Introduction and Theoretical Framework

Three years ago, Newman, Terry, and Raven (1995) reported that very few professors in agriculture had courses on the World Wide Web (WWW). During the past three years, this perception has changed. Today many believe that most successful college programs will soon need to go to the students wherever they are (Barlow, 1998). While not in a leadership position, the field of agriculture certainly seems to be represented in the on-line community. Peterson’s Distance Learning guide (1999) currently provides links to 55 institutions that offer courses in Agriculture on-line. The Communications, Learning and Assessment in a Student-centered System (CLASS) program is a $10 million dollar project to create an accredited high school on-line. The University of Nebraska-Lincoln already has nine of the 55 courses proposed (UNL, 1999) open for enrollment. There are so many on-line courses and programs available that choosing among them has become a topic of concern in the popular press (O’Brien, 1998).

While it may be growing rapidly, it is useful to remember that the instructional use of the Web is still an extremely new practice. Consequently, there has been little research in agricultural student perceptions of course websites. Day, Raven, & Newman (1997) report that while students in AEE3203: Technical Writing in Agricommunication taught using a web-dependent delivery strategy scored higher on their final technical report than did those taught using traditional methods, they actually scored lower on a measure of their attitude.
toward computers. Terry and Briers (1996) report that while only slightly over half of them made use of it, “students’ perceptions about the AGED 440 website were positive” (p. 76). In the same study, Terry and Briers report that students “were most positive about the on-line grade checking function, instructor information, and the availability of lecture notes from the website” (p. 76).

These on-line classes and programs constitute new environments for teaching and learning, and little research has been done to determine their characteristics. Murphy and Terry (1998) found that instructors in a college of agriculture believed that educational technologies would change how they taught within five years. If instructors are to effect positive change in their teaching, more research into the nature of effective and efficient learning and teaching in these new environments will be necessary.

One problem hindering research in this area is the lack of a common language for describing these learning environments. Courses described as “Web-based” run the gamut from a single link to a two-year old syllabus to complete presentations of illustrated and animated content supplemented with fully interactive on-line videoconferencing.

The Frontiers in Education homepage (OSU, 1999) suggests a hierarchical organization of the instructional uses of the Web. They chose to organize courses into four categories based on the degree or extent to which the Web was used as a delivery mechanism in support of the instructional process. These were, Fully Developed, the entire course is on WWW; Dependent, major components of the course are on the WWW but other delivery methods are required; Supplemental, links are provided to other resources; and Informational, where some course information is available. Day, Raven, & Newman (1997) used an earlier version of this organization in their study.
Another problem is separating the HTTP from the hype. In this climate of dynamic change, expectations and projections may be running ahead of actual course offerings. The Frontiers in Education site (OSU, 1999) mentioned earlier lists only eight courses in the field of agriculture, and the World Lecture Hall (UT, 1999), a well-known site for accessing educational opportunities that recently dropped the single course listed in agricultural education, lists 12. How many courses are actually using the WWW instructionally? To what extent is using the WWW an instructional requirement?

Dillman, Christenson, Salant, and Warner (1995) reported that the public now expects lifelong learning opportunities to be available from their land grant universities. Many universities have been moving to meet this expectation by creating electronically mediated courses and programs to be offered at a distance. Much is known about the expectations of these off-campus students (Gubernik & Ebling, 1997). What impact is this electronic extension of the campus having on our on-campus students? Do they perceive the WWW as enhancing their learning process, or as a barrier to it?

Purpose

The purpose for this study was to determine the perceptions of on-campus agricultural students as to the usefulness of the World Wide Web as a vehicle for instructional delivery. Specific objectives included describing the students currently using the WWW, the benefits they perceived the WWW to offer, and the extent to which they perceived the WWW was a requirement in their undergraduate curriculum.
Methods

Population

The population of interest for this study was all students in the college of agriculture at a land grant university. A sample of the population was surveyed. The sample was composed of intact courses selected to provide a population indicative of the College population in their class standing (e.g. freshmen, sophomore . . .) and academic major (e.g. agricultural education, biophysics . . .).

Instrumentation

The instrument used to collect data for this study was a three-part questionnaire designed by the researchers to be read by an OCR scanner. Part I of the questionnaire was designed to identify selected personal and professional characteristics of the respondents. The demographic variables included were gender, age, GRR, class standing, academic major, the number of courses they were currently taking, the number of those courses supported by a website, and the percentage of all College courses they believed were supported by websites.

Part II consisted of 11 statements with a five-point Likert-type response scale. The response choices were: 1 = “Strongly Disagree,” 2 = “Disagree,” 3 = “Neutral,” 4 = “Agree,” 5 = “Strongly Agree.” Items in Part II were designed to measure the level of competence of students in the utilization of the WWW and the perceived value of these technologies to their learning processes.

Part III provided an opportunity for the students to select perceived benefits of course web pages, and the report degree to which using the WWW was a requirement in their courses. Six items describing benefits of course websites and four items indicative of the levels of required web support were provided.
A panel of five experts made up of faculty members from the Department of Agricultural Education and the Department of Educational Human Resource Development established content validity of the instrument. Selected students from Agricultural Education provided input on face validity and completed a pilot test of the instrument.

Collection of Data

Data were collected over a two-week period in the Fall Semester of 1998 during regular class sessions. The survey instrument was passed out along with #2 pencils and collected. Students absent from class were randomly sampled and contacted via phone. The final sample contained 1005 usable instruments.

Analysis of Data

Data were analyzed using SPSS® for Windows version 8.0 software. Descriptive statistics were calculated for each variable. To attempt to control non-respondent error the data from respondents was compared with that from the late respondents contacted via telephone as suggested by Miller and Smith (1983). No significant differences were found between the groups.

Reliability was established by calculating Cronbach’s Alpha. The alpha for the eleven items in Part II was calculated on the pilot instrument prior to collecting data and found to be .91. Post hoc reliability was calculated using the same techniques and found to be .86.

Descriptive statistics including frequencies, percentages, and means were used to summarize agreement or disagreement with statements related to student competence, the value of WWW supported instruction, and the level to which the WWW was required.
Results

Part I: Demographic Data

The 1005 students in the sample were 51% male and 48% female. Seven students failed to report their gender. Students enrolled in each of the 24 academic majors available in the College of Agriculture were represented in the sample. Their frequency in the sample is reported in Table 1.

Table 1

Academic Majors of Survey Respondents

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<tr>
<th>f</th>
<th>Major</th>
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<tbody>
<tr>
<td>30</td>
<td>Agribusiness</td>
<td>46</td>
<td>Biochemistry</td>
<td>43</td>
<td>Nutritional Sciences</td>
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<tr>
<td>61</td>
<td>Agricultural</td>
<td>27</td>
<td>Bioenvironmental Science</td>
<td>5</td>
<td>Plant and Environmental Soil Science</td>
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<td></td>
<td>Economics</td>
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</tr>
<tr>
<td>147</td>
<td>Agricultural</td>
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<td>Dairy Science</td>
<td>13</td>
<td>Poultry Science</td>
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<tr>
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<td>Development</td>
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</tr>
<tr>
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<td>Agricultural</td>
<td>10</td>
<td>Entomology</td>
<td>13</td>
<td>Rangeland Ecology and Management</td>
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<td>43</td>
<td>Agricultural</td>
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<td>Floriculture</td>
<td>18</td>
<td>Recreation, Park, and Tourism Sciences</td>
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<td></td>
<td>Engineering</td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td>Agricultural</td>
<td>12</td>
<td>Food Science and Technology</td>
<td>63</td>
<td>Wildlife and Fisheries Sciences</td>
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<tr>
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<td>Journalism</td>
<td></td>
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</tr>
<tr>
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<td>2</td>
<td>Forestry</td>
<td>51</td>
<td>GEST (General Studies)</td>
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<td>Systems</td>
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<td>Management</td>
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<tr>
<td>31</td>
<td>Agronomy</td>
<td>43</td>
<td>Genetics</td>
<td>9</td>
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<td>Animal Science</td>
<td>29</td>
<td>Horticulture</td>
<td>49</td>
<td>Non – COALS Major</td>
</tr>
</tbody>
</table>

The class standings of those in the sample were 423 Freshmen, 130 Sophomores, 228 Junior, 216 Seniors, and 4 graduate students. Four student failed to report a class. Three students failed to choose a range for their age. Of those who did, 80.4% were between 18 and 21, 16.8% were between 22 and 25, 1.6% were between 26 and 29, and .9% reported being over 30. Their mean, self-reported grade point ratio (GPR) was 3.07.
In comparing the sample to the population of interest, freshmen were clearly over represented. On the other demographic variables, the sample was not significantly different. The three academic majors with the largest enrollments in the College, namely Animal Science, Agricultural Economics-Business, and Agricultural Education (Agricultural Development and Agricultural Science) were adequately represented.

About 46% of the courses in the College of Agriculture were supported by websites. The students reported being enrolled in an average of 5.33 courses. Of these, the mean number that included web support was 2.45. This compared favorably with the average student’s perception that 41-60% of the courses in the college involved web support.

**Part II the Instructional Use of the WWW**

Students use the WWW often (79.4% agree or strongly agree). They perceive the WWW to be a valuable tool to access current events (90.2% agree or strongly agree) and research materials (86.0% agree or strongly agree). They perceive the WWW to be a valuable method to communicate with others (86.9% agree or strongly agree), and a valuable source of leisure activities (79.8% agree or strongly agree).

As a means of accessing course content, students perceive that the WWW is effective (81.4% agree or strongly agree) and efficient (77.9% agree or strongly agree). While slightly less certain, they believe the WWW is a convenient method of accessing course content (73.9% agree or strongly agree).

The students in this study (65.7%) disagree or strongly disagree that course websites create an additional burden for them. They (65.9%) disagree or strongly disagree that course websites are difficult to use.
The expectations of students as to the instructional utility of the WWW are perhaps best represented by the following item. “Well done course websites create additional interest in learning course material.” On this item, 17.2% strongly agreed and 45.6% agreed while 4.3% disagreed and .5% strongly disagreed. Murphy and Terry (1998), in reporting similar survey data, suggested that those holding neutral opinions, as reflected by the center of the Likert scale, were unlikely to act on those beliefs. Looking at either end of the this scale, the students likely to act (to use the WWW to improve their learning environment) greatly outnumber those who will not.

Part III: Benefits of the WWW

Students were asked to choose from among six statements following the question, “How do you benefit from course webpages?” Respondents were allowed to choose all the benefits they believed applied. Over half (51.2%) of the students believe that course websites make learning “more convenient for me.” They believe that the using the technology saves them time (45.1%). Students (42.2%) perceive that they “gain practical experience in using current technology” from these websites. Many (39.6%) felt that the website created “more effective or efficient communication between me and the instructor.” Fewer (29.0%) believe that course websites “increase my awareness of current technology.” A minority (10.5%) responded that they do not benefit at all from course websites.

The researchers were interested in the extent to which existing course websites were a requirement of the courses they supported. Students were again allowed to choose all that applied, and many did, apparently expressing variability among the level of required web usage among the (mean = 2.45) course websites they interacted with. Slightly more than a third (37.2%) reported that the website was not required at all. Another 31.9% reported that
the website contained the same information presented in class. Of the two levels of required access, 24.3% reported that students were required to interact on the WWW to research a topic, work an assignment, etc. The highest level of requirement, where some required course materials and assignments were only available on the web, was chosen by 34.8% of respondents.

Conclusions / Recommendations

Agricultural students found the WWW to be a valuable tool when used in support of the instructional process. They did not perceive that the WWW was an additional burden in the learning process, nor did they find it difficult to use. The WWW was an effective and efficient method to access information on current events, research materials, and communicate with others. Websites created to support a course benefited them by making learning “more convenient”, and saving them time. Course websites were perceived as providing additional benefit by helping students gain practical experience using current technology, and providing more effective and efficient communications with their instructors. A majority of the students agreed that “well done course websites create additional interest in learning course material.”

In this study, agricultural students perceived that they benefited from course websites. Other studies have found that students in a web supported learning environment perform better than those in a traditional settings in a technical writing technical writing in agriculture course (Day, Raven, & Newman, 1997), and a statistics course (McCollum, 1997). Based on these findings, the development of course websites should be encouraged among agricultural faculty and their effect on learning should be evaluated in additional content areas in agriculture.
Specific components or features of effective course websites should be identified and evaluated with respect to learner satisfaction and outcome measures of learning.

The obstacles to adopting other technologically mediated delivery systems have been explored (Dillon & Walsh, 1992; Jackson & Bowen, 1993, Murphy & Terry 1998). Additional studies should be conducted to identify barriers to the adoption of course websites.

There is some danger that the perceived benefit of these technologies was due, wholly or partly, to their newness. This study should be replicated in other locations and over time to minimize the possible effects of this phenomenon.

Additional research in this area will be facilitated through the development of a common descriptive language. In order to facilitate discussion of the instructional value of the WWW as a delivery medium for agriculture education, the following classification model is recommended. This simplified three-level classification model is based on the Oregon State University scheme (OSU, 1999) with the additional dimension of the level of required access to WWW resources. In this scheme, courses delivered entirely over the WWW are called Web Delivered. Courses that meet off-line but have required components (reading assignments, activities) available only via the WWW are called Web Dependent. Courses that use the WWW as an additional channel to deliver materials and information or provide access to non-required instructional resources or information are called Web Enhanced.

Murphy and Terry (1998) found that instructors in a college of agriculture believed that educational technologies would change their methods of teaching within five years. The constructivist ideas of redefining the role of instructor from “sage on the stage” or presenter of content, to “guide on the side” or organizer of educational opportunities and experiences,
continue to gain momentum. Course websites are gaining acceptance as a useful tool in this transition.

References


A CRITIQUE OF
AGRICULTURAL STUDENT PERCEPTIONS OF THE
VALUE OF WWW SUPPORTED INSTRUCTION

Michael K. Swan
Washington State University

Contributions and Significance of Research
The results of this study add to the limited body of knowledge surrounding distance education and delivery modes. The WWW is a giant tool waiting to be tapped by educators throughout the world. What is not mentioned in the paper is how valuable is the web in delivering courses. This study is also lacking in identifying how the courses were on the web were delivered.

The first section did identify students in the College of Agriculture. Section 2 was hard to read and left us with several unanswered and important questions. Benefits of WWW sites identified by students were included but were mainly focused on non-instructional areas. Section 3 identified what students perceived the WWW provided as a basis of learning in the course.

The study data was collected using paper pencil type of reporting. This may have been a place to test what the study is saying and put it on the WWW for students to respond to the questions.

Procedural Considerations
The study was well designed and conducted. It was evident from examining the related literature that an adequate and defensible base had been developed. At time it was hard to draw these out of study as presented.

Questions for Consideration
Are we really comparing like concerns in section 2 of the study or is it just how students felt about the WWW site? How often were they required to go to the WWW as an active participant in the course? What I really want to know does placing course materials on the WWW make a difference in what the students learns and how much they retain? Perceived benefits are one thing but actual results will tell us more and either support or not support what is being said or hypothesized. Where does this study lead us and what is the impact or difference it makes on the industry of agricultural education?

Dr. Murphy raises some great questions at the end of the presented paper. We should focus on these to get to some real answers.