

# FACTORS RELATED TO THE INTENT OF PROFESSIONALS IN AGRICULTURAL AND EXTENSION EDUCATION TO ENROLL IN AN ON-LINE MASTER'S DEGREE PROGRAM

*Elizabeth Wilson, Assistant Professor*  
*Gary Moore, Professor*  
North Carolina State University

## Abstract

*“Build it and they will come” appears to be the stance of many in distance education. Yet marketing experts contend that a market analysis and needs assessment should be conducted first. This study examines the need for an on-line Master’s degree program in Agricultural and Extension Education. The researchers also sought to identify predictors of intent to enroll in such a program. Finally the researchers sought to learn more about the technology availability and characteristics of potential students. It was found there is a strong demand for an on-line Master’s program in Agricultural and Extension Education. A model was also developed that identified potential enrollees as those who had more years of professional experience. There were major differences between extension agents and agricultural teachers on computer operating systems used at work, CD-ROM availability, web browser use and software preferences.*

## Introduction

Distance education is defined by Telg & Cheek (1998) as “two-way communication between teacher and students who are separated by a geographical distance and/or time, where communication is mediated by technology to support educational process” (p. 32). In many universities there is a growing demand not only to offer more courses via distance education but entire degree programs. In the past decade, the most significant factor that has occurred in relation to distance education is the availability of the Internet. Online courses have provided conventional campuses with a medium to reach new audiences who require more flexible learning opportunities (Harry & Perraton, 1999).

The prevailing attitude in distance education seems to be “build it and they will come.” What do professionals in agricultural education need to know about potential audiences to make sure a product is delivered that gets students to come and stay? Sherry (1996) states “Too often,

instructional designers and curriculum developers have become enamored of the latest technologies without dealing with the underlying issues of learner characteristics and need and their equity of access to interactive delivery systems” (p. 337). What characteristics of the potential audiences should be considered when designing on line distance education programs? Three questions need to be answered: does the customer or audience perceive a need for distance education? Who are the students expressing that need? And do they have access to distance educational offerings?

The Agricultural and Extension Education Department at North Carolina State University is in the process of designing an online distance education Master’s degree program. Currently, the majority of the customers in the conventional Master’s degree program in Agricultural and Extension Education are employed as agricultural education teachers and Cooperative Extension agents and administrators. Extrapolating from that observation, the department has chosen to

study the needs and characteristics of agricultural education teachers and Cooperative Extension agents and administrators and their access to the Internet, before designing and building an online Master's degree program. The researchers wanted to find out who the potential students are and to build a program based on their needs. Other universities that are considering offering distance education graduate degree programs could benefit from these findings.

### Theoretical Framework/ Literature Review

Potential students for an online master's degree program are essentially consumers. Consumer behavior is studied by marketing experts in order to predict the identity of the consumer and to employ appropriate marketing tools. The most popular contemporary model for consumer behavior is the Engel-Blackwell-Miniard Model, originally developed by Engel, Kollat and Blackwell in 1968. This model is based on the scheme that consumer behavior is a decision making process and consists of five activities. The first activity in this model is motivation and need recognition of the consumer followed by search for information, alternative evaluation, purchase and outcomes (Loudon & Betta, 1993). According to this theory, in order for a consumer to begin the process of purchasing a good or service, he or she must first possess and realize a need. Therefore, those providing the goods and services should find out what the characteristics are of those who have realized this need. Who is the targeted market and if we build it, will they come?

Several researchers (Faseyitan, Libii, & Hirschbuhl, 1996; Gist, Schwoerer & Rosen, 1989) have found that computer self-efficacy was the key indicator of the intent of students to take online distance education courses. In further investigation, Lim (2001) found academic status, age, years of computer use, previous experience with online courses and academic self-concept to be predictors of computer self-efficacy as well as predictors of intent to enroll in an online distance education course. Peterson's

Distance Learning (2002) concludes that the majority of students who enroll in online courses are employed, over 25 years old and have a previous college degree.

Boyd and Murphrey (2001) found no significant relationships between the personal characteristics of undergraduates and their interest in taking online courses. Undergraduate students in this study had previously chosen to take an on campus course instead of choosing to take it on line. Born and Miller (1999) state that "distance education has long been based on the promise 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" (p. 30). If this is the case, could the distance a student lives from campus be a factor in predicting the intent of potential students to enroll in an online distance education course?

Several authors (Hezel & Dirr, 1990; Thompson, Simonson & Hargrave, 1991) found that distance education students often live too far from campus to attend on campus courses. Zirkle (2002) states that students who are "place-bound" and "time-bound" are looking for courses they can take at their convenience. Miller (1995) found that graduates ranked career advancement as the most motivating factor for enrolling in an off-campus program.

Several career and technical education studies have found postsecondary distance education students to more likely be female and older with heavy work and family responsibilities (Zirkle, 2002). Tucker (2000) found distance education students in her courses to be on average 14 years older than those in her on campus courses. Wilson (1991) found distant education students typically maintained professional careers and were older.

Recent studies indicate that professionals in specific environments have access to technology that is necessary for participating in distance education (Perdue & Valentine, 2000). Not surprisingly, past studies have indicated that lack of access to technology is a barrier to distance education (Gray 1997, McCormack & Jones 1998, Wulf 1996).

Nti and Bowen (1998) found that type of certification needed for employment and attitudes toward distance education were the

best indicators of graduates' interest in taking distance education courses. Teacher certification and continuing education requirements for Cooperative Extension agents in North Carolina provide two examples of identified need for distance education. In 2000-2001, the public schools had a teacher turnover rate of 13.96%. Lateral entry teachers, who need additional courses to complete their certification, fill many of these vacant positions. Approximately 25% of all teachers in the state who obtain certification stay in the classroom and pursue master's degrees. One motivation for these teachers to obtain a master's degree is a 10% pay increase. In the Cooperative Extension service, agents are required to take one course at least every five years to maintain their employment. In order to be promoted to the rank of associate county agent, a Master's degree is needed. Most administrators and senior agents are encouraged to possess master's degrees.

### Purpose and Objectives

The purpose of this study was to determine and describe the needs and characteristics of teachers and extension personnel who are likely to enroll in an online Master's degree program in Agricultural and Extension Education. Specific objectives of the study included:

1. Determine the need for a distance education online Master's degree program in Agricultural and Extension Education.
2. Identify factors that predict the intent of agricultural education teachers and extension personnel to enroll in an online Master's degree program in Agricultural and Extension Education.
3. Determine if there are differences in the needs and characteristics of agricultural education teachers and extension personnel that could affect the delivery of online courses in Agricultural and Extension Education.

### Procedures

This was a descriptive/correlational study using responses from agricultural teachers and extension personnel in the state. The entire population from both groups was surveyed which included 358 high school agricultural education teachers and 395 extension agents and administrators. The instrument was reviewed by a panel of experts made up of distance education instructors and administration and a group of selected graduate students for content validity. The revised instrument was then administered twice to a group of graduate students who were preparing for employment in these two fields and therefore were not included in the final survey population. The test-retest technique for determining instrument stability yielded a grand mean coefficient of stability of  $r = .95$  (Pearson  $r$ ) for those items that were non-demographic in nature. This indicates the instrument was stable.

The participants were sent a cover letter and a questionnaire by mail along with a self-addressed stamped return envelope. Those who had not responded by the requested deadline were contacted by a mailed post card and listserv e-mails to encourage their participation. Those that responded after this contact and within a three-week period after the deadline were considered late respondents. The total response rate for agricultural education teachers was 41% ( $n=148$ ). The total response rate for extension personnel was 51% ( $n=201$ ). Market research surveys commonly yield response rates in the 10-30% range and employee surveys typically have a response rate of 25-60% according to DSS Research (n.d.). Two different procedures were used to address the validity threat posed by non-responders.

Early and late respondents were compared as the basis for controlling non-response error. According to Miller & Smith (1983), late respondents are similar to non-responders. No significant differences in the items were found between early and late responders. Thus the late respondents were included in the total response pool.

To further address the threat of the external validity of the study, respondents were compared to non-respondents (Lindner, Murphy & Briers, 2001). Twenty randomly sampled non-respondents were contacted by phone and were administered the entire survey. Their responses were compared to previous respondents. A comparison of differences between respondents and non-respondents revealed no significant differences. The resultant responding sample was assumed to be representative of the target population.

Descriptive statistics were used to determine the frequency and percentages of those likely to enroll in an online Master's degree program in Agricultural and Extension Education. Multiple regression analysis was used to determine the best model for explaining the variance associated with the intent to enroll by a linear combination of the independent variables. Stepwise elimination was used to determine the multiple regression model that best explained the dependent variable of the intent to enroll. The chi square test for independence was used to determine if there were differences in the characteristics of agricultural education teachers and extension personnel that could affect the delivery of an online Master's degree program in Agricultural and Extension Education.

### Results/Findings

#### *Determine the need for a distance education online Master's degree program in Agricultural and Extension Education.*

Eighty-eight (88) of the 148 high school agricultural education teacher respondents indicated that they did not already possess a master's degree. Seventy percent of these respondents (62 of 88) indicated they were interested in pursuing an online Master's degree program. Sixty (60) of the 201 extension agent respondents indicated that they did not already possess a master's degree. Forty five percent of extension agent respondents (27 of 60) indicated that they were interested in an online Master's degree program. A total of 107 teachers and agents

who do not already possess a master's degree were interested in on-line Master's degree program. According to the respondents, there is a need for an online Master's program in Agricultural and Extension Education.

#### *Identify factors that predict the intent of agricultural education teachers and extension personnel to enroll in an online Master's degree program in Agricultural and Extension Education.*

With tight state budgets, it is important to identify who would be most likely to enroll in an online Master's program. This group could then be targeted for advertising and recruitment. The various variables identified in the literature review that were predictors of intent to enroll in a distance education program along with several additional variables selected by the researchers were analyzed using stepwise multiple regression. Only those respondents who indicated they did not already possess a master's degree were entered into the regression model. The independent variables entered in the regression model were undergraduate GPA, age, gender, computer capability, previous experience with distance education, distance from the university, years of experience in the profession, occupation (teacher or agent), administrative support, need for courses for advancement, and years of experience in using computers.

A statistically significant model ( $p=.003$ ) containing one variable was generated with a R of .248. This model explained only 6% of the variance. The only variable that entered the model was years of professional experience. Individuals with more years in the profession were more interested in an online program than were individuals with fewer years of experience. Items that were deleted from the model due to collinearity were undergraduate GPA, age, gender, computer capability, previous experience with distance education, distance from the university, occupation (teacher or agent), administrative support, need for courses for advancement, and years of experience in using computers.

*Determine if there are differences in the needs and characteristics of agricultural education teachers and extension personnel that could affect the delivery of online courses in Agricultural and Extension Education.*

In planning web based distance education, one should be cognizant of the technology and computer capabilities of the individuals who might participate in on-line courses. All agriculture teachers and extension agents who responded to the survey were addressed in this part of the study since all are potential customers of on-line education either for professional development or degree programs.

A number of the items in the instrument focused on these aspects of distance education. A number of differences and some similarities were found between agriculture teachers and extension agents. Each difference or similarity will be reported as a separate finding. These data are found in tabular form in Table 1. The Chi Square test for Independence was used to determine statistical

significance of the differences. In the table, data are reported as percentages for ease of interpretation but actual frequencies were used in the Chi Square analysis.

Both extension agents and teachers have ready access to computers at work. All agents with the exception of one (99.5%) had daily access to a computer at work while 98% of the teachers had daily access to computers. All of the extension agents with daily access to computers had Internet connections. However, eight of the teachers with computers at school did not have access to the Internet, which reduced the percentage of teachers with computers and Internet access to 95%.

Most agents and teachers have a computer at home with Internet access. Eighty-two percent of the agents reported having a computer at home while 91% of the teachers indicated they had home computers. Sixteen of the 165 agents with computers at home did not have Internet access while six of the 134 agriculture teachers with computers at home did not have Internet access.

Table 1  
*Characteristics of Agriculture Teachers and Extension Agents That Could Affect the Delivery of a Distance Education Master's Degree*

Variables	Extension Agents %	Agriculture Teachers %	$X^2$	$p$
Access to Computer at Work	99.5	98.0	2.48	.290
Access to Computer at Home	82.4	90.5	4.97	.080
Computer Used in the DE Program:			16.59	.001
Work	25.3	9.2		
Home	11.3	20.4		
Both	63.4	70.4		
Type of Computer used at Work:			191.80	.001
Sun/Unix	79.7	0.0		
PC/Windows	19.8	95.0		
Mac	0.5	0.5		
Type of Computer used at Home:			1.12	.289
PC/Windows	98.7	96.9		
Mac	1.3	3.1		
CD-ROM Drive at Work	41.3	100.0	128.40	.001
CD-ROM Drive at Home	98.2	99.2	0.65	.420
Internet Connection at Work:			10.69	.005
Modem Dial Up	13.8	9.7		
High Speed Connection	79.7	70.8		
Don't Know	6.5	19.4		
Internet Connection at Home:			0.91	.220
Modem Dial Up	84.7	88.7		
High Speed Connection	15.3	11.2		
Internet Browser Comfort:				
Internet Explorer	62.5	76.2	7.34	.007
Netscape Navigator	83.0	62.6	18.52	.001
Word Processor Comfort:				
Word Perfect	92.0	37.4	117.10	.001
Microsoft Word	78.0	95.9	22.06	.001
PowerPoint	54.5	66.7	5.22	.022
Self Rated Computer Efficacy:			4.63	.200
Very Capable	27.0	35.5		
Capable	58.5	48.6		
Limited Capability	13.5	12.8		
Not Capable	1.0	2.0		
Previous Distance Course	33.2	41.9	2.78	.060

Most agents and teachers would use both the computer at home and the computer at work to participate in a distance education program. Sixty-three percent of the agents and 70% of the teachers indicated they would use computers at both work and home to participate in the program. When comparing the use of the computer only at work or only at home it was found that agents were more likely to participate in a distance education program from work while teachers were more likely to participate from home. (Table 1).

There is a major difference in the computing platform used by agents and teachers at work. Most extension offices in the state (80%) have Sun computer terminals operating on Unix. Most teachers (95%) have PCs using the Windows operating system. There are virtually no Macintosh systems in use. At home nearly all agents and teachers have PC systems running Windows. (Table 1).

There is a difference between agents and teachers in whether or not the computer at work has a CD-ROM drive. All of the computers used by teachers at work have CD-ROM drives while only 41 percent of the agents have access to computers at work with CD-ROM drives. However, at home nearly all the teachers and agents have CD-ROM drives. (Table 1).

Most teachers and agents have high-speed Internet access at work but dial up modems at home. Over 70% of both teachers and agents have high-speed Internet access at work but less than 15% of both groups have high-speed Internet access at home. It was interesting to note that nearly 20 percent of the teachers didn't know what type of access they had at work (Table 1).

Agriculture teachers are more comfortable with Internet Explorer as their web browser while extension agents are more comfortable with Netscape Navigator as their web browser. The majority of the agents and teachers indicated comfort with both web browsers. However more agents were comfortable with Netscape (83%) than they were with Explorer (62.5%). Conversely, more teachers were comfortable with Explorer (76%) than they were with Netscape (63%). (Table 1).

Agents are more comfortable with Word Perfect as their word processor while agriculture teachers prefer Microsoft Word. Ninety-two percent of the agents indicated they were comfortable using Word Perfect as compared to 37 percent of the agriculture teachers. Ninety-six percent of the teachers were comfortable with Microsoft Word while 78 percent of the agents indicated they were comfortable with Word. It appears the agents use Word Perfect at work on their Unix workstations but use Word at home on their personal computers. (Table 1).

Teachers are more comfortable with PowerPoint than are agents. Two-thirds of the teachers indicated they were comfortable with PowerPoint while a little over half of the agents indicated comfort in using PowerPoint. (Table 1).

Both teachers and agents perceive they have good computer skills. Eighty-six percent of the agents and 84 percent of the teachers rated their computer skills as "Very Capable" or "Capable." However, this is a self-reported rating. These individuals might not be as computer savvy as this indicates. One of the questions in the survey asked what type of operating system was on their computer at work and at home. Thirty-six percent of the agents reported the computer at work was operating on a Windows platform, yet less than 20% of the computers at work are PC machines. Forty-three percent of the agents identified Unix (or a variation thereof), as being their operating system at work while nearly 80 percent of their work machines are Sun workstations operating on Unix. About 90% of the agents and teachers were using a Windows operating system at home while about 10% were not sure which operating system they utilized.

### Conclusions and Implications

There is a demand for a distance education Master's program in Agricultural and Extension Education at North Carolina State University. A group of extension agents and agriculture teachers who do not possess master's degrees indicated they would enroll in such a program. It is likely that other individuals in agricultural businesses and service and individuals who

would like to enter the profession would also have an interest in the program. Teachers and agents in other states might also enroll. There is a solid demand for an online Master's program in Agricultural and Extension Education and nearly all agents and teachers in North Carolina have computers with Internet access.

Based upon the findings, the marketing plan for a distance education Master's program should first focus on those potential students who have more professional experience. This group could be interested in asynchronous Internet coursework due to heavy work and family responsibilities common to those with more years of professional experience. More research should be conducted to examine which factors related to years of professional experience influence the intent of potential students to enroll in an on-line degree program. More research should also be conducted to examine the strong correlations between the variables deleted from the regression model due to collinearity and those relationships that may have existed in previous research.

A number of factors need to be considered in designing the distance education courses if it is to accomplish the goal of reaching both agriculture teachers and extension agents. Some of the factors to consider include:

1. Web content needs to be designed for viewing in both Netscape and Explorer. If the web pages are optimized for viewing on one browser, the audience that uses the other browser will have an inferior product.
2. The web course designers should keep the "bells and whistles" and large files to a minimum. Since over 75% of the agents and teachers plan to use their computers at home and the great majority of these computers use dial up modem access, designers need to keep this in mind. It will take some time for large files, big graphics, and slick animations to

load. Accordingly, file size should be kept to a minimum.

3. Instructors of distance education courses should be clear in their communication to students about their preference for the file formats of assignments. Teachers are more likely to submit assignments in Word while agents are more likely to submit assignments in Word Perfect. The majority of agents in the field have access to Word at home even though they have limited access to Word at work.
4. Distributing distance education materials on CD-ROM might be harder for extension agents to use at work, since most of the work machines do not have CD-ROM drives. However almost all agents have access to CD-ROM machines at home so instructors could require they use CD-ROM technology in their distance education course.
5. If PowerPoint presentations are to be downloaded and viewed by students or if students are expected to prepare PowerPoint presentations for class assignments, some additional instruction may be needed since only 2/3 of the teachers and 1/2 of the agents indicated they were comfortable with PowerPoint. We cannot assume that distance education students are PowerPoint capable.

In a presentation at the 27<sup>th</sup> National Agricultural Education Research Conference, Cartmell & Garton (2000) assert, "Agricultural education programs at the university level must continue to diversify to maintain enrollment levels for survival" (p. 531). They cite Newcomb (1993) who suggested that departments should scan the horizon and identify needs that are not being adequately served and foster relationships with new client groups. An online distance education Master's program in Agricultural and Extension education is a step in this direction.

## References

- Born, K. A., & Miller, G. (1999). Faculty perceptions of web-based distance education in agriculture. *Journal of Agricultural Education*, 40(3), 30-39.
- Boyd, B. L., & Murphrey, T. P. (2001). Interest in online leadership education and implications for instructional design and strategies. *Journal of Agricultural Education*, 42(1), 28-37.
- Cartmell, D. D. II, & Garton, B. L. (2000). An assessment of agricultural education graduates' preparation for careers in teaching and industry. In G. Miller (Ed.), *National Agricultural Education Research Conference: Vol. 27. 21<sup>st</sup> Century Research for Agricultural Education*.
- DSS Research (n.d.). *Mail survey response*. Retrieved August 14, 2003, from <http://www/dssresearch.com/Library/General/mailresp.asp>
- Faseyitan, S., Libii J. N., & Hirschbuhl, J. (1996). An inservice model for enhancing faculty computer self-efficacy. *British Journal of Educational Technology*, 27, 214-216.
- Gist, M. E., Schwoerer, C., & Rosen, B. (1989). Effects of alternative training methods on self-efficacy and performance in computer software training. *Journal of Applied Psychology*, 74(6), 884-891.
- Gray, S. (1997). Training teachers, faculty members, and staff. In B.H. Khan (Ed.), *Web-based Instruction*. Englewood Cliffs, NJ: Educational Technology Publications., 329-332.
- Harry, K. & Perraton, H. (1999). Open and distance learning for the new society. *Higher Education Through Open and Distance Learning. Volume 1*. Ed. Keith Harry. London/New York: Routledge, 57-71.
- Hezel, R. & Dirr, P. (1990). Understanding distance education: Identifying barriers to college attendance. (ERIC Document Reproduction Service No. ED 340335).
- Lim, C. K. (2001). Computer self-efficacy, academic self-concept, and other predictors of satisfaction and future participation of adult distance learners. *The American Journal of Distance Education*, 15(2), 41-51.
- Lindner, J. R., Murphy, T. H., & Briers, G. E. (2001). Handling nonresponse in social science research. *Journal of Agricultural Education*, 42(4), 43-53.
- Loudon, D. L., & Della Bitta, A. J. (1993). *Consumer Behavior* (Fourth ed.). New York: McGraw- Hill Inc., 610-613.
- McCormack, C., & Jones, D. (1998). *Building a web-based education system*. New York: Wiley Computer Publications, 22-28.
- Miller, G. (1995). Off-campus study in agriculture: Challenges and opportunities. *Journal of Agricultural Education*, 36(2), 1-7.
- Miller, L. E., & Smith, K. L. (1983). Handling nonresponse issues. *Journal of Extension*, 21(5), 40-50.
- Newcomb, L. H. (1993). Transforming university programs of agricultural education. *Journal of Agricultural Education*, 34(1), 1-10.
- Nti, N. and Bowen, B. (1998). An assessment of agricultural science graduates' interest in participating in credit courses using distance education. *Journal of Agricultural Education*, 39(3), 21-30.
- Perdue, K. J., & Valentine, T. (2000). Deterrents to participation in web-based continuing professional education.

*The American Journal of Distance Education*, 14(1), 9-26.

Peterson's Distance Learning (n.d). *Who is learning at a distance?* Retrieved February 22, 2002, from <http://iiswinprd03.petersons.com/distancelearning/code/articles/who.asp>

Sherry, L. (1996). Issues in distance learning. *International Journal of Educational Telecommunications*, 1(4), 337-365.

Telg, R. W., & Cheek, J. G. (1998). A case study of distance education programming in a college of agriculture. *NACTA Journal*, 42(3), 31-37.

Thompson, A., Simonson, M. & Hargrave, C. (1991). *Educational technology: A review of the research*. Ames: Iowa State University, College of Education, Department of Curriculum and Instruction.

Tucker, S. (2000). *Assessing the effectiveness of distance education versus traditional on-campus education*. New Orleans, LA: AERA Business Education and Information Systems Research SIG Proceedings (ERIC Document Reproduction No. ED 440 271).

Wilson, C. (1991). *Trends in distance education: A viable alternative for higher education*. (ERIC Document Reproduction Service No. ED 337081).

Wulf, K. (1996). Training via the Internet: Where are we? *Training and Development*, 50 (5), 50-55.

Zirkle, C. (2002). Distance education and Career and Technical Education: A review of the research literature. *The Journal of Vocational Education Research*, 28 (2), 161-181.

ELIZABETH WILSON is an Assistant Professor in the Department of Agricultural and Extension Education at North Carolina State University, 13 Ricks Hall, Box 7607, Raleigh, NC 27695. E-mail: [bwilson@ncsu.edu](mailto:bwilson@ncsu.edu).

GARY MOORE is a Professor in the Department of Agricultural and Extension Education at North Carolina State University, 13 Ricks Hall, Box 7607, Raleigh, NC 27695. E-mail: [gary\\_moore@ncsu.edu](mailto:gary_moore@ncsu.edu).