Analysis of Distance Education Research Presented at the National Agricultural Education Research Meetings (1992-2001)

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Abstract

The purpose of this study was to analyze the distance education research presented at the annual National Agricultural Education Research Meetings (NAERM) from 1992-2001. A trend analysis design resulted in a description of themes and patterns. Analysis included categorization of these patterns and themes into eight classifications: quality and effectiveness, finance, policy and governance, regulatory, setting distance education direction, faculty issues, student issues, and technology. Findings from 84 distance education manuscripts addressed five of the eight classifications. The majority of the studies addressed issues in quality and effectiveness, and technology. The remaining classifications included faculty issues, setting distance education direction, and student issues. An unexpected theme that surfaced focused on 'participant' groups or target populations. Post-secondary students were studied most, followed by post-secondary faculty and secondary teachers. Research emphasis moved away from secondary participants to post-secondary in 1996, where most of the research involved post-secondary students. Further research should be focused on synchronous and asynchronous streaming; faculty incentives; and funding and policy issues. Research techniques should be expanded to include focus groups and longitudinal studies to determine long-term changes in knowledge, skills, attitudes and behaviors. Additionally, strategies need to be developed to address research involving under-aged clientele groups.

Introduction

A general consensus among agricultural educators is that there is a lack of focus in agricultural education research. There are also concerns regarding the conduct of research activities in agricultural education (Crunkilton, 1988; Mannebach, McKenna & Pfau, 1984; Moore, 1987; Radhakrishna & Xu, 1996; and Warmbrod, 1986). Crunkilton (1988) suggested that if the profession wants to chart a course for its research, then some type of framework is needed that shows where agricultural education has been and where it can or should go, as individual professional researchers, as institutions and as a total profession. Shinn and Buriak (1988) identified five obstacles that limited systematic research in agricultural education as viewed by decision-makers. These included (a) lack of focus, (b) inadequate qualifications, (c) teaching and service orientation, (d) insufficient funding, and (e) lack of value for research among agricultural educators.

Bowen, Radhakrishna and Jackson (1991) stated that the responsibilities of agricultural education faculty are changing. A concern derived from this is to what extent these changes in faculty responsibilities reflect the research priorities of the profession. Flowers (1995) asked whether research is being conducted on subject-matter topics that address the most critical issues facing the profession.

One subject-matter topic in agricultural education that is changing the responsibilities of faculty and the profession is that of distance education. In reviewing the trends in a ten-year analysis (1985-1994 and 1986-1995, respectively) of subject matter topics researched in agricultural and extension education (Radhakrishna & Mbaga, 1995; Radhakrishna & Xu, 1996) the area of distance education, addressed specifically as a subject-matter topic, did not show up until 1990. While it may have fallen under the category of 'other' until that time, the number of publications about agricultural education and distance education were limited.

Since 1995 there has been a multitude of studies published regarding distance education in general. There has also been a potpourri of studies regarding distance education in agricultural education but most of these have been recent publications. Just as Flowers (1995) addressed the question about whether research in agricultural education is addressing the most critical issues facing the profession, the researchers of this study are asking whether the trends in distance education research reported in agricultural education are similar to distance education research in general. To answer this question, we took a systematic analysis of distance education research reported in agricultural education venues. This study addresses where agricultural education has been and where it can or should go with distance education. It also links distance education research in agricultural education to distance education research in general. As well, it contributes to the theoretical framework in education, a hallmark of the applied nature of agricultural education.

Theoretical Framework

Implementing distance education requires a systems focus (Frantz & King, 2000). The aim is not so much on the technology but on a system that contributes to a positive, equivalent learning experience (Simonson, et al., 2000). In looking at what the issues might include for the learning process, Holmberg (1987) suggested that the structure of distance education research include:

Philosophy and theory of distance education
Distance students and their milieu, conditions and study motivations

Subject matter presentation
Communication and interaction between students and their supporting organization (tutors, counselors, administrators, other students)
Administration and organization
Economics
Systems (comparative distance education, typologies, evaluations, etc.)
History of distance education

Two other studies of distance education issues included a Delphi study identifying research and evaluation priorities for distance education in one Midwest state (Rockwell, Fergason, & Marx, 2000) and a study of barriers to distance learning (Berge, 1999). In particular, Berge identified eight issues facing online distance learning programs. Through a modified Delphi study, Schauer (2002) presented these issues to a national panel of experts in distance delivery. The panel ranked the importance of each issue in implementing distance education. The resulting eight categories and factors listed below were identified as issues in distance education implementation.

Quality and Effectiveness – The eight factors include: evaluation of student performance (testing and grading); student evaluation of distance education courses and programs; program or course credibility outside of department; academic integrity of student work; measuring the effectiveness of the learning experience; assessment of course effectiveness by department; course standards (including technology tools); and course enrollment limits (faculty/student ratios).

Finance – Factors include: availability of internal and external grants; competition with on-campus courses for enrollments; source of additional revenue for the department; competition from other educational providers; sufficient departmental budget to develop courses; recognition of distance education in funding formula(s); cost of implementation and delivery of distance education; and treatment of distance education in institutional budget structure.

Policy/Governance – Factors identified are intellectual property (course ownership); appropriate academic calendar for distance education courses; acceptance of distance education courses (transfer/articulation); collective bargaining agreements; presence of an institutional "acceptable use policy"; academic control over course content and delivery; compliance with American Disabilities Act regulations; and provision for consortia, partnership and commercial providers.

Regulatory/Legal – Six factors identified include recognition and treatment by accrediting agencies; copyright and "fair use"; establishment and participation in consortia and partnerships; regulations imposed by taxing authorities (legislatures); regulations imposed by the federal government; and regulations imposed by state (system) higher education boards, councils and offices.

Setting Distance Education Direction – Factors include: development of appropriate department plans for distance education; inclusion of distance education in institutional strategic plan; justification of need for using distance education; institutional administrative acceptance of distance education; shared vision (buy-in) by faculty of need for distance education; pace of implementation of distance education courses; leadership within the department to pursue distance education; and marketing and promotion of courses and programs.

Faculty – Factors are compensation for course development and delivery; faculty incentives to integrate distance education technology; workload issues related to

development and delivery; recognition of distance education teaching in tenure decisions; access to appropriate professional development for faculty; faculty awareness of new delivery alternatives and technologies; faculty acceptance of distance education; and pedagogical shift from teacher-centered to learner-centered.

Student – Factors include encouraging faculty – student interaction; encouraging student – student interaction; course and program services (admissions, registration); availability of financial aid; availability of support services (advising, counseling and tutoring); access to library and instructional materials; development of sense of learning community in students; and 'helpdesk' support for students (course and program information).

Technology – Factors are security of courses; reliability of technology supporting distance education courses; appropriateness of technology for program and pedagogy; student access to technology; faculty access to technology; student technology literacy; technology support for students; and technology support for faculty.

According to the National Institute for Literacy (2000), it is no longer a question of whether distance learning will develop, but how fast it will occur. Therefore, it is important to understand the issues connected with planning, implementing, and maintaining distance delivery. Keeping these issues in mind, this study takes a look at the trends in research on distance agricultural education efforts.

Statement of the Problem

To test the theoretical framework, this study was undertaken to describe distance education research presented at the National Agricultural Education Research Meetings (NAERM) from 1992-2001. Through the analysis of NAERM proceedings, a trend analysis design was used that resulted in a description of themes and patterns. For the purpose of this study, distance education was defined as a method of education where the learning group is geographically separated and where the application of interactive telecommunications and electronic devices are used to bridge the physical distance and connect learners, resources and instructors. It may be used on its own, or in conjunction with other forms of education, including face-to-face (Rumble, 1989; Moore & Kearsley, 1996; Simonson, et al., 2000; Distance Learning Resource Network, 2001).

Research Design

A trend study (analysis) is a longitudinal study exploring time-ordered associations (Borg & Gall, 1983). It is a method using observational techniques and literature sources to identify patterns and predict future development (Wakefield & King, 1994). Therefore, the trend analysis methodology was deemed appropriate to explore the distance education topics studied within the broad field of agricultural education.

The American Association of Agricultural Educators disseminate research within the agricultural education profession at the annual National Agricultural Education Research Meetings (NAERM). The sample for this study was the distance education manuscripts accepted for presentation at the annual National Agricultural Education Research Meetings from 1992-2001(Borg & Gall, 1983).

Distance education manuscripts were collected from each NAERM proceedings from 1992-2001. A total of 84 papers were identified for review. Particular attention was paid to the title, abstract, research objectives, methods, and procedures. For each manuscript, patterns and

themes were recorded in the areas of research methods, media, setting, and research objectives. To further analyze the themes and patterns each manuscript was then categorized according to the eight classifications identified by Schauer (2002): quality and effectiveness, finance, policy and governance, regulatory and legal, setting distance education direction, faculty issues, student issues, and technology.

Manuscripts were then reviewed to identify distance education subject matter categories. Several manuscripts were represented in multiple categories. For example, a manuscript entitled "Student Learning Styles, Strategies, Patterns, and Achievement in Web-based Courses" was categorized as quality and effectiveness, student issues, and technology. Each category was summed and then rank ordered per calendar year. To further describe the phenomenon, themes within categories were described according to quality and effectiveness, audience, media, and faculty issues.

Findings

The 84 distance education manuscripts addressed five of the eight categories described by Schauer (2002). Quality and effectiveness were included in 60 studies and technology studies in another 46. Faculty issues were addressed in 18 studies; distance education direction in 10; and student issues in 6. Categories not represented in the study were finance, policy and governance, and regulatory and legal (Table 1).

Table 1
Categories, Article Frequency and Rank

Category and Rank	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	Total	Rank
Quality & Effectiveness	2	7	5	10	5	7	9	7	4	4	60	1
Technology	4	5	3	5	4	5	9	3	7	1	46	2
Faculty Issues	1	3	3	1	0	1	5	1	2	1	18	3
Distance Education Direction	1	3	1	1	0	0	0	1	3	0	10	4
Student Issues	0	0	1	1	0	2	1	1	0	0	6	5
Finance	0	0	0	0	0	0	0	0	0	0	0	6
Policy & Governance	0	0	0	0	0	0	0	0	0	0	0	6
Regulatory & Legal	0	0	0	0	0	0	0	0	0	0	0	6
Total	8	18	13	18	9	15	24	13	16	6	134	

Several themes were prevalent in the category of quality and effectiveness (Table 2). Student perceptions and attitudes were studied in 30 of the 84 manuscripts. Academic achievement was studied most during the 1996-98 period with 13 of the 19 manuscripts. Over half of the student learning style and strategies research occurred during 1997 and 1998 (9 of 14) with little research since. Teacher interest and attitude have been studied sporadically during the ten year time period with a total of 12 articles, half of those recorded during 1993-1995. Other themes recorded, but limited, include: teacher competency with technology (6), teacher obstacles with technology (6), student competence with technology (4), academic rigor (3), student use (2), and adult learner perceptions (2).

Table 2
Themes Within the Quality and Effectiveness Category

Quality and Effectiveness	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	Total
Student perceptions and attitudes	1	5	1	3	2	3	5	3	4	3	30
Academic achievement	1	1	1	0	4	4	5	1	2	0	19
Student learning style and strategies	0	1	1	2	0	4	5	0	1	0	14
*Teacher interest and attitude	0	1	2	5	0	0	1	3	0	0	12
*Teacher competency with technology	0	0	1	4	0	0	0	0	0	1	6
*Teacher obstacles with technology	0	1	2	1	0	0	1	0	0	1	6
Student competence with technology	1	1	0	0	0	0	0	0	1	1	4
Academic rigor	0	0	0	0	0	1	1	1	0	0	3
Student use	0	0	0	0	1	0	0	0	1	0	2
Adult learner perceptions	0	1	0	0	0	0	0	0	0	1	2

Note. * Includes secondary, post-secondary, and extension educators

An unexpected theme that surfaced focused on "participant" groups (Table 3), or the target population. The participant groups are defined as those individuals who participated in the research studies. Post-secondary students were most studied (41), followed by post-secondary faculty (15) and secondary teachers (14). While secondary student studies were limited, they were more prevalent in the early 1990s. Research emphasis moved away from secondary participants to post-secondary in 1996 with more of the research conducted with post-secondary students.

Table 3
Participant Groups Studied

Audience and Rank	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	Total
Post-secondary students	1	3	2**	3**	5	6**	7	6**	5	3	41
Undergraduates only	1	1	2	1	4	5	6	2	4	3	29
Graduates only	0	2	1	3	1	2	1	5	1	0	16
Post-secondary faculty	0	1	1	2	1	1	2	1	4	2	15
Secondary teachers	3	2*	4	1	0	1	2	1	0	0	14
Cooperative extension	0	1	1	5	0	0	0	2	0	0	9
Adult education students	0	2	0	1	0	1	2	0	0	1	7
Secondary students	0	1*	0	1	0	0	1	0	0	0	3
Post-secondary administrators	0	1	0	0	0	0	0	0	1	0	2
Secondary administrators	1	1	0	0	0	0	0	0	0	0	2

Note. * International Study
**Research studies that included both graduate and undergraduate students

Under the category of technology, nine media themes surfaced. Microcomputer use was addressed in 15 studies followed by two-way audio-video networks (14), web-based methods (14), and selecting delivery method (13). Other themes researched were video-taped instruction (10), computer applications (8), internet use (7), satellite instruction (3), and distance education design (1). Internet and web-based instruction research started emerging strongly about 1995. Microcomputer use has been consistently studied throughout this nine year time period with an increased focus on computer applications after 1997 (Table 4).

Table 4
Media Themes Within the Technology Category

Media Themes	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	Total
Microcomputer use	2	3	1	1	2	3	0	0	3	0	15
2-way audio video networks (i.e. interactive network, fiber-optics)	1	1	1	2	1	0	2	3	2	1	14
Web-based	0	0	0	1	2	2	2	4	1	2	14
Selecting delivery methods	0	1	2	5	0	2	2	1	0	0	13
Video-taped instruction	0	2	2	2	0	1	1*	2	0	0	10
Computer applications (i.e. power point, excel, graphics, e-mail, etc.)	1	1	0	0	0	1	2	0	3**	3	11
Internet use	0	0	0	0	1	0	3	2	1	0	7
Satellite instruction	0	1	1	0	0	0	0	1	0	0	3
Distance education design	0	0	0	0	0	0	1	0	0	0	1

Note. * Interactive 2-way audio visual versus just video-taped
** Changed title to digital technologies

In the category of faculty issues, five themes surfaced. The area most researched has been the acceptance of distance education by faculty (10) followed by awareness of new delivery alternatives and technologies (6) and training needs (5). Research reported at the National Agricultural Education Research meetings was limited in faculty development and incentives since none was reported after 1993 (Table 5).

Table 5
Themes Within the Faculty Issues Category

Faculty Issues	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	Total
Acceptance	0	1	1	0	0	1	4	1	1	1	10
Awareness of new delivery alternatives and technologies	0	3	1	1	0	0	0	0	1	0	6
Training needs	0	1	2	1	0	0	1	0	0	0	5
Faculty development	1	0	0	0	0	0	0	0	0	0	1
Incentives	0	1	0	0	0	0	0	0	0	0	1

Conclusions and Recommendations

Conclusions

Quality and Effectiveness. The majority of research in distance agricultural education from 1992-2001 has been conducted for determining quality and effectiveness of distance courses, measuring the performance of the students, determining the experiences and skills of the participants, and exploring the media employed in distance courses.

Technology and Distance Methods. The area of technology and the method(s) used to present distance courses ranked high in receiving attention in research in distance agricultural education. The research has focused on (a) tasks required, (b) attitudes of the users, (c) the affect of the technology upon student achievement, (d) faculty adoption of it, (e) the utilization of the technology by student and faculty, (f) the affect of it on the learning styles of the student, and (g) skills needed for working with it.

The earlier years of research focused on the medium of videotapes distributed through the mail; but as technology advanced, the research shifted toward media that offered more interaction between participants. Essentially, the research changed to study the Internet, Web-based instruction, and Interactive video networks and moved away from the videotapes and satellite. As satellite access costs increased and people used computers, it became more economical to present courses via the Internet and Web than satellite. Additionally, the Internet and Web-based media allowed more faculty control and shifted from television producer-driven to faculty-driven development. Also, the grouping interactive nature of video and the web allowed for more involvement and participation between instructor and student(s) and students and students.

Faculty Issues. Several studies focused on faculty attitudes and perceptions of distance education. This is important because the effectiveness of the learning experience, the acceptance of distance courses, and the interaction among students and instructor are influenced by the attitudes and perceptions one has toward distance education and the course.

The studies concentrating on faculty issues fell in the areas of faculty skills with the technology, the attitudes and perceptions about the technology, and the skills needed to work with it. Although the areas of faculty and their acceptance of distance education saw some research in 1993 and 1994, the primary research began in 1997. Areas lacking research include training needs, faculty development, and incentives for faculty. Research focus has been on faculty teaching via distance and being aware of the delivery alternatives and technologies rather than developing faculty to teach distance and providing incentives for teaching distance. These last two may be seen as more administrative concerns than faculty issues.

In comparing the audience studied, students have been researched more than faculty in distance agricultural education. By and large, students researched in agricultural education have been post-secondary students, predominantly undergraduates. While this research is valuable, it omits studies with the adult student. This incongruence means that strategies that do emerge from research with traditional students are likely to be implemented with adult students. However, this approach is contrary to what the profession knows about the differences in motivation and participation between the traditional and adult learner. It also potentially retards the expansion of distance education to the adult learner.

Finance, Policy/Governance, and Regulatory/Legal. Finance, policy/governance, and regulatory/legal were not areas researched in the last nine years in agricultural education. One explanation is these are seen as essentially administrative issues. Allocation of funds and the availability of the budget for distance courses are determined by the administration. In many

instances, the feasibility and future of a distance course being offered is determined by the success and profitability of it. Equally noteworthy is that faculty conducting the research are more than likely to perceive they or their peers do not have a voice in the finance, policy/governance, and regulatory/legal issues at their own campuses, therefore, they do not initiate research to understand these issues. Researchers were concerned with faculty issues and not issues perceived to be administrative.

Recommendations

Audience. From the information gathered in this study, the researchers found many studies concerned with student attitudes and perceptions. While student perceptions were included in many of the studies, they were used primarily to determine success of the course and student performance. Measuring student performance in distance courses is important; however, little research in distance agricultural education in the last eight years has focused on students' attitudes and perception and whether there is a correlation of these to students' performance in distance education.

In the category of student issues, research had focused on student performance (i.e. knowledge, skills, attitudes and behaviors). Potential areas to be researched include: faculty and student interaction; student to student interaction; course and program services; availability of financial aid; availability of 'help desk' services; and access to library and instructional materials. Additionally, research techniques involving focus groups and longitudinal studies would allow researchers to capture information not easily obtained through standard assessment and to measure students' long-term changes in knowledge, skills, attitudes and behaviors.

As seamless, articulated programs increase, research is needed that explores the challenges associated with effectively educating under-aged clientele groups. Most institutions require special consideration when researching under-aged populations. This institutional research barrier does not negate the need to understand under-aged populations' knowledge, skills, attitudes and behaviors. Strategies, involving university – K-12 collaborations, need to be developed that provide research access to this population.

Distance Delivery Models. The focus of the papers researched, was on conducting distance education as an extension of the college classroom experience. Not surprising, but very one sided for a multifaceted activity. Research could be conducted to develop new models, such as one credit hour modules, courses that begin at different starting dates that are more conducive to the adult learner. Current offerings are tied to the on-campus, undergraduate traditional model where the adult learner's environment is not considered, except for time of day.

Exploring Synchronous and Asynchronous Streaming. The current trend appears to be movement toward synchronous and asynchronous streaming. Using multi-media (print, PowerPoint with audio, audio, and video) is changing or will change the way faculty teach and students learns. It appears that this is the future. While use of this delivery system still may be driven by economics and faculty control, it also presents a context that bears exploration. This exploration should involve research that documents impacts on learning, instructional design and strategies. Because impacts, design and strategies have been studied in regard to other distance delivery systems, it is further recommended that replications of previous research be conducted to determine if, indeed, the context changes the outcomes.

Faculty Incentives. Since research in the area of incentives for faculty is lacking, this is one area where research could be conducted. While research is beginning to explore why some faculty teach via distance education and others do not, research linking desire or willingness to

teach via distance to change theories, various delivery strategies, comfort level, creativity, and encouragement and support of on-campus teaching and learning is limited. Also, since faculty participation in distance education and the recognition of their work by way of promotion or some other means of recognition seems to have a low profile in the research, one recommendation is to examine the rewards or recognition of faculty as they participate in designing and teaching distance courses.

Funding and Policy Issues. Further research in these areas could include marketing of distant education courses to students, the financial role of offering courses for professional development may have on generating income, and the packaging of segments or modules from existing campus courses for contractual delivery to specific professional audiences that may generate additional and probably very lucrative income for the faculty and departments.

For the most part, policies in distance education are not systematic and are not pervasive; they are still an issue undergoing research. Further research in distance agricultural education could include review of what, if any, policies are in place in secondary and post-secondary educational institutions and what policy issues are being faced as distance education is implemented.

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Analysis Of Distance Education Research Presented At The National Agricultural Education Research Meetings (1992-2001)
A Critique

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The study addressed where agricultural education has been with distance education research and offers suggestions for future research direction. A trend analysis design was used on a total of 84 papers published in NAERM proceedings from 1992-2001 that resulted in a description of themes and patterns. These themes and patterns were then categorized according to eight classifications identified in earlier research. These categories were:

- Quality & Effectiveness
- Finance
- Policy & Governance
- Regulatory & Legal
- Setting Distance Education Direction
- Faculty Issues
- Student Issues
- Technology

Quality & Effectiveness and *Technology* categories were found in 79% of the studies conducted during this time frame. With this information in hand and other findings from the data, the researchers proposed several recommendations for future research.

The fun part of trend analysis research is that trends can be interpreted differently by different researchers. While the researchers of this study are to be commended for their leadership in framing agricultural education's future research agenda in distance education on the basis of NAERM proceedings alone, I contend that their results could lead to a different set of recommendations. This leads to items for us to discuss and further research in the profession.

1. Distance education has evolved a great deal during the time frame studied by the researchers. Web-based instruction and tools such as WebCT was barely on the distance education radar screen in 1992 but clearly are today. Have new and emerging technologies driven the research that has been conducted? If yes, what is next – effectiveness of PDA or cell phone technology in distance education?

2. Accessibility has increased, fluctuations in the economy are extreme, and the knowledge base in non distance education areas of teaching and learning (as well as other environmental factors) has changed over time. What factors will impact future research considerations? Are Americans more likely to consider distance education options since September 11, 2000? Will fear of attending group gatherings increase our desire to "cocoon" and thus increase the desirability of distance education?