FACULTY PERCEPTIONS OF WEB-BASED DISTANCE EDUCATION IN AGRICULTURE

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Abstract

The demandfor distance education (DE) has continued to increase. Recent technology advances allow more flexibility in the methods of delivering this education. These advances have created a challenge for most universities and educators to again reevaluate their role in DE. Web-based courses andprograms are one exciting avenue that needs to be researched and evaluated. Faculty will play an important role in the acceptance and adoption of these types of programs. This study investigated the perceptions of Iowa State University Department of Agronomy faculty regarding web-based DE and more specifically the M.S. in Agronomy Distance Education Degree Program. Findings showed that perceptions were significantly higher when faculty were familiar with the MS. in Agronomy Degree Program, had viewed a lesson, or had been involved in the program. Overall, the faculty were undecided about their perception of web-based DE and the M.S. in Agronomy Degree Program; their largest concerns focused on the value of web-based degrees, the effectiveness of student-professor interaction, and the rigor of web-based DE. Faculty were the most positive about the comparability between web-based DE and on-campus courses in regard to challenge. The faculty also thought the university should develop more web-based courses and integrate them into the curricula.

Background

The agronomy department at Iowa State University is currently developing a new Master of Science Distance Education (DE) Degree Program intended for individuals working in an agronomy-related field in either industry or government who need additional training for professional advancement. These individuals are often unable to pursue an advanced degree because employment and family commitments preclude their returning to campus. The need for an alternative graduate program to meet the educational needs of those persons was recognized and pursued. Fifteen individuals from within the state began course work in this web-based Master of Science Degree Program in the fall of 1998. This web-based degree program will be open for enrollment to state residents in the fall of 1999.

Faculty play a major role in the development and success of any new degree program. This is especially true for distance learning degree programs. Because success or failure of degree programs is so dependent on faculty, their concerns and perceptions must be understood (Schurle, 1997). Until now there has been no data collected about the faculty's perception of web-based DE and, more specifically, the Master of Science in Agronomy DE Degree Program.

Introduction

Distance education has long been based on the premise of delivering education to people who do not have access to or whose career does not allow them to participate in, a campus-based curriculum. Reasons for being in this category include financial costs, career demands, family commitments, and/or geographic obstacles. Time and convenience issues play a major part in the

need for DE. Many people in this evolving group are professionals who are seeking relevant information that is specific to their career field (Butler, 1996). The Master of Agriculture degree in the Department of Animal Science at Texas A&M University is one example of a degree aimed at providing an education for students in agriculture-related businesses while allowing a flexible graduate degree schedule (Miller et al., 1998). Many other universities have similar programs aimed at serving this group of individuals, and for one reason or another this group continues to grow and evolve creating a challenge for all universities and colleges (Telg & Cheek, 1998).

Despite this outreach, DE is constantly being scrutinized as to the quality and rigor of the classes or programs it delivers. Miller and Shih (1998a,b) showed that faculty perceived the quality and rigor of off-campus courses and programs to be lower than that of traditional on-campus courses. Because of this bias, new DE programs must be ready for the inevitable opposition and challenge. Understanding how quality is measured is the first step toward overcoming this prejudice. The perception of quality in DE programs depends on the criteria or standards used to evaluate the program. Each stakeholder, such as the student, educator, or industry, will have different criteria they use to evaluate the quality of the program (Middleton, 1997). Middleton (1997) continues to suggest that from an educator's point of view, issues such as cost effectiveness, educator workload, level of interaction between teacher and student, and the ability of the students to cooperatively form groups and problem solve must be evaluated. The idea that DE is mass education must be overcome and attitudes changed if we are to create the perception that DE is a viable and equal alternative to an on-campus program. Distance education courses require that educators be aware that they are developing lessons for or actually teaching to an audience that is not physically present (Diebel et al., 1998). Some DE courses are based on traditional models of teaching and are simply reproductions of courses taught on campus without any thought to the differing needs of the students (Saltzberg & Polyson, 1995; Duchastel, 1997). Developing this new mind-set is just one of the issues to be confronted in order to provide quality DE programs and to improve the overall perception of DE.

Meeting the needs and goals of students in the 21st century is an important necessity of higher education (Herr & Parsons, 1995). Technology has played and will continue to play a major role in meeting the ever changing needs of the students. Massy and Wilger (1998) explained that DE coupled with technology is not mass education, but rather mass customization. Technology provides the ability to accommodate individual differences in educational goals, learning styles, and abilities while allowing the convenience to access this information any time and from any place.

Distance education in general has expanded rapidly, and yet there are still more tools at the instructor's disposal to educate the distance learners. Web-based DE is one of those tools that can be very effective for teaching individuals who need a very flexible schedule (Telg & Cheek, 1998; Saltzberg & Polyson, 1995; O'Kane & Armstrong, 1997).

Web-based instruction allows self-paced learning and evaluation, offering students some immediate feedback on their ability to comprehend the information. The world wide web (WWW) provides powerful, new resources for education in agriculture. The Web is very different from any other teaching tool we have ever known (O'Kane & Armstrong, 1997). We are able to exchange documents, images, video, sound, and other electronic information formats. Students need to be provided with choices in instructional methods in order to maintain motivation and attention, and to address the individuals' different learning styles (Miller, 1997; Seiler et al., 1997). Those

educators that have explored this resource have experienced a rapid transition from typical lecture type formats, to interactive student centered Internet courses (Oliver et al., 1998). This transition requires instructors to develop new skills for curriculum development and delivery and to keep up-to-date on the quickening pace of technology adoption and change in the Internet areas (Diebel et al., 1998; Miller & Powell, 1998).

A wide spectrum of use of the WWW can be found in educational settings beginning with the use of the WWW to supplement teaching and extending to the creation of virtual classrooms (Saltzberg & Polyson, 1995). Even schools that have a long reputation for effective DE must continue to learn or relearn how to deliver educational programming. Universities have long been known for their ability to be on the cutting edge of instructional techniques and development, but they seem to be lagging in the adoption of web-based technology (Telg & Cheek, 1998). Miller (1995, p. 10) wrote, "Today's youth are much more accustomed to learning from electronic products than are the faculty who teach the classes. Higher education no longer holds the monopoly on information packaging and transfer." Individual educators and institutions of higher education are under increasing pressure to reevaluate their positions as well as constantly improve the development of effective teaching strategies (Miller & Powell, 1998; Miller, 1995; Diebel et al., 1998).

Massy and Wilger (1998) noted some of the reasons that universities and faculty are reluctant to adopt and use these new resources. A major reason is that there are no established institutional norms relating quality to the use of technology. Another reason is that faculty, if given the chance, will use money to hire another faculty member before purchasing new technology. It is difficult to get faculty to think of productivity in terms other than scholarship and research. This concept is quantified by Fasenko et al. (1996) in which a survey of North Carolina State University faculty showed that faculty do not believe teaching is valued highly by administration. Learning accomplishments usually do not make that list of productivity in many minds.

Adoption of this type of instruction depends heavily on the perception and attitudes of faculty surrounding web-based DE. Understanding the faculty's perceptions and attitudes is the first step in gaining respect for this newfound method of instruction (O'Kane & Armstrong, 1997; Lawless & Smith, 1997). As with any new tool, the need to be cautious hangs in the air. The key is to use the technology to bring the subject matter to life for the students and not to allow the technology to become the focal point. There is a thin line that should not be crossed between controlling the technology and the technology controlling us (Herr & Parsons, 1995).

Purpose and Objectives

The purpose of this study was to investigate faculty perceptions of web-based DE in general and of the Master of Science in Agronomy Distance Education Degree Program specifically. The objectives of the study were as follows:

1. Describe faculty perceptions of web-based DE.
2. Describe faculty perceptions of the Master of Science in Agronomy Distance Education Degree Program.
3. Determine whether faculty perceptions depended upon selected faculty characteristics.

Procedures

The population (N=72) for this quantitative descriptive study consisted of all Assistant, Associate, and Full Professors in the Agronomy Department at Iowa State University.

The questionnaire used for this study had three sections. The first and second sections included Likert-type statements inquiring into the faculty's perceptions of web-based DE and the M.S. in Agronomy Degree Program. Section one contained general statements pertaining to an overall perception of web-based DE programs. Section two contained specific statements about faculty perceptions of the M.S. in Agronomy Degree Program compared with on-campus programs and other similar degrees. The answers in these two sections were rated from one for "strongly disagree" to five for "strongly agree." Section three contained general demographic questions as well as specific questions about familiarity with and involvement in the M.S. in Agronomy Degree Program.

The perception instruments used were developed by the researchers and reviewed for content and face validity by a panel of experts. This panel consisted of one professor and two graduate students from the department of curriculum and instruction, two professors and one adjunct professor from the department of agronomy, and one professor from the department of agricultural education and studies. The two professors in agronomy that served on the panel of experts were also asked to participate in the survey. Reliability of the data was established by calculating internal consistency using Cronbach's alpha. Cronbach's alpha was 0.88 for the overall perception of web-based DE and 0.63 for the perception of the Master of Science in Agronomy Distance Education Degree Program.

During fall semester of 1998, the questionnaire was mailed to all members of the population with a cover memo from the interim department head explaining the purpose of the study and asking them to complete the questionnaire and return it. A reminder e-mail was sent to all faculty two days before the return deadline. A total of 42 faculty members (58%) completed and returned the questionnaire. No additional follow-ups were conducted. Nonresponse error was controlled by comparing faculty with the population on known characteristics as recommended by Miller and Smith (1983).

The group that returned the questionnaire included 22 (54%) Professors, 13 (3 1%) Associate Professors, and 6 (15%) Assistant Professors. This was in comparison to the population, which consisted of 52% Professors, 27% Associate Professors, and 20% Assistant Professors. Despite the strong correlation based on rank, the reader is cautioned that the conclusions found may not necessarily represent the entire agronomy faculty.

Data were analyzed with the SPSS for Windows personal computer program. Means and standard deviations for the Likert-type items were used to summarize the responses. Negatively worded statements were reverse coded for analysis. One-way analysis of variance and t-tests were used to determine whether faculty perceptions depended on selected faculty characteristics. The alpha level was set at .05 for determining statistical significance.

Results

On average the faculty had held the Ph.D. degree for twenty-one years. Fifty-nine percent of the faculty listed research as their primary position responsibility whereas 23% listed teaching and 18% listed extension. Thirty percent of the faculty were involved in DE other than the M.S. in Agronomy Degree Program whereas 70% indicated that they had no other involvement in DE. Sixty-two percent of the faculty indicated that they were familiar with the M. S. in Agronomy Degree Program but 38% felt that they were not familiar with the program. Sixty percent of the faculty were not involved in the M.S. in Agronomy Degree Program whereas 40% were in some way associated with the program. This involvement ranged from being an instructor of an M.S. in Agronomy Degree Program course to providing

administrative support for the program.

Regarding perception of web-based DE, faculty were undecided, with a mean response of 3.46 (Table 1). The most positive perceptions held by the faculty were that web-based DE

Table 1. Means and standard deviations for faculty percentions of web-based distance education and the M. S. in Agronomy Distance Education Degree Program

Statement	M[a]	SD
Overall perception of web-based distance education	**3.46**	**.63**
Web-based, distance education courses can be as challenging as on-campus courses.	**4.00**	**.92**
Web-based, distance education courses should become an integrated part of university curricula.	**3.98**	**.75**
Our department needs to develop more web-based, distance education courses.	**3.67**	**.93**
If I were a student, I would consider enrolling in a web-based, distance education course or program.	**3.50**	**.89**
Web-based, distance education courses are as academically challenging as on-campus courses.	**3.43**	.91
Web-based, distance education courses should be offered as substitutes for some on-campus courses.	**3.38**	1.03
Web-based, distance education courses can not be as effective as on-campus courses.	3.33[b]	1.14
Students spend less time working on web-based, distance education courses than on-campus courses.	3.33[b]	.61
I would consider teaching a web-based, distance education course.	3.31	1.07
Teaching a distance education course would improve my on-campus teaching.	3.31	1.05
Effective student-professor interaction is not possible in web-based, distance education courses.	3.26[b]	**.96**
On-line degrees should not be valued as equivalent to on-campus degrees in the job market.	2.98[b]	**.14**
Overall perception of the M.S. in Agronomy Degree Program.	**3.15**	**.59**
The time and effort expended on the Master of Science in Agronomy Distance Education Degree Program is not appropriate.	3.27[b]	**.59**
A Master of Science in Agronomy Distance Education Degree Program will be perceived by employers as having similar status or value as compared to an on-campus Master of Science degree.	3.10	**.77**
The Master of Science in Agronomy Distance Education Degree Program is as rigorous as an on-campus Master of Science Degree Program.	3.10	**.94**

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree; [b] Indicates negatively worded items that were reverse coded.

courses can be as challenging as on-campus courses, web-based DE courses should become an integrated part of the university curricula, and the department needs to develop more web-based DE courses. The least positive views were that on-line degrees should be valued as equivalent to on-campus degrees, that effective student/professor interaction is possible in web-based DE courses, and that teaching DE courses would improve on-campus teaching.

Faculty were also undecided about their perception of the M.S. in Agronomy DE Degree Program (Table 1). The most positive perception held by the faculty was that the time and effort expended on the M.S. in Agronomy Degree Program was appropriate. The least positive views were that the M. S. in Agronomy degree will be perceived by employers as having similar value compared with an on-campus M.S. and that the M.S. in Agronomy Degree Program is as rigorous as an on-campus M.S. The reader is cautioned that comparing the data for overall perceptions of web-based DE generally with the M.S. in Agronomy Degree Program specifically is not appropriate in this study. The scales used to measure each construct were distinctly different.

Professors had the highest mean response for both the overall perception of web-based DE and the M. S. in Agronomy Degree Program (Table 2). Assistant Professors had the lowest mean response for the overall perception of web-based DE and Associate Professors had the lowest mean response for the M. S. in Agronomy Degree Program. Faculty whose primary responsibility was extension had the highest mean response for the overall perception and faculty whose primary responsibility was teaching had the highest mean response for the M.S. in Agronomy Degree Program (Table 3).

Faculty whose primary responsibility was research had the lowest mean response for both the web-based DE in general and the M.S. in Agronomy Degree Program. The overall perception of web-based DE was higher and the perception of the M.S. in Agronomy Degree Program significantly higher if the faculty member was involved in other DE (Table 4).

Faculty had a significantly higher response for both the web-based DE and perception of the M. S. in Agronomy Degree Program if they were familiar with the M.S. in Agronomy Degree Program (Table 5). Overall perception of web-based DE was higher and perception of the M.S. in Agronomy Degree Program significantly higher if the faculty were involved with the M.S. in Agronomy Degree Program (Table 6). Both overall perception of web-based DE and the perception of the M.S. in Agronomy Degree Program had significantly higher mean responses when the faculty had viewed an M. S. in Agronomy Degree Program lesson (Table 7).

Table 2. A comparison of perceptions by faculty rank

		Web-Based[b]		Agronomy Program[c]	
Variable	N	M[a]	SD	M[a]	SD
Professors	22	3.51	.67	3.26	.64
Associate Professors	13	3.41	.42	2.89	.36
Assistant Professors	6	3.18	.75	3.11	.54

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree; [b] $F=.68$ (2,370 $p>.05$; [c] $F=1.69$ (2,37) $p>.05$

Table 3. A comparison of percentions by fauclty members' primary responsibility

		Web-Based[b]		Agronomy Program'	
Variable	N	M[a]	SD	M[a]	SD
Research	23	3.37	.64	2.97	.63
Teaching	9	3.41	.78	3.41	.46
Extension	7	3.68	.30	3.29	.36

"1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree; [b] F=.57 (2,35) p>.05; [c]F=2.29 (2,35) p>.05

Table 4. A comnarison of nercentions bv involvement in other distance education (DE) courses

		Web-Based[b]		Agronomy Program[c]	
Variable	N	M[a]	SD	M[a]	SD
Not involved in DE	32	3.38	.61	3.03	.55
Involved in DE	10	3.70	.66	3.53	.57

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree; [b] t=-1.40 (39) p>.05; t=-2.47 (39) p<.05

Table 5. A comnarison of perceptions bv familiaritv of the M.S. in Anronomv Degree Program

		Web-Based[b]		Agronomy Program[c]	
Variable	N	M[a]	SD	M[a]	SD
Not familiar with the MOAP[d]	16	3.30	.61	2.93	.54
Familiar with the MOAP	26	3.70	.61	3.50	.52

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree; [b] t=-2.15 (39) p<.05; t=-3.35 (39) p<.05; [d] MOAP=Master of Agronomy Program.

Table 6. A comparison of nercentions bv involvement in the M.S. in Agronomy Degree Program

		Web-Based[b]		Agronomy Program[c]	
Variable	N	M[a]	SD	M[a]	SD
Not involved in the MOAP[d]	25	3.36	.59	2.99	.50
Involved in the MOAP	17	3.60	.68	3.34	.65

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree; [b] t=-1.23 (39) p>.05; t=-2.27 (39) p<.05; [d] MOAP=Master of Agronomy Program.

Conclusions and Recommendations

The data gathered from the agronomy DE faculty survey provided valuable insight on how the faculty perception of the Master of Science in Agronomy Distance Education Degree Program could be enhanced. It also provided the Department with a base from which to work in order to improve overall perceptions of web-based DE. The following conclusions and

Table 7. A comparison of perceptions by whether faculty had viewed an M. S. in Agronomy Degree Program lesson

		Web-Based[b]		Agronomy Program[c]	
Variable	N	M[a]	SD	M[a]	SD
Have not viewed a lesson	26	3.22	.60	2.88	.46
Viewed a lesson	16	3.83	.49	3.58	.52

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree; [b] $t=-3.41$ (39) $p<.05$; $t=-4.52$ (39) $p<.05$

recommendations were drawn from the findings.

1. Overall, the faculty were undecided about web-based DE and the M. S. in Agronomy Degree Program. There is ample room for improvement inasmuch as less than 60% of the faculty considered themselves to be familiar with the M.S. in Agronomy Degree Program. It was recommended that faculty seminars focusing on the M. S. in Agronomy Degree Program be held and that major events of the program be announced in the department newsletter.

2. There was no correlation between faculty rank or primary position responsibility and perception of either web-based DE or the M.S. in Agronomy Degree Program. Efforts to familiarize and inform about the M. S. of Agronomy Degree Program and web-based DE should focus on the faculty as a whole and not single any one group out.

3. Perceptions of web-based DE were significantly higher for faculty who were involved in the M. S. of Agronomy Degree Program or other DE. Faculty should have an open invitation to participate in the development of this program. Follow-ups should be conducted with the faculty participants to explain and show them where their particular contribution was used.

4. Perceptions of the M.S. in Agronomy Degree Program were significantly higher if the faculty were involved in the M.S. in Agronomy Degree Program, involved in other DE, familiar with the M.S. in Agronomy Degree Program, or had viewed an M.S. in Agronomy Degree Program lesson. It was recommended that a more interactive M. S. in Agronomy Degree Program website be developed outlining the mission and educational objectives and allowing the visitor to view an example lesson. The M. S. in Agronomy Degree Program's URL should be printed in the department newsletter highlighting the fact that it is something new and innovative.

5. Faculty agree that web-based DE can be as challenging as on-campus courses and that the department needs to continue to develop these types of courses, but their greatest concerns are the effectiveness of student/professor interactions and the overall quality of a web-based degree. It was recommended that examples of student/material, student/instructor, and student/student interactions be integrated into the seminars and the program's website.

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Journal Paper No. J-18305 of the Iowa Agriculture and Home Economics Experiment Station, Ames, Iowa. Project No. 3265, and supported by Hatch Act and State of Iowa funds.