

Criteria Used to Develop Effective Online Courses

**A proposed study of the criteria used to design and implement effective
online distance education courses in higher education.**

by

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I. ABSTRACT

Education represents 10 percent of the U.S. Gross Domestic Product and the Internet is the fastest growing mass-market media in history. Distance education is dramatically changing the educational environment by combining the best of both of these markets.

With the phenomenal growth worldwide of teaching and learning on the Internet, attention is now being paid to the nature and quality of online higher education. The biggest challenge confronting higher education is helping faculty successfully integrate technology into instruction. What criteria should instructors use in designing an effective distance education course? That is the purpose of this study— to provide a valuable resource and guideline for teachers and instructors who now find themselves with the task of preparing high quality distance education courses.

II. INTRODUCTION

Just as 100 years ago the nation struggled with the transition from an agrarian to an industrial economy, today we confront the transition from an industrial to a global, technological economy (Technological Literacy 1997). Knowledge has become our key resource. It is not tied to any country. It is portable. Increasingly, an educated person will be someone who has learned how to learn and who continues formal learning throughout his or her lifetime (Drucker, 1994, pp. 4,10).

In the last two decades of the 21st century, the environmental landscape of education and industry has changed climactically. As a result of two enormous culture-changing technologies—the Computer and the Internet—the door has opened for learning to be acquired much more quickly, ambitiously, democratically, engagingly, asynchronously, and ubiquitously.

Distance education offers students the most timesavings and least costly method for obtaining a higher education. This is precisely why one of the authors of this paper choose George Washington University's (GWU) Educational Technology Leadership (ETL) distance education

program. Previously he attended a local state university about 40 miles from his home. He calculated that he was spending about 10 hours a week driving and walking to and from classes, as well as spending about \$1,800 a year in fuel and maintenance to his vehicle. Furthermore, he had to remain on campus for classes that were scheduled at different parts of the day, creating a lot of down time for him. To make matters worse, he felt the lecture-based classes he was required to attend were quite uninteresting.

After enrolling in GWU's ETL distance education program that is accessed entirely online, he is now using those extra 10-plus traveling hours a week toward his work or study time. His automobile doesn't get any miles put on it for educational purposes. He is able to totally control his learning environment, including going to class online in his pajamas. As he puts it, "This, truly, is the way to learn!"

III. RESEARCH QUESTIONS

For the purposes of this research, here are the primary questions we intend to answer:

- What criteria (benchmarks) do institutions that have substantial experience in distance education use to develop high-quality distance education courses?
- Of these institutions, which of them are recognized as the leaders in distance education?
- Of these institutions, which of them are regionally accredited?
- Of these institutions, how many degrees do they offer via online distance education?
- What institutions, if any, have a poor track record for distance education programs?
- Of these institutions, how do their criteria (benchmarks) compare with schools with successful track records in distance education (control group)?

IV. HYPOTHESES

It is the hypotheses of this research report that the criteria used in effective distance education courses will be as follows:

- The goals, objectives, guidelines, and direction for courses will be clearly stipulated
- Student interaction with instructors and assistants will be primarily through e-mail or voice-mail

- Feedback to student assignments and questions will be constructive and timely
- The program's educational effectiveness and teaching/learning process will be assessed through an evaluation process that uses several methods and applies specific standards
- Overall educational gratification will be higher for online students than students in the traditional classroom settings
- The student to teacher ratio will be smaller in effective online distance education courses than in other online distance education courses or face-to-face courses
- Those faculty who teach effective online distance education courses will receive substantial support from I.T. and instructional design personnel
- Students who successfully participate in online distance education courses will meet a minimum level of technical competency prior to the beginning of class

V. DEFINITION OF TERMS

- **Asynchronous Communication:** interaction that doesn't occur in real time; communication characterized by time-independence. That is, the sender and receiver do not communicate at the same time. Examples: electronic mail and voice mail. (<http://www.utexas.edu/cc/cit/de/deprimer/glossary.html>); Interaction between two or more people that is time delayed, that is, separated by minutes, hours, even days. Correspondence courses and e-mail are asynchronous forms of distance education. The opposite is synchronous communication, such as talking on the phone or videoconferencing. Good distance education programs typically use both synchronous and asynchronous communication (<http://www.lucent.com/cedl/glossary.html>).
- **Audio Conferencing:** Voice communications, traditionally accomplished using standard telephone lines, with new technologies, such as Internet telephony gaining a portion of the market. When more than one person is in a single location, speakerphones or special audio-conference terminal equipment is employed. When more than two locations are involved, multipoint bridging equipment or Internet-based software is used. <http://www.lucent.com/cedl/glossary.html>; Voice communications, traditionally accomplished using standard telephone lines, with new technologies, such as Internet telephony gaining a portion of the market. When more than one person is in a single location,

speakerphones or special audio-conference terminal equipment is employed. When more than two locations are involved, multipoint bridging equipment or Internet-based software is used (<http://www.lucent.com/cedl/glossary.html>).

- CD-ROM: digital information stored on a high capacity, optically readable compact disc in Read Only Memory format (i.e., users can't alter the information).
- Compressed Video: System by which a vast amount of information contained in a TV picture and its accompanying audio signal is squeezed or compressed into a fraction of its former bandwidth and sent onto a smaller carrier, with some information sacrificed in transmission, resulting in some diminishing of color, clarity, and some ragged motion. It can be delivered over landlines, broadcast of satellite, but results in many more signals being sent more economically. The compression ration of 234:1 can make a matchable picture deliverable at 384 kilobytes per second, which is .043% of the original information in the signal.
http://www.ihets.org/distance_ed/ipse/fdhandbook/glossary.html
- Computer-Based Training (CBT): self-paced instructional modules that learners access from a computer, the electronic version of correspondence study.
- Computer Conferencing: computer software that allows people to converse either synchronously or asynchronously via a computer network.
- Distance education: refers to the process of connecting learners to remote educational resources; a nomenclature which is also expressed by a variety of other terms—distance education, cyber schools, eduwebs, Internet schools, online learning, online instruction, and web-based courses. Perhaps the simplest and clearest definition of distance education is -- where technology rather than a classroom connects student and teacher. Distance education is a system and a process of connecting learners with distributed learning resources. Definition is from the American Council on education (ACE)
<http://www.lucent.com/cedl/glossary.html>).
- Distance education System: all the technologies an organization uses to deliver its distance education programs. Comprehensive distance education systems combine technologies. For example, in a system that primarily uses interactive video to deliver programs, voice mail, e-mail, and fax technologies might also enhance learner-instructor interaction and provide system support services; An integrated combination of technologies designed to support interactive teaching and learning among those not physically present in the same location.

Such systems often emphasize one technology, but draw on others for increased flexibility. For example, a system built on video as the primary method of delivery may use voice mail, e-mail, Internet multimedia databases, and fax technologies for additional interaction between and support for participants (<http://www.lucent.com/cedl/glossary.html>).

- Electronic Mail (e-mail): a system that allows computer users to transmit and distribute messages via an electronic network.
- Hypertext: the ability to link files electronically via multiple pathways so that readers can "click" on a highlighted word or phrase and "jump" to a file that details information about the word or phrase.
- Instructional Design: the process of determining instructional needs and goals, identifying instructional objectives, and developing instructional materials to accomplish the objectives.
- Internet: a worldwide computer network generally recognized as the largest computer network; originally connected universities and research centers but now connects millions of users in many kinds of organizations.
- Intranet: a private network within an organization; similar to the Internet but can be used only by people who are directly connected to the organization's network.
- Media: all technology-based means of communicating information in a distance education environment.
- Multimedia: incorporates text, graphic images, sounds, and full-motion video into a single electronic document or file; A combination of audio, video, and/or computer technologies to provide a range of expression and experience (<http://www.lucent.com/cedl/glossary.html>).
- Nontraditional Learner: someone outside the scope of the traditional focus of education (e.g., an adult who enrolls in college courses after several years of professional an/or family involvement).
- Online: Being in direct communication to with a remote computer or computer system, thus enabling communication and/or transfer or exchange of information (<http://www.lucent.com/cedl/glossary.html>).
- Pedagogy: the art and science of teaching.
- Synchronous Communication: interaction that occurs in real time; an interaction between individuals or groups that occurs at the same time. That is, with no appreciable delay between the end on one message and the beginning of another. Face-to-face, telephone and

video teleconference conversations are synchronous
(<http://www.lucent.com/cedl/glossary.html>).

- World Wide Web (WWW): a part of the Internet that links via a hypertext mechanism electronic files containing text, still images, and video; Also known as WWW and the Web. A virtual library of video, audio, and textual data and information stored on the computers of the Internet. This data is accessible to anyone with a modern, personal computer, a way of connecting to the Internet (through a private or public Internet service provider), and a computer application program or "software" called a "browser" designed to allow you to explore this the Web resources (<http://www.lucent.com/cedl/glossary.html>).

VI. LITERATURE REVIEW

Background

The scope of this literature review has been limited to articles and studies completed in the last five years. Until recently, many believed that reliable and valid research studies regarding the criteria used in distance education courses were rare. This paper concentrates primarily on an evaluation of the original research—including experimental, descriptive, correlational, and case studies. While this review of original research does not encompass every study published since 1995, it does capture the most important and salient of these works, which are few.

Over the past ten-years, distance education has created quite a stir among educators. Going outside the traditional classroom approach to teaching/learning, distance education has been an experimental design that has not had the support of established educational heads. Each year the debate has risen to a higher level: Is distance education as good as the traditional approach to education? If so, what criteria (benchmarks) characterize those distance education courses?

Reliable Research Studies

The most difficult part of this research was finding quality and reliable case studies regarding distance education courses. There appears to be three primary shortcomings in research studies that test and measure the effectiveness of distance education courses (What's the Difference? 1999, pp. 3,4):

- Control groups are often absent in the studies
- Randomization of study subjects are missing
- Measurement devices used were questionable

Following are two case studies where it appears all three of these controls are followed. The first has a narrow focus (one course) involving 33 students, while the second one has a larger focus (nine courses) involving about 4,000 students.

Case Study 1

An experimental design was carried out during the Fall 1996, in which 33 students in a Social Statistics course at California State University, Northridge were randomly divided into two groups, one taught in a traditional classroom (control group) and the other taught virtually on the World Wide Web (experimental group). The null hypothesis was that face-to-face interaction makes no difference in student test performance. The research hypothesis asserted it did, arguing that such face-to-face interaction with the professor is fundamental to the learning process and that without it students suffer (Schutte 1997).

All students were given identical pre-term questionnaires, midterm tests, and final tests. The tests consisted of four parts: 1) matching; 2) objective; 3) definitions; and 4) problems. No significant difference appeared in any of the demographic or experiential variables. The same instructor was used for the control group and the experimental group, although researchers were unable to control or measure the teaching effort across the two sections.

Contrary to the proposed hypotheses, quantitative results demonstrated the virtual class scored an average of 20% higher than the traditional class on both the 100-point midterm and the final examination. Further, post-test results indicate the virtual class had significantly higher perceived peer contact, spent more time on class work, and had a perception of more flexibility, understanding of the material and greater affect toward math at semester's end than did the traditional class.

Thus, the null hypothesis was rejected. The probability of error was less than one percent. An authentic control group was used for this study, as was true randomization. The midterm and final examinations were quantitatively measured. Therefore, it appears this was a reliable research study. However, it only tested one class at one campus so it does not represent the broader picture for distance education in higher education.

Following are the criteria (benchmarks) used in the experiment:

- Virtual students attended class in a computer lab
- Students were grouped into three's, sending email statistical reports weekly to the instructor
- Weekly discussion topics were responded to twice each week by the students
- Use of forms which allowed submission of homework were the same as the classroom
- Weekly moderated Internet relay chat in real-time with professor

Case Study 2

Between 1996 and 1998, the Sloan Center for Asynchronous Learning Environments (SCALE) at the University of Illinois at Urbana-Champaign performed nine research studies that were entitled, "Efficiency Projects" (Arvan, September 1998). The nine Efficiency Projects were specifically aimed at using ALN (Asynchronous Learning Network) to achieve higher student/faculty ratios without sacrificing instructional quality.

The nine ALN courses studied under the Efficiency Projects were only a small number of the courses supported by SCALE (there were 80 ALN courses per-semester offered in the 1997-98 academic year). However, they did account for about half of the 8,000 students enrolled in the ALN courses. The following table shows the criteria used for this study:

Criteria for Study

ALN Courses Studied	Common Criteria	Other Criteria
1. General Chemistry 2. Advanced Organic Chemistry 3. Circuit Analysis (Intro) 4. Differential Equations 5. Microeconomics 6. Intermediate Microeconomics 7. Microbiology (Intro) 8. Spanish (Intermediate Grammar) 9. Statistics (Introductory for non-technical students)	<ul style="list-style-type: none"> ◆ All large undergraduate classes ◆ Automatic, web-based grading software ◆ All online developers were early adopters of technology 	<ul style="list-style-type: none"> ◆ Range of ALN experience of instructors: none to prior ◆ Help for students: asynchronous, synchronous (text-based chat), face-to-face ◆ Delivery methods: large variation in authoring, presentations, coaching, and traditional lecture format ◆ Environment of campus: culture of daily life permeated with technology

From the results obtained from SCALE's Efficiency Projects, the study supports the view that when a sensible pedagogic approach is embraced that affords the students with avenues to communicate about their learning. Asynchronous Learning Networks (ALN) can produce real efficiency gains in courses without sacrificing the quality of instruction.

More Recent Studies

In early 1999, Tom Russell developed a web site with the title, No Significant Difference Phenomenon (Russell, 1999). Here he collected extracts from 355 research reports, summaries, and papers—a comprehensive annotated bibliography on technology for distance education. With documents dating back as far as 1928, Russell relates that there is no significant difference between teaching/learning with different media.

Russell's No Significant Difference claim set off a fire for many in the educational community. They retorted that most of the studies reporting positive results in distance education have gaps in their research methods and thus are not reliable or verifiable. To substantiate this point with sound research, last April the Institute for Higher Education Policy released the paper, What's

the Difference? A Review of Contemporary Research on the Effectiveness of Distance education in Higher Education (What's the Difference, 1999). The objective of this case study was to examine the research on distance education more closely so that public policy may be better informed: "Assessing the quality of the original research requires a determination that the studies adhere to commonly accepted principles of good research . . . If a study does not abide by these principles, the results can be erroneous or misleading, and therefore lead to conclusions that result in poor public policy" (p. 9).

What was the conclusion of this research paper? "There is a relative paucity of true, original research dedicated to explaining or predicting phenomena related to distance education. The most significant problem is that the overall quality of the original research is questionable and thereby renders many of the findings inconclusive" (p. 2).

The study found that much of the research made on distance education did not use control groups or randomization in their studies (p. 9). Furthermore, their instruments used to measure student outcomes and attitudes were questionable (p. 10).

The report's final comments: the key question still needs to be asked, "What is the best way to teach students?" (p. 38). The implication for the reader of the report—the jury is still out regarding the effectiveness of distance education.

Latest Study

As a follow up to the What's the Difference case study, the NEA and Blackboard, Inc. last month released the findings of a first-of-its-kind case study regarding distance education (Quality on the Line, March, 2000). "The results of the study revealed, for the most part, the benchmarks for quality Internet-based distance education were considered important and, in general, the institutions strove to incorporate them into their policies, practices, and procedures" (p. 2).

The case study process consisted of three sequential phases. In the first phase, a survey was sent out to several organizations to find out what benchmarks [criteria] were being used in distance education courses. This search resulted in 45 benchmarks being identified, which were then

grouped into seven categories (p. 9). As the study progressed, the list of 45 was reduced to 21 as being the most relevant to distance education courses, and three additional benchmarks were added to bring the total to 24.

In the second phase, institutions that had substantial experience in providing distance education courses were identified for the study. This list was narrowed down to six institutions including a community college, a comprehensive institution, a research institution, and a virtual institution. What was missing in this study was a control group, such as institutions that offered distance education courses, but had little experience in the field (pp. 9, 10).

For phase three, between September 1999 and January 2000 the staff from the Institute of Higher Education Policy (NEA) visited each of the six institutions being studied. In addition to conducting in-depth interviews with faculty, administrators, and students, a survey using a Likert Scale was administered to each interviewee. The survey also was administered to distance education students who were not able to participate in the interview process primarily because they did not reside near the institution. In all, 27 faculty, 62 administrators, 16 individuals who were both a faculty member and an administrator, and 42 students were interviewed and/or completed a survey, for a total of 147 respondents (p. 10). Following is a table showing the high/low range of scores calculated for all the surveys completed on the Likert questionnaires:

Survey Results for Likert Questionnaire (pp. 40-42)

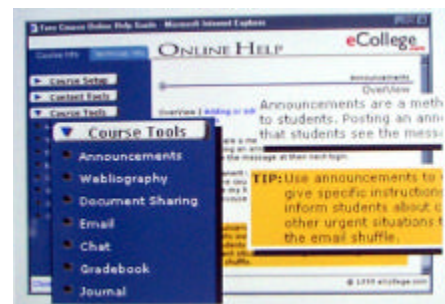
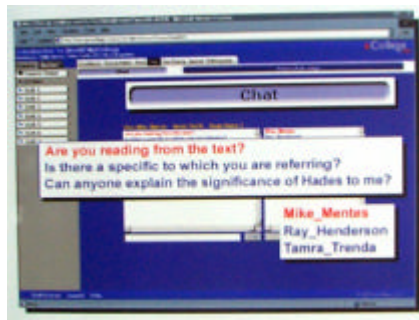
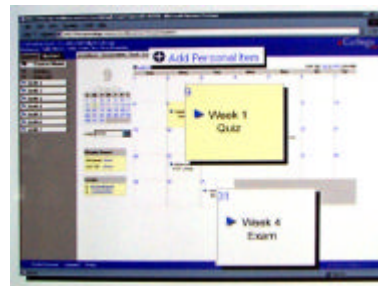
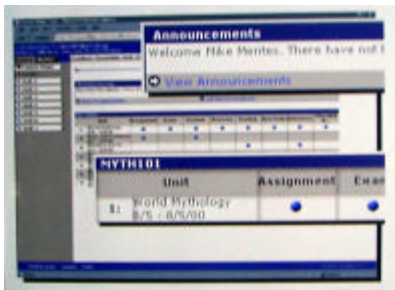
45 Benchmarks	Mean	SD	Count	Mode
Range - Low	2.8	.0520	72	1
Range - High	6.1	2.083	141	7

Although several good outcomes were produced from this study, it also had its weaknesses. For instance, out of thousands of higher educational institutions offering distance education courses, why were only six chosen for the study? Were proper randomization procedures followed for this selection? Also, out of six institutions, why were only 147 respondents surveyed when it takes closer to 1200 to obtain statistical numbers for reliable and trusted research? Accordingly, more comprehensive studies need to be made to test the null hypothesis that distance education courses that use specific benchmarks are as effective as traditional classroom courses.

Other Relevant Articles

In order to provide teachers with the simplest of transitions when setting up distance education courses, new companies like Blackboard.com and eCollege.com have designed templates to greatly reduce the time it takes to get courses online. This is perhaps the most important criterion for getting distance education courses online.

The virtual campus for the University of Colorado (CU) uses the delivery system (interface design) of eCollege.com as shown below (see: <http://www.ecollege.com> or <http://www.cuonline.edu>):



Instructors delivering their courses through CU Online make use of cutting-edge technology for presenting course content such as streaming audio, video, and multimedia slide shows. A number of technologies allow students to interact with the instructor and their peers—these include threaded discussions in a bulletin board-type area, live discussions in an online classroom, email, and collaborative workspaces (CU Online).

Blackboard.com has as their motto, "You do the teaching, we handle the technology." Founded only in 1997, their vision is to transform the Internet and other online networks into powerful environments for teaching and learning (Blackboard Profile). Without any knowledge of HTML,

teachers can literally add their instructional material to Blackboard's template in five easy steps and immediately begin to teach their online class. Based on flexible, open technology, Blackboard.com incorporates numerous criteria to enrich the online learning experience (Blackboard Features and Benefits):

- Asynchronous Communication (threaded discussions)
- Synchronous Communication (real-time chat and whiteboard)
- Assessment Tools and Gradebook
- Collaborative Work Groups
- Content Creation (e.g. syllabus and course description pages)
- Electric Blackboard® for taking notes and filing them for future use.
- Database Reporting and CourseSite Statistics
- Messaging System
- Online File Exchange (between instructor and student)
- Online Tutorial
- User Tracking

The most popular criteria concerning Blackboard is—it is a free service to those who do not charge for their online courses; otherwise, there is a small fee. They also offer more advanced services at different levels of cost for the more serious online instructors. Because of the popularity of their free online course templates, they have more than 3,300 institutions in every state and more than 70 countries that are using their services (Blackboard Overview).

Some companies offering online courses and training have 24/7 online mentors as a valuable complement in enhancing the learning process. Even though this idea is still in the testing stages, it may turn out to be one of the more important criteria used in distance education courses. Microsoft first began to experiment with this idea back in 1998 when implementing training for their Microsoft Certified Solution Providers (Microsoft Mentorship Study, 1998). Since then, SmartForce has taken over the training for Microsoft, but continues to offer the online mentors' immediate help and support for all their students (e-Learning Pioneer SmartForce, 2000).

Western Governors University is another new cyber university. Their motto is, "Education without boundaries." The distance education criteria for their claim to fame are also online mentors; however, they are not available 24/7. Upon enrollment, every student is provided with their own qualified mentor who is an expert in their field of study. This mentor will help the student create and plan a calendar for completing their degree program and will work with their assigned student until they graduate (Western Governors University).

Until recently, no cyber university was accredited. But in March 1999, Jones International University (formerly Jones College Connection) became the first fully online accredited institution of higher learning when North Central Association of Colleges and Schools bestowed upon them this honor (The First Fully Accredited Online University, 1999). This is a most important criterion for the future of distance education programs, which will allow them to compete head-to-head with traditional teaching/learning systems.

One of the complaints from traditional educators is the lack of "authentic" and "reliable" research sites available for distance education students. This, too, seems to be another roadblock that is coming down. On April 3, 2000, six of the world's leading educational and cultural institutions announced that they would create Fathom, a company that intends to launch the premier site or knowledge and education on the web. Fathom will present the best public content and courses of universities, libraries, and museums on a wide variety of professional, cultural, and academic subjects. The consortium's website, fathom.com, will introduce the first home for authenticated knowledge on the Internet, serving a worldwide audience of business and individual users (Fathom 2000).

As is shown in this literature review, it is possible to develop quality distance education courses that capitalize on the opportunities provided by emerging technologies. Every day the boundaries for distance education courses are pushed further out. It is hoped that the criteria (benchmarks) set forth in this research paper will provide trusted and reliable resources for any instructor or trainer who wish to put their course online.

VII. PROBLEM STATEMENT

The purpose of this study is to identify the criteria used to design effective online distance education courses in higher education. Alternately, what are the methods used to provide the highest quality, most effective web-based distance education courses? The question regarding teaching hasn't changed, only its method of delivery. As Gregory Debourgh has put it, "Technology is the tool, teaching is the task" (Debourgh, 2000).

But what does the term "effective" mean? How is it measured? Are traditional methods of teaching more "effective" than distance education? Is traditional instruction doing the best job of providing the skills and knowledge employers are looking for today? What percent of those graduates actually put to use in their new jobs what they learned in college? Do companies have to spend time and effort providing further training and education for these new hires? If so, how much?

In this regard, is there any evidence that traditional college graduates perform better, are more proficient, need more/less supervision, or need less on-the-job training than graduates of distance education programs? Are there enough graduates from distance educational courses to provide an analysis and results for trusted comparisons?

Our intent with this study is to provide a guideline for educators who find themselves tasked with preparing distance education courses. More and more educators are being required by their schools to place their courses online. However, few have any knowledge of what it takes to provide quality and effective cyber-instruction. Where do they turn to for ideas, resources, recommendations, or examples on how to create these courses?

Some universities have begun asynchronous learning networks (ALN) with the following mission targets (Arvan, 1998):

- Improve student retention
- Decrease time to degree
- Demonstrate verifiable increase in student learning

- Lower the cost of instruction

However, universities no longer feel the need to make certain that distance education courses increase student learning over traditional methods. It is simply the path that technology is taking us. Distance education doesn't have to prove itself superior to traditional methods of learning, for those methods, too, are being challenged by technology in several areas.

VIII. RESEARCH DESIGN

Overview

As the literature review presented, educators are moving toward distance education as a method of offering convenient access to education and training materials for a wide audience of students. In addition, several studies relating to distance education courses identified a need for comprehensive criteria or benchmarks for faculty to follow to design an effective, high-quality distance education course. The purpose of this proposed research, therefore, is to develop a course design model for faculty to follow as they design and develop distance education courses.

With the growth worldwide of teaching and learning on the Internet, attention is now being paid to the nature and quality of online higher education. A study by the National Education Association and Blackboard, Inc. found 24 measures of quality in Internet-based distance education courses (The Institute for Higher Education Policy (March 2000)). To formulate the benchmarks, the report identified first-hand, practical strategies being used by U.S. colleges considered to be leaders in online distance education. The benchmarks distilled from this study are divided into seven categories of quality measures currently in use on campuses around the nation. Many are common sense, but the study validates their importance. The benchmarks that NEA chose are the ones we will follow in designing our study. However, our study intends to broaden the number of participants in the study significantly. The benchmarks are as followed (see Appendix A for full description of the benchmarks):

1. Institutional Support
2. Course Development
3. Teaching / Learning Process

4. Course Structure
5. Student Support
6. Faculty Support
7. Evaluation and Assessment

Method

We chose to approach this study using two methods, surveys and face-to-face interview/observation. The survey brings different perspectives and approaches while keeping our sample population broad. Face-to-face interviews/observations provide a concrete study of the dynamic process of designing and implementing an online course.

The purpose of the survey is to gather responses from diverse institutions regarding their approaches to designing and developing online distance education course. Surveys will permit us to measure directly what design and development features are used often and those that are not used at all.

The purpose of the face-to-face interviews/observations is to gather a hands-on perspective from teachers and designers. The face-to-face interviews/observations will ask questions similar to those in the survey, but will allow for more interaction between the researchers and the participants.

Measurement

The survey results will be measured through a point system. Each answer to a survey question will be assigned a point value. The total points given to that question by survey participants will determine the value of that particular criterion. For instance, if a designer used any design method (such as ADDIE - Analysis, Design, Develop, Implement and Evaluate), five points would be assigned to that question as opposed to designers who did not follow any designing process.

The question development will be based on the benchmarks. See Appendix B for the draft of the survey.

The interview will be measured by a points system as well, but simply by observing what methods were used and how were they used. For instance, if a videoconference were used for the course, five points would be assigned to that section as opposed as a course without videoconferencing that would get no points.

Researchers' Role

The role of researchers will be to remain neutral and gather information from participants and put together the results. However, after the results are pulled together, the researchers will present a recommendation regarding the best criteria to use for designing an effective distance education course based on the results.

IX. DATA COLLECTION

We will target higher education institutions (community colleges and four-year colleges and universities both public and private) in the United States that offer identical courses via online distance education and face-to-face during the current semester. These courses must be taught by the same instructor, using the same syllabus and other materials, and are on the same schedule. Those surveyed will include the course instructors, course students, and course designers.

We hope to recruit at least 100 institutions, 200 instructors and designers (representing at least 50 different courses), and 2,000 student participants into this study.

We plan to recruit participants initially by e-mail requests that they participate in our survey, followed up by phone calls if necessary to increase the number of participants. The survey will be available on the Internet so participants can easily access it, hopefully speeding up their responses.

The face-to-face interviews/observations will be made at five to 10 universities which represent, as best as possible, each of the universities responding to they survey in terms of the geographic location, size, public/private, etc. The interviews/observations will include interviews with the

teachers who are teaching the course(s) and the course designers to learn more about their support services, preparation methods, and teaching styles. Additionally, we will be observing the courses to determine how the teacher facilitates learning. Finally, if possible, we will be conducting interviews with students (both in person and online) to receive their input.

X. DATA ANALYSIS

The data analysis will be done in three stages. In the first stage we will review the surveys to establish if they have been filled out correctly and determine if we have sufficient participants to produce valid conclusions from the surveys.

In the second stage we will review the face-to-face interviews/observations to find out if they contain sufficient information to calculate valid and reliable results.

The third stage will involve combining the results from the survey and the face-to-face interviews/observations. Those results with the most points will represent the criteria/benchmark that is essential to designing an effective online distance education course.

The result will be sorted into the following categories:

Students

- sex
- school
- grade level
- course title
- course delivery method
- grade at end of course

Designers and Instructors

- sex
- school
- course title
- course delivery method

- Responses to the following benchmarks:
 - Institutional Support
 - Course Development
 - Teaching / Learning Process
 - Course Structure
 - Student Support
 - Faculty Support
 - Evaluation and Assessment

XI. SIGNIFICANCE OF STUDY

Anticipated Outcomes

As stated in our Hypothesis section, we expect the results of this student to show that effective distance education courses will offer or have:

- Clearly stipulated goals, objectives, guidelines, and direction for the course
- E-mail and/or voice-mail interaction between students and the instructor
- Constructive and timely feedback to students from the instructor
- A process for evaluating the teaching/learning process using several methods applying to specific established standards
- Online students with higher gratification levels regarding the course than those who took the course in a traditional classroom setting
- A smaller student to teacher ratio than in other online distance education courses or face-to-face courses
- Faculty who have received substantial support from I.T. and instructional design personnel
- Students who meet a minimum level of technical competency prior to the beginning of class

Relevance to Education

Distance education is changing education. The single-source text is dying. Time and location as determinants of learning are mortally wounded. We are now moving away from the one-way "transmission" model of college teaching with the professor as the knowledge authority located

at the front of the classroom. A focus on learning has come to the fore in higher education. Today's students, instead of being acted upon by instructors, are acting on themselves, becoming more involved in choices of what, where, and how they learn (Reconfiguring Courses for Distance Education, 2000).

According to a survey by ZD Market Intelligence, approximately 52 million homes—half of all U.S. households—now have at least one personal computer (Distance Education in Higher Education, 1999, p. 1). Households with annual incomes of less than \$30,000 make up a quarter of PC-equipped households. This reveals that the technological disparity between income levels may be starting to evaporate.

According to new research from International Data Corporation (IDC), distance education will become a "viable option to traditional teaching methods," and is "poised for major growth over the next several years" (Newbytes, 2000). IDC says the number of college students enrolled in distance education courses will go up from 710,000 in 1998 to 2.2 million in 2002.

Not only that, but the number of higher education institutions offering distance education programs will rise along with the number of students. By 2002, says IDC, 85 percent of two-year colleges will be offering distance education courses, up from 58 percent in 1998. In addition, the number of four-year colleges that will be offering distance education courses will go up from 62 percent in 1998 to 84 percent in 2002 (Newbytes).

The size of the U.S. market for distance education is already \$2 billion and is projected to be \$6 billion in 2002 and \$9 billion by 2003 (Fathom, April 3, 2000). When combined with professional training and K-12, the National Institute of Standards and Technology expects the total online learning marketplace to reach \$46 billion by the year 2005 (Powered by Blackboard). Enrollment in online programs is expected to increase at an annual rate of 30-35 percent (Fathom).

Research from International Data Corporation (IDC) estimates that the number of college students enrolled in distance education courses will increase from 710,000 in 1998 to 2.2 million

in 2002. To guarantee that the quality of higher education does not suffer from this increase, it is imperative that educators have clearly defined criteria to follow when designing their web-based distance education courses.

As a result of the rapid growth of distance education, what are the greatest information technology challenges confronting colleges and universities? According to the Campus Computing Project study, the top priority for teachers in higher education is— helping faculty integrate technology into instruction (Distance education in Higher Education, February, 1999).

In an earlier study by Parisot, the ease of use was the primary factor in the adoption of technological innovation by faculty (Chang, 1998).

It is the purpose of this study to provide a valuable resource and guideline for teachers and instructors who suddenly find themselves with the task of preparing distance education courses. More and more instructors are being required by their schools to place their courses online. However, few have any understanding of what it takes to provide quality and effective cyber-instruction. Where do they turn to for ideas, resources, recommendations, or examples on how to set up an eduweb? What can each instructor bring to the table that will aid in the development of their own online course? The objective of this paper is to help provide answers to these questions and more.

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APPENDIX A

Benchmarks for Success in Internet-Based Distance Education

(Quality On the Line, pp. 11,12)

I. Institutional Support Benchmarks

1. A documented technology plan that includes electronic security measures (i.e., password protection, encryption, back-up systems) is in place and operational to ensure both quality standards and the integrity and validity of information.
2. The reliability of the technology delivery system is as fail-safe as possible.
3. A centralized system provides support for building and maintaining the distance education infrastructure.

II. Course Development Benchmarks

4. Guidelines regarding minimum standards are used for course development, design, and delivery, while learning outcomes—not the availability of existing technology—determine the technology being used to deliver course content.
5. Instructional materials are reviewed periodically to ensure they meet program standards.
6. Courses are designed to require students to engage themselves in analysis, synthesis, and evaluation as part of their course and program requirements.

III. Teaching/Learning Benchmarks

7. Student interaction with faculty and other students is an essential characteristic and is facilitated through a variety of ways, including voice-mail and/or e-mail.
8. Feedback to student assignments and questions is constructive and provided in a timely manner.
9. Students are instructed in the proper methods of effective research, including assessment of the validity of resources.

IV. Course Structure Benchmarks

10. Before starting an online program, students are advised about the program to determine (1) if they possess the self-motivation and commitment to learn at a distance and (2) if they have access to the minimal technology required by the course design.
11. Students are provided with supplemental course information that outlines course objectives, concepts, and ideas, and learning outcomes for each course are summarized in a clearly written, straightforward statement.
12. Students have access to sufficient library resources that may include a “virtual library” accessible through the World Wide Web.
13. Faculty and students agree upon expectations regarding times for student assignment completion and faculty response.

V. Student Support Benchmarks

14. Students receive information about programs, including admission requirements, tuition and fees, books and supplies, technical and proctoring requirements, and student support services.
15. Students are provided with hands-on training and information to aid them in securing material through electronic databases, interlibrary loans, government archives, news services, and other sources.

16. Throughout the duration of the course/program, students have access to technical assistance, including detailed instructions regarding the electronic media used, practice sessions prior to the beginning of the course, and convenient access to technical support staff.
17. Questions directed to student service personnel are answered accurately and quickly, with a structured system in place to address student complaints.

VI. Faculty Support Benchmarks

18. Technical assistance in course development is available to faculty, who are encouraged to use it.
19. Faculty members are assisted in the transition from classroom teaching to online instruction and are assessed during the process.
20. Instructor training and assistance, including peer mentoring, continues through the progression of the online course.
21. Faculty members are provided with written resources to deal with issues arising from student use of electronically accessed data.

VII. Evaluation and Assessment Benchmarks

22. The program's educational effectiveness and teaching/learning process is assessed through an evaluation process that uses several methods and applies specific standards.
23. Data on enrollment, costs, and successful/innovative uses of technology are used to evaluate program effectiveness.
24. Intended learning outcomes are reviewed regularly to ensure clarity, utility, and appropriateness.

APPENDIX B

SURVEY

Name:

University:

Student (who took course via Distance Education) Survey:

1. Has the institution provided sufficient support? () Yes () No
2. If so, how was the support given?
 - a. () electronic support
 - b. () face-to face support
 - c. () both
3. Would you have preferred to take the course in classroom? () Yes () No
4. Did you felt that communication and interaction between instructor and students / students and students were effective? () Yes () No
5. Briefly explain why...
6. Were the materials taught via on-line;
 - a. () equal to classroom learning
 - b. () difficult than classroom learning
 - c. () easier than classroom learning
7. Briefly explain why...
8. How would you evaluate the course you took:
 - a. () excellent
 - b. () fair
 - c. () poor

Designer () course for Distance Education () in class course

Teacher (who teaches via Distance Education) Survey:

1. Has the institution provided sufficient support? () Yes () No
2. Are there institutional rewards for teaching on-line? () Yes () No
3. Course development has to be approved? () Yes () No
4. Is there a guideline for course design and delivery? () Yes () No
5. What type of interaction(s) is offered?
 - a. () e-mail
 - b. () videoconferencing
 - c. () face-to-face
 - d. () others
6. How do students portray that they have successfully learned the subject?
 - a. () test
 - b. () portfolio
 - c. () presentation
 - d. () others
7. Do you keep track of how many hour(s) students log in? () Yes () No
8. What type of support do the students receive?

- a. on-line only
 - b. on-line and face-to-face
 - c. technical support from others
 - d. others
9. What type of support do you, as a teacher, receive?
- a. on-line only
 - b. on-line and face-to-face
 - c. technical support from others
 - d. others
10. Are you being evaluated for your course? Yes No
- Teacher (who teaches in classroom) Survey:
1. Have the institution provided sufficient support? Yes No
2. Are there institutional rewards for teaching in class? Yes No
3. Course development has to be approved? Yes No
4. Is there a guideline for course design and delivery? Yes No
5. What type of interaction(s) is offered?
- a. face-to-face
 - b. e-mail
 - c. videoconferencing
 - d. face-to-face
 - e. others
6. How do students portray that they have successfully learned the subject?
- a. test
 - b. portfolio
 - c. presentation
 - d. others
7. Do you keep track of how many hour(s) students log in? Yes No
8. What type of support do the students receive?
- a. on-line only
 - b. on-line and face-to-face
 - c. technical support from others
 - d. others
9. What type of support do you, as a teacher, receive?
- a. on-line only
 - b. on-line and face-to-face
 - c. technical support from others
 - d. others
10. Are you being evaluated for your course? Yes No

Survey 5: Designer (course for Distance Education) Survey:

Survey 6: Designer (in class course) Survey: