A Content Analysis of University Setting Agricultural Education Research: Focusing Research Efforts at Michigan State University

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Abstract

Two premiere publications of the agricultural education profession were examined to identify research topics in agricultural education that addressed issues within the university setting. A total of 312 articles (114 in the Journal of Agricultural Education and 198 in the National Agricultural Education Research Conference) published during 1992-2001 were reviewed. The 312 articles were categorized into one of the 10 relevant research areas identified by Buriak & Shinn (1993). The five research areas receiving the greatest research attention during this 10 years period were: 1) evaluation of teaching/programs, 2) educational methodologies for learning and teaching, 3) professional preparation and competence, 4) innovative instructional technologies, and 5) individual achievement. Findings from this study conclude that agricultural education research over the past 10 years has indeed fit into Buriak and Shinn's 1993 model; however, there are areas of the model, which are lacking sufficient research. The authors recommend that researchers in our profession focus attention on the following areas: 1) faculty and staff development; 2) critical thinking and problem solving; 3) history, philosophy, futuring, and policy; 4) needs of future agricultural workforce; and 5) teaching basic and academic skills.

Introduction

Agricultural education research has been scrutinized over the past forty years (Dyer, Wittler and Washburn, 2001; Radhakrishna & Xu, 1997; Williams 1991a; Warmbrod & Phipps, 1966). According to Buriak and Shinn (1989) external decision makers tied to the agricultural education discipline have perceived our research efforts as lacking focus, being soft and not systematic. In 1993, Buriak and Shinn stated, "…internal experts in agricultural education are either reluctant or incapable of focusing research initiatives within a structure compatible to that of other agricultural disciplines" (p. 34). Just over a decade ago, Warmbrod (1986) expressed similar concerns:

> Progress during the past years in the technological and methodological aspects of research in agricultural education has not been accompanied by comparable improvement in another very important aspect of research, namely, the relevance, significance, and importance of problems and issues we investigate. I propose that our highest priority for continuing progress in research in agricultural education must be that we pay greater attention to the significance and importance of the problems and issues that we research (p.9).

Agricultural education researchers have categorized the disciplines research based on its central focus and subject matter topics (Crunkilton 1988; Dyer & Andreasen, 1999; Moore, 1987; Moss, 1986). Other researchers have used established practices such as review panels, the Delphi Technique, and committee meetings to categorize agricultural education research (NCA-24 Committee, 1987; Radhakrishna & Mbaga, 1995; Silvia-Guerrero & Sutphin, 1990). Researchers have developed models, which provide a guide for analyzing past agricultural education research efforts (Williams, 1991a; Buriak and Shinn, 1993). William's (1991a) model identifies the need for agricultural education research in five areas; 1) settings, 2) processes, 3) discipline, 4) foundations, and 5) footings. Williams noted, "we must fully understand the dimensions of agricultural education before we can successfully focus our research" (Williams, 1991a, p.8). Two years later, Buriak and Shinn (1993) constructed a model designed to structure a research agenda for agricultural education. Accompanying their model, Buriak and Shinn (1993) identified three ways that structuring and identifying a research agenda can be valuable:

> For maintaining compatibility with the national priorities for the food and agricultural science system and educational system, for guiding our research investments, and for communicating our priorities to agencies and organizations which have national responsibilities to plan and budget research (p.34).

Moreover, Buriak and Shinn (1993) contended that agricultural education research initiatives should be focused and articulated to take advantage of talent and knowledge that exist within the profession. "A strategic plan designed to remove or minimize the identified obstacles should be developed by individual researchers, universities and the profession of agricultural education" (Buriak & Shinn, 1989, p. 22). Likewise, theoretical, developmental and applied inquiries are the blocks upon which an agricultural education program should be built (Buriak & Shinn, 1993). Whereas, Williams (1991b) explained that the first step in building a research

program's theoretical base is to evaluate research already completed. "Much effort must be put forth to determine the frontier of knowledge in a defined area.

Answering this call, researchers in the discipline have determined the subject matter topics researched in agricultural education (Radhakrishna & Xu, 1997; Silvia-Guerrero & Sutphin, 1990). However, to date the research agenda has neglected to categorize agricultural education research according to a professionally accepted model. Dyer et al. (2001) states, "there are models to which all agricultural education research can and should adhere" (p. 2). This study addresses Dyer et al.'s statement by determining how agricultural education research adheres to Buriak and Shinn's (1993) model.

Theoretical Framework

Buriak and Shinn (1993) and Williams (1991b) provided the theoretical framework for this study; the analysis of past research in agricultural education should be the basis on which we advance our body of scientific knowledge. Further, Williams (1991b) states, "much effort must be put forth to determine the frontier of knowledge in a defined area. Professors must first learn what others have done and what remains to be done in an area before attempting to expand knowledge" (p. 19).

Purpose and Objectives

This study was designed to determine how university setting agricultural education research fits into Buriak and Shinn's (1993), "A Structure for a Research Agenda for Agricultural Education" model. The investigation was undertaken to identifying gaps in agricultural education research at the university setting in order to develop a research agenda for agricultural education at Michigan State University. Specific objectives of this study were to:

1. Identify current research in the field of agricultural education at the university setting (according to Buriak and Shinn's, 1993 model),
2. Identify areas of deficiency in research of university setting agricultural education (according to Buriak and Shinn's, 1993 model).

Methods and Procedures

Two data sources were used to examine research activity topics researched in agricultural education. These included, articles published in the *Journal of Agricultural Education (JAE)* and papers presented at the *National Agricultural Education Research Conference (NAERC)* during 1992-2001. JAE and NAERC were selected because they are the premier refereed outlets for published research in agricultural education. Selection of these two data sources resulted in examination of 346 journal articles published in the JAE and 495 papers presented at the NAERC (Table 1). Williams (1991a) identified five settings that should be researched in agricultural education: 1) agencies, 2) schools, 3) university, 4) extension, and 5) industry. For this study, only the university setting was considered. Therefore, articles dealing with agricultural education at the secondary level and articles dealing with Extension were excluded from this study.

Table 1
Total Number of Journal Articles Published in JAE and Papers in NAERC Proceedings by Year (1992-2001)

Source	92	93	94	95	96	97	98	99	00	01	Total
JAE	31	44	47	34	32	32	32	30	34	30	346
NAERC	54	55	53	49	42	51	48	47	48	48	495
Total	85	99	100	83	74	83	80	77	82	78	841

Three hundred and twelve of the 841 articles and papers (37.1 %) dealt with agricultural education in the university setting. These 312 papers were reviewed and categorized according to Buriak and Shinn's (1993) "A Structure for a Research Agenda for Agricultural Education" model. The model included ten research activities for agricultural education: "1) critical thinking and problem solving; 2) individual achievement; 3) professional preparation and competence; 4) teaching basic and academic skills; 5) needs of future agricultural workforce; 6) educational methodologies for learning and teaching; 7) innovative instructional technologies; 8) history, philosophy, futuring, and policy; 9) faculty and staff development; and 10) evaluation of teaching/programs" (Buriak & Shinn, 1993, p. 32-34). Each of the 312 articles and papers dealing with agricultural education in the university setting was coded into one of the ten categories. Papers were categorized using three criteria: 1) title of the study, 2) abstract, and 3) purpose of the study. Reliability was achieved through independent reviews, independent coding, intercoder comparison of article categorization, and discussion of coding discrepancies until one code was agreed upon.

This study assumes that the research activities identified in Buriak and Shinn's, 1993 model should have an equal number of papers published. Thus, research articles with a smaller percentage of papers categorized were considered deficient.

Findings

In these ten years of agricultural education research publications, the category with the most publications reported was that of evaluation of teaching/programs (105 studies - 42 in JAE and 63 in NAERC), followed by educational methodologies for learning and teaching (56 studies - 13 in JAE and 43 in NAERC), professional preparation and competence (38 studies - 13 in JAE and 25 in NAERC), innovative instructional technologies (36 studies - 15 in JAE and 21 in NAERC), and individual achievement (26 studies - 13 in JAE and 14 in NAERC). These were the top five research activity topic areas investigated by agricultural education researchers. The other research activity topic areas had the following number of studies published: faculty and staff development (23 studies), critical thinking and problem solving (15 studies), history, philosophy, futuring, and policy (9 studies), needs of future agricultural workforce (4 studies), and teaching basic and academic skills (0 studies). Tables 2 and 3 provide a complete look at the synthesis of research for JAE and NAERC dealing with agricultural education in the university setting. Following is a description of the studies coded under each of the 10 research activity topic areas.

Table 2
Number of Papers Published in the Journal of Agricultural Education (1992-2001) According to Categories Denoted by Buriak and Shinn (1993)

Research Activity	92	93	94	95	96	97	98	99	00	01	Total	%
Critical Thinking and Problem Solving	-	1	-	1	1	1	-	-	1	-	7	6.1
Individual Achievement	3	3	3	-	-	-	1	1	-	1	12	10.5
Professional Preparation and Competence	2	-	2	2	2	1	1	1	1	1	13	11.4
Teaching Basic and Academic Skills	-	-	-	-	-	-	-	-	-	-	0	0.0
Needs of Future Agricultural Workforce	-	-	-	-	-	-	-	-	-	-	0	0.0
Educational Methodologies for Learning and Teaching	1	-	2	1	2	-	1	5	1	-	13	11.4
Innovative Instructional Technologies	-	2	1	-	-	1	3	2	3	3	15	13.2
History, Philosophy, Futuring, and Policy	-	-	-	-	2	-	1	-	-	1	4	3.5
Faculty and Staff Development	1	2	-	2	-	-	2	1	-	-	8	7.0
Evaluation of Teaching/Programs	3	6	5	4	1	5	1	3	12	2	42	36.8
Total	10	14	13	12	8	8	10	13	18	8	114	100

Critical Thinking and Problem Solving

Critical thinking and problem solving was defined by Buriak and Shinn (1993) with the following research objective areas: 1) metacognition, 2) experience, 3) source of information, 4) curricula structure, and 5) teaching techniques. A total of 15 studies were coded into this topic area. Four of the 15 studies placed in this category either assessed or examined the cognitive levels and/or abilities of college students. Four dealt with the experience college students had with regards to cognitive level of instruction provided to them and two dealt with the problem solving approach as a teaching technique. The remaining five studies addressed factors related to critical thinking and problem solving abilities of undergraduate students and learning styles' influence on critical thinking.

Individual Achievement

Buriak and Shinn (1993) identified five research objective areas important to research in the individual achievement category. Those areas are: 1) motivation, self-concept, and individual difference, 2) climate, 3) teacher-learner interaction, 4) quality of instruction, and 5) leadership and organizational development. Of the 26 studies categorized into this topic area, ten focused on learning styles or personality types of faculty and students in colleges of agriculture. Seven focused on leadership skills, practices and perceptions. Four studies dealt with factors related to recruitment, retention and major selection of students in colleges of agriculture.

Student motivation and persistence was a topic explored by two different studies. An additional two studies examined the self-efficacy and knowledge of undergraduate students with regards to computer experiences, while only one study examined the influence of an instructor's computer proficiency on students' achievement.

Table 3
Number of Papers Presented at the National Agricultural Education Research Conference (1992-2001) According to Categories Denoted by Buriak and Shinn (1993)

Research Activity	92	93	94	95	96	97	98	99	00	01	Total	%
Critical Thinking and Problem Solving	2	1	2	1	-	-	1	1	-	-	8	4.0
Individual Achievement	2	1	1	1	2	2	-	2	2	1	14	7.1
Professional Preparation and Competence	2	1	3	6	1	6	1	2	2	1	25	12.6
Teaching Basic and Academic Skills	-	-	-	-	-	-	-	-	-	-	0	0.0
Needs of Future Agricultural Workforce	2	1	-	1	-	-	-	-	-	-	4	2.0
Educational Methodologies for Learning and Teaching	3	5	6	5	2	6	6	3	5	2	43	21.7
Innovative Instructional Technologies	-	1	1	2	5	1	-	2	5	4	21	10.6
History, Philosophy, Futuring, and Policy	-	1	1	-	1	-	1	-	1	-	5	2.5
Faculty and Staff Development	-	-	4	3	1	1	1	1	-	4	15	7.6
Evaluation of Teaching/Programs	5	7	3	2	4	6	9	9	8	10	63	31.8
Total	16	18	21	21	16	22	19	20	23	22	198	100

Professional Preparation and Competence

Professional preparation and competence was defined by Buriak and Shinn (1993) with the following research objectives: 1) prerequisite experience and qualifications, 2) career development theory, 3) ethics and values, and 4) administration and organizational development. A total of 38 studies were coded into this topic area. Seven studies assessed and/or predicted academic performance, preparation, achievement and retention of college of agriculture students. Six studies determined the attitudes and perceptions of college students toward agriculture. Five studies assessed the level of preparation received by college students. Three studies identified reasons why pre-service teachers of agriculture choose to major in agricultural education, while one study determined the learning and teaching styles of this same population. Three studies focused on the in-service needs of first year agricultural science teachers. Three studies examined the effects of mentoring activities, peer work attitudes and cooperating teachers on student attitudes and student teachers use of problem solving approaches to teaching. Two studies identified factors influencing career choices while one study identified barriers to professional careers. Two studies focused on agricultural awareness of faculty and in Arizona. An additional two studies focused on leadership ethics and practices. The remaining three

studies dealt with professional competencies, relevance of core curriculum to career goals of students and knowledge about international agriculture.

Teaching Basic and Academic Skills

Buriak and Shinn (1993) determined that the following are important research objectives of teaching basic and academic skills: 1) agricultural literacy, 2) integration of basic and academic skills, 3) infusion of science and mathematics, 4) infusion of communications and language, 5) infusion of social values, and 6) economics, entrepreneurship and free enterprise. There were no studies dealing this research activity topic area.

Needs of Future Agricultural Workforce

As identified by Buriak and Shinn (1993) the following are important research objective areas for teaching basic and academic skills: 1) demographic analysis, 2) employment, supply-demand, and nature of workforce, 3) job satisfaction, 4) global market demands, 5) gender, race and diversity, and 6) specific training needs. Four studies were presented at NAERC that dealt with the needs of future agricultural workforce. No studies dealing with this category were published in the JAE. Two studies dealt with employment, supply-demand, and nature of workforce, one study dealt with job satisfaction and one with specific training needs.

Educational Methodologies for Learning and Teaching

This category was defined by Buriak and Shinn (1993) with the following research objectives: 1) learning style – teaching style interaction, 2) cooperative learning and peer teaching, 3) experiential methods including youth groups, 4) methods for special populations, and 5) evaluation techniques. Over this ten year period, there were 56 studies found that deal with educational methodologies for learning and teaching. Twenty-four studies focused on learning styles, learning strategies and thinking styles as they relate to teaching styles and student performance. Nine studies determined preferences and experiences of distance learners, learning strategies for distance education students, and interaction needs and performance of distance learners. Seven studies compared alternate forms of instruction (computer multimedia, decision cases and a constructivist model for teaching) to that of traditional forms of instruction (lecture and traditional laboratory instruction). Three studies addressed the problem solving approach to teaching. Two studies assessed evaluation techniques of educational instruction and an additional two studies assessed the team teaching approach and cooperative learning approach to agricultural education. The remaining six studies dealt with such topics as service learning, relationship between instructional method and critical thinking, use of think-aloud protocols to compare cognitive levels of students and professors, integrating agriculture and science to increase contextual learning, faculty perceptions of teaching skills and educational technologies, and crafting a scientific base for teaching.

Innovative Instructional Technologies

Buriak and Shinn (1993) outlined four research objectives which define innovative instructional technologies; they are as follows: 1) innovation, adoption, and diffusion of technology, 2) expert systems and knowledge representation, 3) learner-client technology preference, and 4) articulation strategies. Further, studies were grouped into five main areas by

the researchers: distance education, electronic teaching instruction, world wide web instruction, videotape instruction, and assessment of student's skills with and knowledge of computers. There were 36 studies were determined to belong in the innovative instructional technologies category. Sixteen of the 36 studies in the research activity area dealt with distance education. Distance education included any course offered through an online only format, through a desktop video conferencing format, or through two-way audio two-way video format. Seven studies examined the benefits, effectiveness and perceptions of electronic teaching instruction in a variety of different courses. Six studies explored the use of world wide web instruction and its effects, perceptions and relationships to student motivation, attitude, learning styles, and achievement. Four studies addressed the use of videotape as an instructional technology. The remaining three studies determined student's computer skills, experiences, self-efficacy and knowledge.

History, Philosophy, Futuring, and Policy

The research objectives identified by Buriak and Shinn (1993) are: 1) historic perspectives and social change, 2) philosophical bases of agricultural education, 3) values and ethics, 4) future roles, and 5) policy development. From 1992-2001, nine studies were found to address the category of history, philosophy, futuring, and policy. Six studies dealt specifically with historical perspectives of agricultural education research. Two studies dealt with philosophical bases of agricultural education while one study dealt with values and ethics.

Faculty and Staff Development

As found by Buriak and Shinn (1993) faculty and staff development can be broken down into the following research objective areas: 1) needs assessment, 2) structures and organizations, 3) undergraduate and graduate curricula, 4) qualitative results and impact, and 5) perceptions, satisfaction and retention. There were 23 studies dealing with faculty and staff development. Six studies dealt with topics such as faculty productivity, interests, participation, and priorities. Four dealt with increasing the cognitive level of instruction offered by faculty in college of agriculture classrooms. Four focused on faculty productivity with regards to research and journal publications. Three studies addressed faculty needs associated with distance education. Two studies focused on faculty perceptions of their own teaching skills and interests in teaching improvement. The remaining four studies individually dealt with peer evaluation, mentoring, job satisfaction, and learning styles of college of agriculture faculty.

Evaluation of Teaching/Programs

This category was defined by Buriak and Shinn (1993) with the following research objective areas: 1) program impacts; 2) program change; 3) communications methods; 4) curricula designs; 5) follow-up of program completers; and 6) program evaluation and accreditation. There were 105 studies were categorized into the research topic area of evaluation of teaching/programs. Forty-seven studies addressed program evaluation and accreditation (38 of the 47 focused on general program evaluation while nine evaluated off-campus vs. on-campus course quality and rigor). Sixteen studies used the perceptions of program completers evaluate programs. Another 16 studies examined research topics, priorities and methods used to conduct research in agricultural education. Twelve studies made suggestions and implemented program

change for various agricultural education programs. Seven studies outlined and noted agricultural education program impacts. Four studies examined curricula designs, determined their relevance, recommended room for enhancements, and reported industry perspectives on needed changes. Three studies brought to light the in-service needs of agricultural teachers.

Conclusions and Recommendations

The findings of this study provide information on agricultural education research conducted on issues within the university setting in the last 10 years. This information in turn provides perspectives about research efforts of the agricultural education profession. Findings suggest that university setting agricultural education research conducted between 1992-2001 has indeed adhered to a model as Dyer et al. (2001) stated it should. However, there are research activity topic areas defined by Buriak and Shinn (1993) that lack the research attention other topic areas have received.

Findings indicate that researchers looking into university issues confronting agricultural education have focused on 1) evaluation of teaching/programs, 2) educational methodologies for learning and teaching, 3) professional preparation and competence, 4) innovative instructional technologies, and 5) individual achievement. Conversely, relatively few researchers have explored the research activity topic areas of 1) faculty and staff development, 2) critical thinking and problem solving, 3) history, philosophy, futuring, and policy, 3) needs of future agricultural workforce, and 4) teaching basic and academic skills. Identifying these areas deficient of research is the first step in expanding our discipline's knowledge base. As Williams (1991b) suggested, this study has "determined the frontier of knowledge in (our) defined area" (p.19), we may now "expand (our) knowledge" (Williams, 1991b, p.19) but we must do so under the guidance of research structures such as Buriak and Shinn (1993) have supplied. Following a well developed and properly laid out research agenda for both the discipline and individual universities will help researchers address these five research activity topic areas that are deficient of research.

Periodic reviews (such as this) of the *Journal of Agricultural Education* and the *National Agricultural Education Research Conference* are just the beginning step toward a systematic research agenda. To effectively develop and follow research agendas, researchers must also focus on critical issues in our profession (i.e.: Buriak and Shinn's 10 research activity topic areas) and use collaborative approaches to research. "Undertakings like these will help to build a strong foundation to address problems and uniquely position ourselves to face future challenges" (Radhakrishna & Xu, 1997, p.67). The authors recommend that all researchers in the field of agricultural education begin to show more discipline in following a research structure such as the one Buriak and Shinn (1993) have provided our field with. In order to effectively do this, collaborative approaches must be used. This will mean collaboration not only between faulty within universities, but among faculty from different universities. Radhakrishna and Xu (1997) and Radhakrishna (1998), have also pleaded this call; hopefully now, we will begin to answer it.

The authors recommend that future researchers conduct in depth synthesis of research for each of the 10 research activity topic areas. These syntheses will bring to light the research objectives that have received an overabundance of research attention. Such studies will also identify the research objectives which have received very little or no research attention. Once

identified, those research objectives can and should be the focus for future research efforts and agendas.

It should also be noted that the *National Association of Colleges and Teachers of Agriculture (NACTA) Journal* was not included in this study. It is recommended that a replica of this study be done with the NACTA Journal. The NACTA Journal is a third premiere outlet for agricultural education research and will include mostly university setting research. A very similar total number of journal articles dealing with agricultural education at the university setting will be found for that study.

Authors such as Buriak and Shinn (1993) have challenged our discipline by stating, "internal experts in agricultural education are either reluctant or incapable of focusing research initiatives within a structure compatible to that of other agricultural disciplines" (p.34). To focus their agricultural education research efforts, institutions such as Michigan State University must first acknowledge past research efforts and identify research gaps. By striving to fill these identified research gaps, institutions can positively build upon the body of knowledge we refer to as agricultural education. Developing a research agenda is one-way institutions can effectively make this contribution.

The process of structuring and identifying a research agenda, according to Buriak and Shinn (1993), can be valuable in three major ways: "1) for maintaining compatibility with the national priorities for the food and agricultural science system and the educational system, 2) for guiding our research investments, and 3) for communicating our priorities to agencies and organizations which have national responsibilities to plan and budget research" (p. 34). The authors adds also that developing a research agenda can help in recruiting graduate students into a program, collaborating among several researchers, and increasing the quality of a department's contribution to the discipline.

The findings of this study reinforced the importance of developing a research agenda and focusing research in agricultural education. The researchers recommend advancing the agricultural education research initiatives within "A Structure for a Research Agenda for Agricultural Education" model proposed by Buriak and Shinn (1993) and begin focusing more on university setting research areas currently receiving less attention.

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A Content Analysis of University Setting Agricultural Education Research: Focusing Research Efforts at Michigan State University

A Critique

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In this profession-reflective manuscript, the authors document 10 categories of agricultural education research conducted over the past 10 years. They conclude that the profession has focused on teaching and learning issues, but needs to broaden its research agenda to include other areas such as faculty and staff development and critical thinking and problem solving. The study was inspired by Dyer's (2001) call for agricultural education researchers to adhere to a specific model of research so that new frontiers of knowledge could be explored, and based on Buriak and Shinn's (1993) model for developing a focused research agenda.

Counting and categorizing the writings of agricultural educators and aligning each article with Buriak and Shinn's model of a recommended research agenda is helpful in terms of reflection as a profession. However, I don't agree with the conclusion that the five lean categories are in need of more research attention. The authors have assumed an *a priori* stance that research on the five under-represented categories is important to the profession, an assumption I challenge the authors to rethink.

It could be equally concluded that these categories are not ripe for analysis and thus deserve no further exploration. Shouldn't a research agenda originate from the needs of our stakeholders and their problems, rather than from a series of *a priori* assumptions from academics? A common criticism tossed at academia today is that our work is irrelevant. Perhaps further investigation could focus on the earnest needs of our stakeholders for new knowledge using a grounded theory approach (leaving behind modernistic notions of predetermination and paternalism).

This study was an analysis of what is, and concluded with what should be. The authors recommend that "all researchers in the field of agricultural education begin to show more discipline in following a research structure such as the one Buriak and Shinn (1993) have provided our field with." Expanding knowledge for the mere sake of doing so is inappropriate at best and wasteful of resources at worst. The primary focus of agricultural education research on evaluation of teaching and programs tells us that we (and hopefully our stakeholders) value this type of research and find it helpful, thus the continued emphasis on such work.

I encourage the authors to look at the problem from a different angle. Like a prism separating light waves into their component parts, this content analysis dissected the journals and conference proceedings, but failed to reconnect the parts of the whole to form a vision of harmony with our constituents.