

A Longitudinal Study of Learner Characteristics and Experiences with a Distance Master of Agriculture Degree Program

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Abstract

This longitudinal study sought to identify trends in learner characteristics and program-related experiences in a distance-delivered Master of Professional Agriculture degree program. Between 2001 and 2009, notable progress had been made to lessen the significance of obstacles faced by off-campus graduate students. The average amount of time taken to complete the master's degree program decreased from 74.46 months for graduates surveyed in 2001 to 55.85 months for graduates surveyed in 2009. A majority of graduates surveyed in 2001 perceived three obstacles to be slightly significant to significant: "limited number of courses offered," "difficulty in balancing school, personal, and work responsibilities," and "cost of the program." However, a majority of graduates surveyed in 2009 perceived only two obstacles to be slightly significant to significant: "difficulty in balancing school, personal, and work responsibilities" and "attending sessions held on campus." Though there is still room for improvement relative to dealing with obstacles to off-campus study, efforts to improve distance learning in the College of Agriculture and Life Sciences at Iowa University have had a positive impact on graduates.

Introduction

Distance education has become an integral component of higher education program delivery, especially for career and technical education programs at the postsecondary level (Allen and Seaman, 2010; Rovai and Downey, 2010; Zirkle, 2003). In 2009, online enrollment had a 17% growth rate, whereas the overall higher education student population growth

rate was just 1.2% (Allen and Seaman, 2009). Students view distance learning as a convenient way to pursue education without sacrificing the quality of learning. According to Hannay and Newvine (2006), 57% of students in their sample believed they learned more in a distance learning approach than in traditional classroom face-to-face lecture courses. In addition, almost 70% of those students indicated they preferred distance learning courses to traditional courses. Two of the biggest motivating factors for higher education institutions to offer more distance education courses are (a) providing greater access for students and (b) meeting the increased demand for more online offerings that is associated with the economic downturn (Allen and Seaman, 2010; Miller and Miller, 2005; Patterson and McFadden, 2009).

Distance education has evolved from modifying existing on-campus and independent study courses to developing degree programs that are completed partially or entirely off campus (Miller, 1995; Miller and Miller 2005). Colleges of agriculture at land-grant universities are able to increase the variety of course options available for undergraduate and graduate distance education through consortiums such as the Tri-State Agricultural Distance Delivery Alliance (TADDA) and Great Plains Interactive Distance Education Alliance (IDEA) (Mink and Moore, 2005; Schmidt et al., 2005). Advances in communication and computer technology have made these types of course offerings and degree programs possible (Miller and Miller, 2005).

Distance education students' characteristics, including their reasons for deciding to enroll in such

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programs, are complex and diverse. Students who pursue degrees through off-campus programs face a variety of obstacles not normally encountered by traditional college students (Kelsey and D'souza, 2004; Miller, 1995; Miller and Miller, 2005; Patterson and McFadden, 2009). Off-campus learners in distance agriculture courses are typically older than traditional on-campus students and generally maintain a professional career in addition to taking courses (Miller and Honeyman, 1993; Murphy, 2000; Nti and Bowen, 1998; Wilson, 1991). Employment, marital status, family responsibilities, physical distance, and expenses associated with traditional education make distance learning the most viable option for many agriculture professionals to access higher education (Hannay and Newvine, 2006). Mink and Moore (2005) determined that participants' decisions to complete a distance Bachelor of Science degree program in agricultural science and technology were influenced by family, flexibility of classes, and being place bound because of employment. Distance learners in an agricultural safety course were described as self-motivated and self-disciplined (Lehtola and Boyd, 1992).

The exponential growth of online instruction has led to concerns about program quality and completion rates. Because distance education students generally have many competing demands for their time, requiring more learner-to-learner interactions could be a barrier to completing an off-campus degree program (Hezel and Dirr, 1990; Kelsey et al., 2002; Thompson et al., 1991). Patterson and McFadden (2009) found that online graduate students were significantly more likely than campus-based graduate students to drop out. In a study of lower-level undergraduate business courses, there was a small but significant negative correlation between the amount of learner-to-learner interaction and online course completion rate (Grandzol and Grandzol, 2010). Despite the aforementioned advances in courses and degree programs, the limited number and variety of courses offerings is an often-cited obstacle to timely program completion (Miller 1995; Miller and Miller, 2005; Mink and Moore, 2005). Allen and Seaman (2010) found that 69% of academic leaders whose institutions offer online courses did not believe it is harder to retain online students.

Asynchronous delivery technologies have reduced the negative effects associated with obstacles related to time, cost, and convenience of distance education (Miller and Honeyman, 1993; Owen and Hotchkis, 1991). Gulliver and Wright (1989) suggested that because distance learners did not place a high value on interacting with other students, delivery methods that

allow students to work at their own pace might increase positive perceptions of the distance education program. Drennan et al. (2005) identified positive perceptions toward technology and an autonomous learning mode as two key student attributes affecting satisfaction with distance education. Conversely, Kelsey et al. (2002) found that students participating in the Doc-at-a-Distance program valued the interaction and support they received from other students in a cohort group and were dissatisfied by isolation, inaccessible resources, technology problems, and amount of time required to complete course requirements.

Iowa State University was a pioneer in agricultural distance learning. Their master's degree program in professional agriculture dates to 1979 (Miller and Honeyman, 1993). In 1991, Iowa State University expanded the off-campus professional agriculture program to include a Bachelor of Science degree (Miller and Miller, 2005). Iowa State University's programs have been the subject of several studies that have documented program strengths, weaknesses, and strategies that have evolved to meet student needs over time. Miller (1995) studied program graduates to gain an understanding of the off-campus learning experience. In response, Iowa State University began increasing the use of asynchronous delivery methods to deliver courses associated with the off-campus agriculture degree programs. Of the adult distance learners who participated in Miller and Pilcher's 2002 study on learning strategies, 95% were enrolled in courses delivered primarily through asynchronous technology (e.g., videotape, Internet, or CD-ROM). In spring 2001, Miller and Miller (2005) conducted a follow-up study of graduates of the off-campus degree programs. When comparing graduates from 1993 and 2001, Miller and Miller found that progress had been made to lessen the significance of obstacles faced by off-campus students, with a higher percentage of graduates surveyed in 2001 completing their degrees in five years or less.

In the years since Miller and Miller's 2005 follow-up study, distance education and related educational technologies have continued to develop rapidly. Rovai and Downey (2010) argued that institutional distance education programs that are unable to successfully adapt to the competitive environment created by the economic potential of operating on a for-profit basis are at risk of failing. In the current economic downturn, institutions are seeking to increase tuition revenues by attracting and retaining more distance education students (Allen and Seaman, 2010; Howell et al., 2003; Patterson and McFadden, 2009; Rovai and Downey, 2010). The growing demand for quality

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online learning, advances in technology, and evolving learner demographics makes it imperative for distance education programs to conduct periodic follow-up studies that may be used to determine priorities for program improvement.

Purpose and Objectives

This purpose of this longitudinal study was to identify trends in learner characteristics and program-related experiences in a Master of Professional Agriculture distance degree program. The objectives of this study included the following:

1. Compare alumni of the off-campus master's degree program in professional agriculture who graduated between spring 1994 and spring 2001 with those who graduated between summer 2001 and spring 2009 in terms of demographic characteristics.
2. Compare alumni of the off-campus master's degree program in professional agriculture who graduated between spring 1994 and spring 2001 with those who graduated between summer 2001 and spring 2009 in terms of program-related experiences.
3. Compare alumni of the off-campus master's degree program in professional agriculture who graduated between spring 1994 and spring 2001 with those who graduated between summer 2001 and spring 2009 in terms of their perceptions of obstacles to off-campus study.

Methods

Participants

This study was deemed exempt by Iowa State University Institutional Review Board. The population for the study consisted of all persons who earned a Master of Professional Agriculture degree from Iowa State University between spring semester 1994 and summer semester 2009. The population was studied at two points in time. The first included 30 persons who earned a Master of Professional Agriculture degree at Iowa State University between spring 1994 and spring 2001. The second included 73 persons who earned a Master of Professional Agriculture degree between summer 2001 and summer 2009. Names and contact information for these graduates were obtained through the Iowa State University Alumni Association. Lists were cross-checked for accuracy with graduation lists maintained by the Iowa State University Registrar's Office.

Instrumentation

Identical portions of the questionnaires in 2001 and 2009 were used to collect data for this study. The questionnaires contained demographic questions,

questions related to experiences with the Master of Professional Agriculture program, and a scale to measure perceptions of obstacles faced by off-campus students. A panel of experts judged the questionnaire to be content and face valid. The obstacles scale had a Cronbach's alpha reliability coefficient of .78 for data collected in 2001 and .83 for data collected in 2009.

Data collection and Analysis

At the end of the 2001 spring semester, the questionnaire, a cover letter, and a stamped return envelope were sent to all ($N = 30$) persons who earned a Master of Professional Agriculture degree between spring semester 1993 and spring semester 2001. Approximately four weeks after the initial package was mailed, a second complete package was sent to all non-respondents. There were no additional follow-ups conducted.

During the 2009 summer semester, all ($N = 73$) individuals who earned a Master of Professional Agriculture degree between summer semester 2001 and spring 2009 received a brief pre-notice postcard individually signed by the co-principal investigators informing them of the study. A detailed information letter, questionnaire, and return envelope were sent three days after the pre-notice postcard. A brief reminder letter with a copy of the questionnaire and a return envelope were sent to non-respondents 10 days after the detailed information letter. Ten days later, a second reminder letter was sent to the remaining non-respondents. A final follow-up was conducted by telephone 14 days after the second reminder letter.

The response rate was 80% in 2001 and 86% in 2009. The researchers followed Lindner et al. (2001) recommendations for handling nonresponse. The protocol for comparing early and late respondents was used for the 2001 data. No statistically significant differences were found. Because the response rate exceeded 85% in 2009, control of nonresponse was not necessary (Lindner et al., 2001). The researchers concluded that results were generalizable to the target population.

Data were analyzed with SPSS v.17 software. Descriptive statistics including frequencies, percentages, means, modes, medians, ranges, and standard deviations were used to summarize the quantitative data.

Results and Discussion

Individuals who graduated from the off-campus master's degree program in professional agriculture between 1994 and 2001 ranged in age from 25 to 60. Their mean age was 41.92 ($SD = 8.73$). The majority

Table 1. Occupation of Master's of Professional Agriculture Graduates at the Time of Enrollment and at the Time of the Survey

Occupation ²	At time of enrollment		At time of survey	
	2001 %	2009 %	2001 %	2009 %
Farming	16.7	14.3	13.0	9.5
Agricultural extension	16.7	17.5	26.1	17.5
Agribusiness	29.2	9.5	26.1	7.9
Agricultural education	8.3	12.7	8.3	12.7
Soil conservation	8.3	1.6	0.0	0.0
Other	20.8	50.8	25.0	60.3

² The numbers represent the percentage of respondents who indicated employment in each occupation. Some respondents indicated more than one occupation.

Table 2. Mean Rankings and Standard Deviations for Factors that Motivated Graduates to Enroll in the Master's of Professional Agriculture Distance Degree Program

Motive	2001		2009	
	M	SD	M	SD
Pursuing a degree	1.65	0.98	2.03	1.12
Acquiring current technical knowledge	2.78	0.99	2.93	1.07
For the enjoyment of learning new information	3.17	1.02	3.25	0.97
Career advancement	3.00	1.34	1.95	0.97

(75.0%) of these graduates were male. Individuals who graduated between 2001 and 2009 ranged in age from 25 to 65. Their mean age was 41.06 (SD = 10.86). While the majority (69.8%) of these graduates were male, there was a small increase (5.2%) in the percentage of graduates who were women.

Graduates were asked to identify their occupation at the time they enrolled in their degree program and at the time they participated in this study. Table 1 shows a decline in the percentage of graduates who reported occupations in farming, agribusiness, and soil conservation from 2001 to 2009. At time of enrollment, the percentage of graduates who reported an occupation in "other" areas increased from 2001 to 2009 by 30%. Additionally, at the time of the survey the percentage of graduates who reported an occupation in "other" areas increased from 2001 to 2009 by 35%. The number and diversity of occupations listed as "other" by graduates was great, selected examples included sales representative, postsecondary instructor, manufacturing manager, and military officer. The diversity of occupations of graduates would indicate that the Master of Professional Agriculture degree has opened various career opportunities. A further indicator of this can be seen in the percentage of graduates who credited their degree with occupational change. The percentage of graduates who credited their Master of Professional Agriculture degree with occupational changes increased from 42% in 2001 to 49% in 2009.

Graduates of the off-campus master's degree program in professional agriculture were asked to rank four motivating factors for enrolling in the program. As seen in Table 2, graduates surveyed in 2001 ranked "pursuing a degree" as the most motivating factor and ranked "acquiring current technical knowledge" second. Graduates surveyed in 2009 survey rated

"career advancement" as the most motivating factor and ranked "pursuing a degree" second.

Master's degree students at Iowa University are allowed up to five years to complete their program (Iowa University Graduate College, 2011). Seen in Table 3, the amount of time taken to complete the off-campus program ranged from 11 months to 168 months for graduates surveyed in 2001 and from nine months to 288 months for graduates surveyed in 2009. Less than 20% of graduates who participated in the 2001 and 2009 surveys completed the program in less than two years. Almost half (43.5%) of the graduates surveyed in 2009 and only 16.7% of the graduates surveyed in 2001

completed the program within three years. More than half (61.3%) of the graduates surveyed in 2009 and less than half (37.5%) of the graduates surveyed in 2001 completed the program in four years. After five years, 83.9% of the graduates surveyed in 2009 and 50% of the graduates surveyed in 2001 had completed the program. Graduates surveyed in 2001 completed the program in an average of 74.46 months (SD = 0.79). Graduates surveyed in 2009 completed the program in an average of 56.85 months (SD = 0.88). Factors that may have led to the shorter completion time for 2009 graduates could be the increase in the number of courses available throughout the year. An increase in the number of course offerings during summer months may have contributed to the decrease in the amount of time take to complete the degree program. Graduate advising may have improved for these students due to greater communication through email and other online correspondence with program administrators. Another factor may have been the number of graduate credits that students were able to transfer into to the program.

After 1993, the requirement that students must attend on-campus sessions was discontinued for the off-campus master's degree program in professional agriculture. Asynchronous methods were used to deliver courses. Videotape and later web-based courses became very popular delivery tools that lessened the need for students to attend classes at specific places and times. Table 4 shows that graduates surveyed in 2009 came to campus less frequently than those surveyed in 2001. In 2001, 21.7% of graduates traveled to campus 10 or fewer times, whereas 67.7% of those surveyed in 2009 traveled to campus 10 or fewer times. A majority (65.2%) of graduates surveyed in 2001 traveled to

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Table 3. Time Taken by Graduates to Complete the Master's of Professional Agriculture Distance Degree Program

Number of months	2001 ^z		2009 ^y	
	%	Cum.%	%	Cum.%
<25	12.5	12.5	19.4	19.4
25-36	4.2	16.7	24.1	43.5
37-48	20.9	37.5	17.8	61.3
49-60	12.5	50.0	22.6	83.9
61-72	0.0	50.0	1.6	85.5
73-84	12.5	62.5	3.2	88.7
85-96	8.3	70.8	0.0	88.7
97-108	8.3	79.2	1.6	90.3
109-120	12.5	91.7	3.2	93.5
>120	8.3	100.0	6.5	100.0

^zM = 74.46, SD = 0.79; ^yM = 55.85, SD = 0.88.

Table 4. Number of Times Graduates Traveled to Campus for Reasons Related to Master's of Professional Agriculture Distance Degree Program

Number of times	2001		2009	
	%	Cum.%	%	Cum.%
0-10	21.7	21.7	67.7	67.7
11-20	43.5	65.2	22.6	90.3
21-30	8.7	73.9	4.8	95.2
31-40	8.7	82.6	0.0	95.2
41-50	0.0	82.6	0.0	95.2
51-60	4.3	87.0	1.6	96.8
>60	13.0	100.0	3.2	100.0

campus 20 or fewer times, and 90.3% of graduates surveyed in 2009 traveled to campus 20 or fewer times.

Graduates were asked to rate the significance of 13 obstacles to off-campus study using a 6-point Likert-type scale (see Table 5 for scale description). Taking the 13 obstacles together, there was little difference between the percentage (13.6%) of graduates surveyed in 2001 and the percentage (13.3%) of graduates surveyed in 2009 that rated the obstacles as slightly or moderately significant (Table 5). The overall mean for the 2001 respondents was 2.75 (SD = 0.79), whereas the overall mean for the 2009 respondents was 2.52 (SD = 0.88).

Table 6 provides a more detailed account of graduates' perceptions of the 13 obstacles to off-campus study. A majority of graduates surveyed in 2001 perceived three obstacles to be slightly significant to significant: "limited number of courses offered," "difficulty in balancing school, personal, and work responsibilities," and "cost of the program." However, a majority of graduates surveyed in 2009 perceived only two obstacles to be slightly significant to significant: "difficulty in balancing school, personal, and work responsibilities" and "attending sessions held on campus." Notably, the percentage of graduates who rated the obstacles as slightly significant to significant declined from 2001 to 2009 for 11 out of 13 obstacles and declined by 10% or more for six obstacles. These six obstacles

(percentage of decline listed in parentheses) were "limited number of courses offered" (25.2%), "lack of access to library facilities" (19.3%), "dealing with a number of different departments" (13.4%), "difficulty in balancing school, personal, and work responsibilities" (11.8%), "prerequisites required for classes" (10.5%), and "cost of the program" (9.7%).

Summary and Recommendations

There were distinct changes in the characteristics of learners served by the off-campus Master of Professional Agriculture degree program between 2001 and 2009. In 2009 there was a small increase, although insignificant, in the number of graduates who were women. Between the time of enrollment and when the survey was completed, there was an increase in the percentage of graduates who were employed in "other" occupations for 2001 and 2009. In 2009 at the time of the survey fewer graduates were employed in farming, agribusiness, or soil conservation. Graduates surveyed in 2009 were primarily motivated to enroll in the program for career advancement, whereas graduates surveyed in 2001 placed more emphasis on the pursuit of a degree. In addition, a greater percentage of graduates surveyed in 2009 credited their degree with occupational change. These data indicate that distance education learners' needs for, interests in,

Table 5. Master's of Professional Agriculture Graduates' Perceived Significance of 13 Obstacles to Off-Campus Study

Perceived significance ^z	2001 ^y		2009 ^x	
	%	Cum.%	%	Cum.%
Insignificant	4.5	4.5	15.0	15.0
Moderately insignificant	36.4	40.9	41.7	56.7
Slightly insignificant	45.5	86.4	30.0	86.7
Slightly significant	9.1	95.5	11.6	98.3
Moderately significant	4.5	100.0	1.7	100.0
Significant	0.0	100.0	0.0	100.0

^z Scale: 1 = insignificant, 2 = moderately insignificant, 3 = slightly insignificant, 4 = slightly significant; 5 = moderately significant; 6 = significant.

^yM = 2.75, SD = 0.79; ^xM = 2.52, SD = 0.88.

Table 6. Percentage of Master's of Professional Agriculture Graduates Who Selected Slightly Significant, Moderately Significant, or Significant for Each Obstacle

Obstacle	2001 %	2009 %
Difficulty in balancing school, personal, and work responsibilities.	66.7	54.9
Limited number of courses offered.	62.5	37.1
Cost of the program.	50.0	40.3
Lack of access to library facilities.	43.5	24.2
Course offerings did not fit needs.	37.5	35.5
Dealing with a number of different departments.	37.5	24.1
Lack of scholarships.	34.7	30.7
Lack of access to other students.	29.2	32.3
Lack of access to instructors.	29.2	27.4
Prerequisites required for classes.	25.0	14.5
Accessing financial aid at the university.	21.7	16.1
Attending sessions held on campus.	20.8	63.3
Faculty did not understand student needs.	8.4	8.1

and motivations for enrolling in graduate programs are changing. If curriculum planners wish to remain competitive in attracting and retaining students to their graduate programs, they must align program outcomes to meet the learners' current and future needs.

The average amount of time taken to complete the master's degree program decreased from 74.46 months for graduates surveyed in 2001 to 55.85 months for graduates surveyed in 2009. In addition, most (89.3%) graduates surveyed in 2009 completed the degree program in less than five years. This was a significant improvement from the 50% five-year completion rate of graduates surveyed in 2001. A variety of factors may have led to such a dramatic improvement in the number students who were able to complete the program within five years. Iowa State University expects students to complete their master's degree program within five years. Although some students pursuing distance degrees may take longer to complete their program than on-campus students, these results suggest that the five-year expectation is now readily achievable. We recommend that the university continue to maintain one expectation of time to completion for on- and off-campus students.

Graduates surveyed in 2009 came to campus less often for reasons related to the off-campus degree program than those surveyed in 2001. This may have been a result of policy changes, course delivery modes, and advancements in communication technology. Additionally, graduates surveyed in 2009 expect to travel even less as indicated by their perception that attending sessions on campus was a significant obstacle. This indicates a shift in graduates' expectations for the off-campus program to be deliverable where and when they want it. We recommend that the off-campus master's degree program in professional agriculture maintain policies and practices that make it possible for students to complete their program without traveling to campus. However, some off-campus students value face-to-face contact and are willing to pursue such contact independent of program requirements. We also recommend that program administrators and course instructors be flexible enough to accommodate on-campus interactions for individuals or small groups who wish to pursue these opportunities.

Between 2001 and 2009, notable progress was made to lessen the significance of obstacles faced by off-campus graduate students. Obstacles on which the greatest degree of improvement was achieved included "limited number of courses offered," "lack of access to library facilities," "dealing with a number of different departments," "difficulty in balancing school, personal, and work responsibilities," "prerequisites required

for classes," and "cost of the program." Graduates believe that faculty have done a consistently good job of understanding their needs. Several developments implemented in the eight years between surveys may have contributed to improved program performance. These developments include ongoing technology enhancements that improved the quality of course materials and communications, training for faculty and staff provided by the Center for Excellence in Learning and Teaching, expanded access to electronic publications through the university library, course development and enhancement grants provided by the College of Agriculture and Life Sciences, employment of a student support specialist to assist distance learners in the college, and the sharing of courses with other institutions through the Great Plains Interactive Distance Education Alliance.

There is still room for improvement relative to dealing with obstacles to off-campus study. Faculty, staff, and administrators may not be able to directly address the most significant obstacle, "balancing school, personal, and work responsibilities," but can address it indirectly by working to lessen the impact of other potential obstacles. We recommend that focus for ongoing improvement be directed at making sure students are not required to travel as part of the program, finding efficiencies to control program costs, and working to increase the number and variety of courses offered.

An increasing number of students have graduated from the master's degree program in professional agriculture, they have done so in a timelier manner, they report positive impacts of the degree on their employment, and they face fewer significant obstacles in pursuit of their degree. We conclude that efforts to improve distance learning in the College of Agriculture and Life Sciences at Iowa State University have had a positive impact on graduates, and we recommend that follow-up studies continue on a periodic basis to measure program impact and inform decisions concerning priorities for program improvement.

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