



1-1-1998

A Technology Assessment Survey for Web Based Higher Education Programs

Earl A. Evans

Susan L. Murray

Missouri University of Science and Technology, murray@mst.edu

Follow this and additional works at: https://scholarsmine.mst.edu/engman_syseng_facwork

 Part of the [Engineering Education Commons](#), [Operations Research, Systems Engineering and Industrial Engineering Commons](#), and the [Psychology Commons](#)

Recommended Citation

E. A. Evans and S. L. Murray, "A Technology Assessment Survey for Web Based Higher Education Programs," *Proceedings of the ASEE Annual Conference (1998, Seattle, WA)*, American Society for Engineering Education (ASEE), Jan 1998.

This Article - Conference proceedings is brought to you for free and open access by Scholars' Mine. It has been accepted for inclusion in Engineering Management and Systems Engineering Faculty Research & Creative Works by an authorized administrator of Scholars' Mine. This work is protected by U. S. Copyright Law. Unauthorized use including reproduction for redistribution requires the permission of the copyright holder. For more information, please contact scholarsmine@mst.edu.

A Technology Assessment Survey for Web Based Higher Education Programs

**Earl A. Evans, P.E., Susan L. Murray; PhD, P.E.
Department of Engineering Management
University of Missouri - Rolla**

ABSTRACT

Advances in communications and computer technology, as well as in human-computer interfaces, have enabled concurrent advances in Web-based education. A number of case studies concerning applications of Web-based education for both distance learning and on-campus programs have been published. Primarily, these studies have focused on individual assessments of the web-based technologies. In contrast, this paper will provide a broad based assessment of applied web-based technology for higher education. This research was conducted via a survey completed by university and college faculty from numerous 4-year institutions. To gain an effective assessment, eleven categories of web-based course delivery tools, such as chatrooms and digitized lectures, were included in this survey. In addition, for each course delivery tool category, course instructors were asked for the frequency of application of the particular tool and their perceptions of importance, efficiency of use, and instructor satisfaction for each tool. Accordingly, this paper presents the findings of this recent survey.

BACKGROUND

The explosion of the Internet, the proliferation of personal computers, and advances in communications technology have all allowed for radical changes in education. In today's environment, a student taking an on-campus course may never set foot in a classroom, distance students may take a course concurrently with on-campus students, and course instructors may find themselves conducting office hours via electronic means. The implications of such changes are wide ranging, for they affect the quality of instruction, the public's access to higher education, and the control consumers will have over their own education.¹

Among these new developments in higher education has been the introduction of *Asynchronous Learning Networks (ALNs)*. ALNs can be described as networks which provide the capability for learners to secure education anywhere and at anytime. ALNs have been applied to on-campus courses, distance courses, and combined distance and on-campus courses. Published research on the topic of ALNs has primarily concerned individual case studies of applications, where the method of application and the subsequent results are described. In addition, models of asynchronous distance learning programs have been presented in the literature. What is lacking in the published research is an assessment of attitudes and experiences with ALN from faculty of multiple institutions.

OVERVIEW OF RESEARCH

The research focus for this study is to determine how university faculty are currently providing an asynchronous distance learning environment and what tools are being applied for this purpose? With these questions in mind, this study examines the different course delivery tools currently applied in asynchronous learning networks for distance courses and for distance components of on-campus courses. Faculty from seventeen institutions were surveyed for this purpose. These faculty had recently taught or were currently teaching applicable courses at both the graduate and undergraduate levels and in subjects ranging from liberal arts to engineering. The survey captured each faculty member's level of satisfaction and opinion of efficiency for each of the examined tools, as well as the frequency of use and the relative importance of the tool to the instruction of the course.

Mayadas defined ALN analogs to the traditional learning activities of an on-campus, classroom, course.² He did this to demonstrate how all of the learning activities of a traditional course can be accomplished in an ALN environment. Accordingly, the eleven course delivery tools included in the survey instrument were selected according to two criteria. The first requirement was to ensure that all of the traditional learning activities and their complementary ALN analogs were represented. The second requirement was to include the most commonly cited course delivery tools in the existing literature. Table I list the course delivery tools included in the survey instrument, together with their complementary ALN analog(s) to traditional learning activities. A given course delivery tool may be included multiple times in Table I, as they may represent more than one traditional learning activity.

The criteria for selecting survey participants were twofold. First, it was desired that the participants in this study be from colleges or universities with established traditional on-campus programs, thereby providing a basis for comparison with the asynchronous courses. Second, the courses taught by the participants should primarily be conducted through asynchronous means.

The American Universities Web page (<http://www.clas.ufl.edu/CLAS/american-universities.html>), maintained by Professor Mike Conlon at the University of Florida, was used as the primary resource for identifying potential participating institutions. This Web page lists the home pages for most universities and colleges in the United States, in excess of 600 institutions. Of these, 83 institutions were identified as having courses of potential interest to this study. Electronic mail was used as the primary means of making initial contact with on campus faculty, continuing education offices and registrars at these 83 institutions. Of this group, 25 institutions responded positively that faculty might be willing to participate in the survey. A total of 62 surveys were mailed to faculty identified at these 25 institutions, of which 25 completed surveys from 17 institutions were returned. This represented a 40.3% response rate to the survey mailing.

**Table I. Traditional Learning Activities with Corresponding ALN Analogs and Survey Course Delivery Tools
(Adapted from Mayadas 1997) ²**

TRADITIONAL, ON-CAMPUS LEARNING ACTIVITY	ALN Analog	COURSE DELIVERY TOOL
Attendance at lectures	Books (on-line or hard copy), web postings, videotape, groupware (text and image or video-on-demand)	Class meetings in a physical location Real time video conferencing Lectures delivered via video tape Lectures delivered via digital means
Recitation sessions	Groupware, interaction on web	Class meetings in a physical location Real time video conferencing Chatrooms for group interaction
Interaction with peers	Groupware, web, list serve, electronic mail	Chatrooms for group interaction Collaborative student assignments
Self-study, library	Books and articles (on-line or hard-copy), web instruments	On-line sources of course information
Lab work	Computer simulation, lab kits, remote control of instruments	On-line laboratory modules and simulations
Interaction with tutors and teaching assistants	Groupware, web, list serve, electronic mail	Electronic mail for 1 to 1 communication between student and teacher and vice-versa Chatrooms for group interaction
Interaction with faculty	Groupware, web, list serve, electronic mail	Electronic mail for 1 to 1 communication between student and teacher and vice-versa Electronic mail for communication between the teacher and all students concurrently Chatrooms for group interaction
Attendance at seminars and colloquia	Videotape, video-on-demand (over ISDN and groupware or web)	Class meetings in a physical location Real time video conferencing Lectures delivered via video tape Lectures delivered via digital means
Inquiries: academic and administrative issues	Electronic mail, voice-response systems	Electronic mail for 1 to 1 communication between student and teacher and vice-versa
Exams	Timed examinations and submission over computer network or proctored exam at remote site	On-line evaluations of student knowledge

RESULTS

Table II gives the percentage of survey respondents who indicated they had used each of the subject course delivery tools at least once in their course, ranking the tools from most popular to least popular. Several conclusions can be made based on this information and additional response data concerning importance, efficiency and satisfaction, not elaborated in this paper.

Table II. Most Popular Course Delivery Tools

Course Delivery Tool	Percentage of Respondents (25) Using Tool in Course
1. Electronic mail for one-to-one communication between instructor and students	100%
2. On-line sources of course information	92%
3. Electronic mail for communication between instructor and all students concurrently	88%
4. Collaborative student assignments via computer and the web	76%
5. Lectures delivered via digital means	56%
6. Chat rooms for group interaction	52%
7. On-line evaluations of student knowledge	52%
8. Class meetings in a physical location	36%
9. On-line laboratory modules and simulations	36%
10. Lectures delivered via video tape	16%
11. Real time video conferencing	12%

Based on the data gathered, one initial conclusion is that synchronous meetings of the class body are not a necessary component to the successful execution of an asynchronous distance course. The survey data revealed that 64% of the respondents never assembled their students for any physical meetings. Of the 36% who did use such meetings, the overall satisfaction level was rated at somewhat satisfied by all but two of these respondents. In addition, 88% of the respondents did not use real time video conferencing as a course delivery tool and only 16% used video taped lectures.

The survey respondents relied heavily upon electronic mail in conducting their courses. Every respondent used it for one-to-one communication between the instructor and students, and 92% used it at least once per week to communicate with each student. Likewise, while the frequency was not quite as high, electronic mail for communication between the instructor and all students concurrently was used by 88% of the respondents and 80% used it at least once per week. In addition to electronic mail, on-line sources of course information were used by 92% of the respondents, 72% of whom reported that more than 70% of the course students used these resources. In both cases, electronic mail and on-line information sources; the importance, efficiency and satisfaction ratings were all high. This supports the conclusion that these tools are important to a successful asynchronous course.

Collaborative student assignments via the computer and the web were used by 76% of the respondents, although the relative importance of these assignments in terms of percentage of

course grade varied considerably. Only 4% of the respondents indicated that these assignments were inefficient and they were unsatisfied with using collaborative assignments in this fashion, the remainder of the respondents who used the collaborative assignments indicated this assignment method was at least somewhat efficient in use and they were somewhat satisfied. Chat rooms were not as frequently used in the courses as were the collaborative assignments, however the subsequent ratings for chat rooms were equally inconclusive.

Digitized lectures were used by only 56% of the respondents. However, most of the respondents who had used digitized lectures rated them high for importance, efficiency, and satisfaction. Likewise, on-line evaluations were used by 52% of the respondents but received high ratings for efficiency and satisfaction, and varied ratings for relative importance to the course grade. This data supports the conclusion that digitized lectures and on-line evaluations can be successfully included in an asynchronous course and are not overly taxing on the instructor's time.

Conclusions

The findings presented in this study can aid instructors in developing new ALN courses by helping them to determine the most useful course delivery tools based on actual instructor perspectives. Furthermore, researchers can use this study to provide direction as to which ALN course delivery tools should be more thoroughly examined. In addition, future research efforts involving a greater number of participants would validate and help to clarify the findings of this study.

References

1. Boschmann, Erwin (editor); The Electronic Classroom: A Handbook for Education in the Electronic Environment; Learned Information, Inc.; Medford, New Jersey; 1995
2. Mayadas, Frank; "Asynchronous Learning Networks: A Sloan Foundation Perspective"; Journal of Asynchronous Learning Networks; Volume 1, Issue 1 - March, 1997; (published electronically at <http://www.aln.org/>)

EARL A. EVANS is a faculty member at the Air Force Institute of Technology, Civil Engineer and Services School. He received his M.S. in Engineering Management from The University of Missouri-Rolla and B.E. in Mechanical Engineering from Stevens Institute of Technology. He is a registered Professional Engineer in California. Mr. Evans is currently a Captain in the U.S. Air Force with eight years of active duty experience.

SUSAN L. MURRAY is an Assistant Professor of Engineering Management at The University of Missouri-Rolla. She received her Ph.D. and B.S. in Industrial Engineering from Texas A&M University and her M.S. in Industrial Engineering from The University of Texas at Arlington. She is a registered Professional Engineer in Texas. Dr. Murray has over seven years of industrial experience in the aerospace and defense field.