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Recommended Citation
Rost, Bob and VanDerZanden, Ann Marie (2002) "A Case Study of Online Learners Participating in the Oregon State University Extension Service Master Gardener Training Program," Journal of Applied Communications: Vol. 86: Iss. 2. https://doi.org/10.4148/1051-0834.2167

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A Case Study of Online Learners Participating in the Oregon State University Extension Service Master Gardener Training Program

Abstract
As more and more Extension educational content finds its way onto the World Wide Web, questions persist among Extension educators about the effectiveness of online delivery. Do Extension clients learn as much from online Extension educational programs as they do from classroom-based programs? And, are Extension clients with computer and Internet experience more likely to accept online educational programs and be satisfied with them? At Oregon State University, a team of Extension educators addressed those questions via a study of learners participating in the OSU Extension Service’s Master Gardener program. The study compared online learners with traditional classroom learners and included pre- and posttesting, user surveys and correlation analysis.

This research is available in Journal of Applied Communications: https://newprairiepress.org/jac/vol86/iss2/1
Table 1. Primary and Preferred Distance Education Technologies

| Technology                  | n  | Percentage |
|-----------------------------|----|------------|
| Primary technology          |    |            |
| WebCT                       | 23 | 74.2       |
| Interactive videoconferencing | 6  | 19.4       |
| Web                         | 1  | 3.2        |
| Email                       | 1  | 3.2        |
| Preferred technology        |    |            |
| Interactive videoconferencing | 24 | 77.4       |
| Videotape                   | 4  | 12.9       |
| WebCT                       | 2  | 6.5        |
| Email                       | 1  | 3.2        |

In response to the question, “Which skill is the most important for a student in a distance education course?” 36.7% (11) of respondents felt that discipline was most important; 20% (6) named Web searching; 20% (6) chose email use; and 10% (3) picked file attaching. When asked if, at the beginning of the semester, they believed they were skilled enough in these areas to succeed in the course, 84.4% (27) of respondents indicated that were, while only 9.4% (3) said they were not. Yet 43.8% (14) of respondents also indicated that they experienced some form of frustration during their course experience; 25% of these (8) indicated that their frustration was technologically oriented. Follow-up, open-ended responses elicited the reasons for their frustration, including “difficulties in downloading documents from WebCT,” “too hard to participate,” “very hard to register,” and “time consuming, interaction too hard.”

Desire to utilize student self-assessment and training in technology tools

In order to assess respondents’ desire to participate in student support services activities, respondents were asked specifically about their willingness to participate in student self-assessment and technology training services. Self-assessment was defined as “a self-assessment that could indicate your suitability for taking and completing a distance education course.” Responses indicated that the majority, 65.6% (n = 21), would not be interested in self-assessment, while 31.1% (n = 10) would be. Technology training was linked to
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Instruction and to analyze characteristics and attitudes of the learners. Statistical analysis of pre- and post-test results indicated that both online and traditional classroom learners performed similarly in terms of amount of material learned. Correlation analysis did not indicate any linkage between experience with computers and the Internet and satisfaction with the online course. However, the analysis did indicate linkage between 1) college experience and satisfaction with the online course, and 2) convenience of taking a course online and satisfaction with the course and willingness to take another online course. The major implications of this research are that online delivery of Extension educational programs can be as effective as traditional delivery, and that convenience of access is significantly associated with learner willingness to take Extension educational programs online.

Introduction and Background

A team of Extension educators at Oregon State University has been using the World Wide Web to deliver the Extension Service Master Gardener Training program to clients for the past three years. During this time, the team attempted to learn as much as possible about the learners participating in the program online. Many Extension educators at Oregon State University are concerned that online delivery of the Master Gardener training program will lessen its effectiveness. This research project was conducted to examine this question. In addition, the researchers believe it is critically important to continually evaluate the educational program delivery process, particularly when it involves a new technology such as the Web, which continues to evolve rapidly.

In December 2000, the team completed the second learning module for the Master Gardener training Web site. Focusing on soils, this module was made available to participants in the Winter 2001 OSU Extension Master Gardener training program. This paper presents the results of research conducted with the initial users of this module.

Findings

Of the students who responded (n = 31), 43.8% were 37 years of age and older, while 21.9% were traditional-aged (under 22 years of age) students. Almost two thirds (62.5%) were female, and 37.5% were male. The majority of respondents were graduate-level students (46.9%), followed by undergraduates (34.4%), and postbaccalaureates (15.6%). (As defined in this study, “undergraduates” are students pursuing a bachelor’s degree, and “postbaccalaureates” are students who have received a bachelor’s degree and are taking graduate courses, but who have not been admitted into a master’s degree program.) One student (3.1%) did not respond to this item. Most students were taking distance education courses at one of the university’s research and education centers located around the state (43.8%); another 34.4% were taking courses from home.

Student experiences with distance education and distance education technologies

Students were asked if the course they were taking was their first distance education course. Their responses were evenly divided, with 46.9% (n = 15) of respondents answering that it was their first distance experience, while the same percentage of respondents (n = 15) indicated that it was not. One student did not respond to this item. Of those who had previous distance education course experience, 67.7% had three or more previous courses, while 33.3% had taken one or two.

Respondents indicated that the primary technology used in the distance education course they were taking was WebCT, followed by interactive videoconferencing, Web, and email. Students were then asked which technology they would prefer in a distance education course. In response to this item, 77.4% said they would prefer interactive videoconferencing, while 12.9% preferred videotape, 6.3% preferred WebCT, and 3.2% preferred email. (See Table 1.)

Students were also asked to indicate all of the software applications that they found most useful in their distance education course. Three fourths (24) of students found presentation software most useful, and 62.5% (20) found chat and bulletin board services most useful, while only 28.1% (9) of respondents found Web page development software, such as FrontPage or Netscape Composer, most useful.
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Purpose of the Study

The purpose of this research project was twofold. One objective was to employ pre-/post-testing to compare the learning performance of two groups of Extension clients. One group, working on computers in their homes, completed the Master Gardener training soils module delivered online via the World Wide Web. The other group completed the soils training module traditionally (face-to-face) in the classroom. The second part of the study involved only the online learner group. The second objective was to employ correlation analysis to look for statistically significant relationships between (1) learners’ education levels and (2) experience with computers and the Internet, and their attitudes toward taking a Master Gardener training course online.

It is important to emphasize that a key aim of this study was to examine learners participating in an Extension educational noncredit program. As will be explained in the following section, there are studies in the literature similar to this one, but they focus on learners in for-credit courses. We take the position that for-credit and noncredit educational programs are not the same in terms of the motivation of the learners.

The researchers developed two hypotheses to meet the study objectives.

1. Extension clients taking a Master Gardener training course online learn as much as clients taking the same course traditionally (in the classroom) as measured by the scores of pre- and post-tests.

2. Extension client acceptance of the online delivered Master Gardener training course is positively correlated with experience with computers and the Internet.

Literature Review

Many studies have employed the pre-/post-test tool to compare the learning performance of students in traditional courses (instructor and learners meet face-to-face) with the performance of students in distance education courses (Baker, Birck, Delaney, and Hicks (1998) included both live classroom and distance students. Fenwick, Birck, Delaney, and Hicks (1998) found that both groups of students had a preference for taking classes in the conventional, live classroom setting. The researchers ascribed this attitude to potential lack of student experience with distance education technologies. Galusha (1999) saw technology as a potential barrier for distance learners, both in terms of students having access to appropriate, reliable technologies, as well as potential student concerns related to the technology learning curve and lack of technical assistance and support. Visser and Visser (2000), in a study of the perceived needs of distance education students, found that student support services were a critical need, and one that “has gone largely unmet” (p.110).
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Hale and Gifford, 1997; Moore and Thompson, 1990; Russell, 1998; Souder, 1993).

However, most of these studies focus on students taking for-credit courses in higher, or continuing, education situations. There appear to be relatively few distance education studies where the pre-/post-test tool has been used to compare performance of distance and traditional learners in an Extension educational program. For example, Sunnarborg, Bradley, and Haynes (1988) used pre-/post-tests to measure student learning in an Extension program on weight control and nutrition delivered via cable television. Also, Flaskerud (1994) used pre-/post-tests to compare the learning performance of distance and traditional learners participating in an interactive video workshop on commodities marketing. The authors are not aware of any studies that employed pre-/post-testing to measure and compare participant learning performance in traditional versus online delivery of Extension educational programs.

The second line of investigation in this study looks at the possibility of relationships between learners’ acceptance of an online educational program and their college experience and experience with computers and the Internet. In Lim (2001), correlation analysis was used to show that acceptance of a Web-based courses was significantly related to experience with computers, which in turn was significantly related to level of academic achievement. However, the learners in that study were undergraduate, graduate and continuing education students taking a for-credit Web-based distance education course. This study focuses on learners in a noncredit Extension educational Web-based program.

Research Methodology

Thirty-eight participants in the 2001 statewide Master Gardener training program volunteered to participate in this study. They were divided into two groups. A traditional group, which consisted of 17 learners, completed the soils module in a traditional classroom setting. An online group (21 learners) used their home computers to complete an online version of the soils module delivered via the Web.

Both groups completed a pre-/post-test consisting of 25 multiple choice and 11 true/false questions relating to the topic.

The online participants also completed an attitudinal survey campus counterparts. A reason for this may be that a significant proportion of adult student learners enroll in courses at a distance with little or no experience of distance learning, and/or the technological delivery format (Wood, 1996). Wood suggested that such students are at greater risk of doing poorly unless they are identified and helped to develop survival skills early on. Indeed, attrition rates of distance education students far exceed attrition rates of students taught in a traditional format (Parker, 1994).

Reflecting on this issue, McAlister (1998) concluded that provisions need to be made to avoid a “revolving door” in which distance students are allowed to enroll, flounder, and fail. Indeed, developing a more accurate understanding of those factors that may potentially influence perceptions and performance of distance education students, positively or negatively, has long been a goal of distance education researchers. Literature in the field of distance education is, for example, replete with studies to demonstrate the effectiveness of interactive telecommunication (ITV) in terms of student performance (Chu & Schramm, 1975; Russell, 1992; Whittington, 1987). In addition to performance, researchers have also attempted to measure students’ attitudes and perceptions about such topics as the overall distance education experience, technology used, instructional methods, and interaction techniques (Biner, 1993; Diebel, McInnis, & Edge, 1998; Sorensen, 1995). Sorensen wrote that students’ primary complaint was poor reception (video and audio), based on technological constraints. Gray and Miller (1999) found that age appeared to be an attitudinal factor, relating to desired interaction levels in distance education courses distributed by videotape and an interactive video network. Older students in the study placed a higher value on learner-content interaction and learner-interface interaction than did younger students.

Technology as a Potential Barrier

Davis, Bagozzi, and Warshaw (1989) made the argument that users’ perceptions and attitudes toward perceived use and perceived usefulness of a technology influenced their adoption and usage. Extending from this model, Webster and Hackley (1997) contended that attitude toward technology, perceived usefulness, and attitudes toward distance learning should all be considered as outcomes of the distance education experience. In a study of a course in agricultural experiment design that
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Introduction

The traditional university classroom has undergone rapid transformation due to the impact of distance education-based technologies, such as compressed video and the Internet. Indeed, corporate management consultants such as Peter Drucker have gone so far as to predict the demise of the traditional university classroom, calling it inefficient and overpriced as compared to distance education delivery methods (Bray, 1999). It’s undeniable that for many students, particularly adult learners, the opportunity to take a technology-based distance education course may be very attractive, even essential to obtaining a degree and achieving professional success. But it’s also true that adult distance learners may be very different, from the standpoint of experience, personality, and perceptions, than traditional “campus-based” university students.

Research has shown that most distance learners tend to be adults looking to return to school after an absence or to obtain a credential useful in furthering their careers. Increasing numbers of distance learners are also elderly, minority, disabled, or English-as-a-second-language students. Studies of distance education student demographics (National Center for Education Statistics, 1998) indicate that a majority of adult distance learners are female, are older than traditional students, and live 50 or more miles from the originating campus (Thompson, 1997). In addition, they may have family and work responsibilities that cause them to learn differently, perform differently, and have different perceptions and expectations about their course experiences than traditional students (Sheets, 1992).

Studies suggest that distance education may be an effective alternative for some students because it is more flexible than conventional approaches to education (Mandie-Filer, 1988). Studies over the years have shown that students who have taken technology-delivered courses through various media (computers, videotape, satellite, and interactive video) have performed, in terms of final course grades, as well or better than their counterparts in “traditional” classrooms (Moore & Thompson, 1997). However, because of their experiences with technology and life experiences, distance learners may react to a course differently, potentially causing them to have more difficulties in achieving scholastic success than their on-

Pre-/post-test scores

Table 1 shows the results of T-test analysis for pre/post test scores from the online and traditional learner groups. The pre/post-test score results were similar for the two groups. Statistical comparison of the increase in test scores for both groups indicated no significant difference in the amount of improvement in pre- and post-test scores between the groups.

Phillips, 1996. Test scores from the traditional and online learner groups were analyzed using a T-test for significant difference between two means. Navarro and Shoemaker (2000) made similar use of correlation analysis and T-test to study the efficacy of online distance learning, although their comparative study focused on university students taking a for-credit course on introductory macroeconomics.

The correlation analysis tool employed was the Pearson Correlation coefficient. All data were processed using the SAS system for the statistical analysis (Cody and Smith, 1997).

Findings

Pre- and post-test score results

Table 1 shows the results of T-test analysis for pre/post test scores from the online and traditional learner groups. The pre/post-test score results were similar for the two groups.

Statistical comparison of the increase in test scores for both groups indicated no significant difference in the amount of improvement in pre- and post-test scores between the groups.
Selected Attitudinal and Demographics Survey Results

Tables 2 and 3 show some of the results from the demographics and attitudinal surveys administered to the online learner group. Several items on the demographics and attitudinal surveys addressed questions outside the scope of this research project. Therefore, only selected items are reported here. As shown below, learners in the online group valued the convenience of participating in the program via online delivery. Results from the demographics survey show that all online participants had some level of college education and most had some years of experience using computers and the Internet.

Correlation Results

As mentioned above, items selected for analysis from the attitudinal survey had to do with user acceptance of the online course and willingness to take another online course. Items selected for analysis from the demographics survey had to do with college experience and experience with computers and the Internet.

The analysis did not indicate a correlation between acceptance of the online course and experience with computers and the Internet. However, correlation coefficients did provide evidence of linkage between several of the survey items.

Table 4 shows the correlations between college/university experience; learner acceptance of the online course; learner willingness to take another online course, and selected attitudinal/demographics survey items.
Table 2. Results for Selected Items from Attitudinal Survey Administered to Online Learning Group (N = 21)

| Statement                                      | Mean level of agreement* |
|------------------------------------------------|--------------------------|
| willing to take another online course          | 1.5 SD = .98             |
| online course acceptable                       | 1.6 SD = .71             |
| convenience of online course important to me   | 1.6 SD = .98             |
| online learning experience adequate            | 1.7 SD = .67             |

*On a scale of 1 to 5, 1 indicating strong agreement and 5 indicating strong disagreement.

Table 3. Results for Selected Items from Demographics Survey Administered to Online Learning Group (N = 20)

| Survey Item                                      | Count | Percentage |
|-------------------------------------------------|-------|------------|
| attended college or university                   | 20    | 100%       |
| 4-year or advanced degree                        | 13    | 65%        |
| computer owner for 5 years or more               | 17    | 85%        |
| 2 years or more experience with Internet         | 18    | 90%        |
| Internet use 3 hours or more per week            | 16    | 80%        |
| never taken an online course before              | 17    | 85%        |

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Table 4. Linking College Experience, Acceptance of the Online Course and Willingness to Take More Online Courses, with Selected Attitudinal and Demographics Survey Items (N = 18)

| Survey item                              | Correlation coefficient with college experience* |
|------------------------------------------|-----------------------------------------------|
| online course acceptable                 | 0.56                                          |
| online learning experience adequate      | 0.66                                          |
| willing to take another online course    | 0.48                                          |

Correlation coefficient with user acceptance of online course

| Correlation coefficient with user acceptance of online course |
|-------------------------------------------------------------|
| online learning experience adequate                         | 0.78                                          |
| convenience of online course important to me                | 0.60                                          |
| willing to take another online course                       | 0.79                                          |

Correlation coefficient with user willingness to take another online course

| Correlation coefficient with user willingness to take another online course |
|-----------------------------------------------------------------------------|
| online learning experience adequate                                         | 0.46                                          |
| convenience of online course important to me                               | 0.81                                          |

*experience as a college/university student, but not necessarily resulting in a degree earned

Discussion and Conclusions

The pre-/post-test component of the study showed statistically significant improvement in test scores for both online learner and traditional learner groups. There was no statistically significant difference in the amount of improvement on post-test scores between the groups, indicating that both delivery methods resulted in similar learning performance by

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able response rate is particularly difficult, which may make data collection from congressional aides less feasible or impossible for many organizations. A more troubling challenge associated with data collection from congressional aides stems from the recent criminal mailings of anthrax to legislative offices and the terrorist attacks of September 11, 2001. Security measures enacted in the wake of these events will create even greater difficulties for on-site and mail survey data collection involving legislators and their staffs.

This also indicates that personal contacts and electronic accessibility become even more important channels through which to provide information. Because of the rapid nature of policy making and perhaps the relative lack of experience and/or expertise among the legislative aides, congressional staffs rely upon others to provide information and subject matter expertise for policy making. Lobbyists and others are viewed by legislative aides as important sources of information. If land-grant universities are not readily providing information, someone else will fill the void, likely without research-based information. This does little to improve the policy or the standing of land-grant universities. Agricultural and applied communicators can play an important role in helping land-grant universities enhance legislative research expertise in this new era.

Endnote

1 The 24 sources included several internal sources of information such as other congressional staff, committees, and three professionally staffed support agencies that are often called upon by senators and representatives to undertake special studies and long-term projects (Wells, 1996; Davidson & Oleszek, 2000). Applied communicators might well be less familiar with these sources than with the variety of nonlegislative information sources used widely in conventional communications work. Table 1 provides more detail on these five internal sources.

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credible and relevant information and that they would file or save the fact sheets. A majority of respondents also rated the fact sheets as easy to understand, well organized, and written to an appropriate length. Timeliness was judged to be one of the most important factors in making the fact sheets useful. More than three fourths of the respondents indicated they would be willing to access Impact information electronically if available through a user-friendly Web site. It is important to note that respondents’ perceptions of the fact sheets were based on the sample provided by the researchers during data collection; very few of the respondents were familiar with the fact sheets prior to the study.

Conclusions

Collective results from this study suggest a number of current strengths in the execution and delivery of the USDA Science and Education Impact Fact Sheet Program. The fact sheets received generally positive evaluations for their organization, readability, and perceived usefulness. While these positive features provide much to build on, significant issues need to be addressed if the program is to reach its full potential as a communication vehicle for congressional aides. Increasing aides’ awareness of the fact sheets is essential to the program’s success. Two factors complicating this goal are the rapid turnover of aides and the massive volume of information received by aides on a daily basis.

Based on the results of this study, efforts to build interpersonal relationships with and communication networks among congressional aides should be increased. While this initiative will require substantial effort and resources, the expense would be justified if it resulted in improved government relations. Also, other channels that reach congressional aides should be identified for distribution of the information. For example, aides appear to have strong contacts with government relations professionals at land-grant universities. Perhaps these professionals could extend the Impact work.

Another conclusion drawn from this research is that data collection from congressional legislative aides is very difficult. Ethical issues are a potential concern because research may be viewed by some as lobbying. The researchers in this study were surprised to find that these two very different functions could be viewed as similar. In addition, achieving an accept-
computers and the Internet was a surprise (see Table 4). Additional study is needed in this area to more fully explore this relationship.

It may also be useful to study the correlation between user satisfaction with online educational programs and usefulness of online multimedia components such as animations, video clips and audio content. This would help developers of online Extension educational programs assess the value of investing resources in multimedia content for online programs.

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Mixed results were also reported for respondents’ assessments of various subjective characteristics of land-grant universities and their components. Land-grant universities tended to generate positive impressions on attributes associated with perceived credibility, including their reliability, reputation, perceived knowledge, and trustworthiness. At the same time, more than one fourth (29.7 percent) expressed concerns about perceived bias, while 14.9 percent rated land-grant universities as “unfamiliar.”

The findings regarding bias may be due to respondents’ recognition that private grants fund a significant amount of research in most land-grant universities today. Such research may be viewed as having an intrinsic bias regardless of its quality. In addition, land-grant universities are strongly associated with rural and agricultural topics and may be considered biased toward them. Meanwhile, the findings regarding familiarity may be due to the fact that most respondents have been in their current positions for a relatively short period. Land-grant universities should consider developing a communication mechanism to inform new congressional staff of their mission, purpose, and programs. Further, the congressional aides indicated they wished to have more opportunities for interaction with university faculty, especially if results of government-funded studies are presented by the faculty.

The USDA Science and Education Impact Fact Sheets received positive evaluations from the majority of respondents. More than half indicated that the fact sheets provided both