finalists for the "1998 Outstanding Online Course Award," sponsored by the Paul Allen Virtual Education Foundation, gave presentations at the "Creating Effective Online Instruction" conference in May 1999. Developers of two of the courses stated that the next wave of development for online courses is to make them more personalized for individual students. Both planned to develop more personalized Web courses with software such as ColdFusion, which allows developers to create database-driven Web sites. When a student accesses one of these course sites, an individualized course Web page can address her by name, and because it has already parsed through her database of interests and learning styles, it can include a quote or story vignette specifically tailored for her. As she works through assignments and online assessments, the database continues to grow. If she is found to have a weakness in an area, a Web resource can be offered, giving her a chance to review the same material from another visual perspective if that matches her learning style strength.

One way to begin integrating learning styles into online curriculum is to use the sensory styles. Three sensory styles are traditionally associated with academic learning: visual, auditory, and haptic (or kinesthetic). An excellent way to address the individual differences of sensory learning styles would be to develop courses using the "Universal Design for Learning" framework. In this framework, curricular materials are developed in "many media so that learners can select one or more ways to approach the subject matter. Text. images with no text, images with text, voice, animation, video, or a sequence of sounds can effectively con-
encourage auditory learners to purchase dictation software that converts their voice to text. These programs can often read the text of online materials and e-mail messages out loud. Some phone companies now offer audio-based e-mail services with which you can send or receive messages over the telephone. Call up, and a computer dictation device will read your e-mail messages to you over the phone. You can then reply to these messages just as you would leave a message on an answering machine. Your response is saved as a digital audio file, attached to an e-mail message, and sent, all without the use of a computer.

**Haptic or Kinesthetic Learners**

Learners who prefer to do something more active to learn course materials are referred to as “haptic” or “kinesthetic” learners. “Practicing problems, doing lab experiments, creating solutions, doing physical activities, engaging in manipulative exercises, and brainstorming ideas are all ways to involve this learner in the classroom” (Ross and Schulz 1999, 126). These learners could print out step-by-step directions for more active course-based experiences that are posted online. Ross and Shultz add that “java-programmed jigsaw puzzles can provide a powerful learning and review tool for students.”

**Conclusion**

Nearly two decades ago, Richard Clark (1983, 450) said, “Five decades of research indicate that there are no learning benefits to be gained from applying different media in instruction, regardless of their obviously attractive features or advertised superiority.” Clark changes this to “70 years” in his foreword to Russell’s (1999) *The No Significant Difference Phenomenon*. Apparently, little has changed in the last twenty years. Will another twenty years pass us by with the same results? One hope is that designers and teachers will try to use other pedagogies of learning that do not embrace the lecture format. Perhaps new leaders of technology will find ways to tap into individual differences to help create meaningful courses that really make a difference. Additionally, it would be beneficial if students could create real friends and lifelong connections with their peers after experiencing an online degree program with them. If this hope is realized, two decades from now we may read about online courses encountering the revolutionary “significant difference phenomenon,” with students experiencing the “happy and connected” effect. We might even read articles on the latest methods to stop students from “dropping in” to the class years after they graduate because it was such a life-changing experience.

**REFERENCES**


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TITLE: Elements of effective E-learning: three design methods to minimize side effects of online courses
SOURCE: College Teaching 49 no3 Summ 2001
WN: 0119603828003

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