

FOCUSING AGRICULTURAL EDUCATION RESEARCH: AN AGENDA FOR THE GRADUATE STUDENT

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Abstract

The agricultural education profession has been challenged to focus its research as a means to further develop the discipline. Recognizing that much of the research in agricultural education is conducted by graduate students under the supervision of mentors, the purpose of this article is to present an agenda for focusing research by graduate students in agricultural education. The thoughts presented are intended to provoke a discussion among agricultural education graduate students and their mentors and to guide individualized action by graduate students. The plan includes eight action points for graduate students: (1) assess professional experiences, (2) understand the discipline, (3) review trends and priorities, (4) study requirements of positions, (5) identify mentors, (6) build on a theoretical base, (7) practice good science, and (8) become a scholar. Action on these points can help develop a new generation of scholars in agricultural education and strengthen the contribution of graduate student research to the discipline.

Discovering, interpreting, and communicating new knowledge is critical to the growth of a discipline. Research is especially important in a young discipline such as agricultural education because its place among other fields of knowledge is not fully understood by the scientific community. Agricultural education research is perceived by external groups as lacking focus (Buriak and Shinn, 1989), and a study conducted internal to the profession confirmed this finding (Buriak and Shinn, 1993). Warmbrod (1986) recommended that the discipline of agricultural education “pay greater attention to the significance and importance of the problems and issues that we research” (p. 9). McCracken (1983) encouraged researchers in the discipline to “pursue wisdom, to search for truth through logical reasoning and research” (p. 4). Much of the research in agricultural education is accomplished by graduate students and work is needed to improve research problem selection and specification (Newcomb, 1993).

Earlier articles addressed strategies for focusing agricultural education research that can be employed by the discipline (Williams, 1991a) and the professor (Williams, 1991 b). The purpose of

this article is to present an agenda for focusing research by graduate students in agricultural education. The agenda is designed for individualized graduate student action but can also be used to stimulate discussions among students and their mentors. Action on an eight-point agenda can help develop a new generation of scholars in agricultural education and strengthen the contribution of graduate student research to the discipline. Detailed discussion of each point follows.

Assess Professional Experiences

An assessment of one’s professional experiences can be helpful in establishing goals for graduate study in agricultural education. Experiences in schools, agencies, extension, colleges and universities, agribusiness, and international settings motivate people to pursue graduate degrees. High school teachers experience new challenges working with student teachers assigned to their schools, observe the role of the university supervisor, and set goals to become university professors. County extension persons find rewards in working with state professional

development initiatives and see opportunities for people with advanced degrees at the state level in human resource development. People in agribusiness are challenged by the needs they have for on-the-job training and seek graduate degrees to become equipped for leadership roles in training and development. Others pursue graduate study that will help them prepare for careers in international development after gaining new perspectives through global experiences. Professional successes as well as challenges can suggest broad areas for research while pursuing a graduate degree.

The aspiration to be a researcher is a less common motive to pursue graduate education in agricultural education, probably because candidates have had limited first-hand experiences in research; however, proficiency in research is needed. Master degree programs require a thesis or other creative work and doctoral programs require a dissertation with prerequisite courses in research methodology and statistics. Participation in regional/national research conferences, e.g., National Agricultural Education Research Meeting, can help graduate students understand the importance of research, observe research processes, and explore their research interests.

Experience in using the problem-solving approach to teaching, an agricultural education philosophical tenet guiding teaching and learning in agriculture, is an attribute that can be helpful in graduate education. Elements from this knowledge base can be transferred to the research process. The steps involved in problem solving or critical thinking, e.g., recognizing a need, stating the problem, formulating a hypothesis, collecting information, and concluding a belief based on facts, are analogous to the scientific method. Perhaps the similarities between philosophical teaching concepts- in agricultural education and the systematic approach used in research contribute to the comparative success agricultural education graduate students frequently experience in

interdisciplinary research methods and statistics courses.

Understand the Discipline

Graduate students in agricultural education should know their discipline, believe in its principles and processes, and contribute to its growth. Barrick (1989) defined the discipline of agricultural education as “the scientific study of the principles and methods of teaching and learning as they pertain to agriculture” (p. 26) and used the following as a basis for declaring agricultural education as a discipline: (1) it has a theory base; (2) it involves application in real settings; (3) it serves as a bridge between agricultural science and other disciplines; (4) it includes principles that serve as a foundation for education in agriculture; (5) it connects disciplines in agriculture to the social sciences; and (6) it advocates self-examination and seeks new knowledge.

Williams (1991 a) illustrated the dimensions of agricultural education by using an arch to depict the application settings (industry, extension, university, schools, and agencies) for the discipline. The keystone of the arch is the university where research in agricultural education is commonly coordinated. The arch rests on the processes of agricultural education (curriculum planning, delivery methodologies, and program evaluation). Agriculture and education form the foundation with social, biological, and physical sciences providing footings for the discipline.

Review Trends and Priorities

An analysis of futuristic developments in agriculture and education can provide direction for graduate student research in agricultural education. The U. S. Department of Agriculture periodically publishes and disseminates, through state agricultural experiment stations, information that can be used to align agricultural education research with emerging national trends and needs.

Opportunities to Meet Changing Needs (U. S. Department of Agriculture, 1994) grouped food, agriculture, and natural resources research priorities into six areas: (1) environment and natural resources; (2) nutrition, food safety, and health; (3) processes and products; (4) economic and social issues; (5) animal systems; and (6) plant systems. Strategic plans of colleges of agriculture, state experiment stations, and state extension services reveal state goals and show ties to regional and national priorities.

NCA-24, a north central regional agricultural experiment station committee for agricultural education research, established the following priorities for regional research (the first five were designated as disciplinary and the last five as interdisciplinary): (1) examine the teaching and learning processes of instruction delivered at a distance, (2) develop models for teacher education in agriculture, (3) determine the effectiveness and efficiency of distance delivery of education to adults, (4) enhance school/work connections in secondary and postsecondary schools, (5) revitalize rural education, (6) help agricultural disciplines disseminate research findings, (7) study the effects of changing rural demographics on the educational needs of rural populations, (8) help technical agriculture units develop, implement, and evaluate teaching materials for secondary school instruction, (9) help speed the adoption for agricultural innovations, and (10) strengthen rural communities and economic viability (North Central Regional Association of State Agricultural Experiment Stations, 1996).

The Holmes Group (1995) advocated making research on high quality learning in schools and communities a primary mission of colleges of education. New knowledge is needed in three areas: (1) needs of students (criteria for deciding what is most important for students to learn), (2) contributions of interdependent parts, e.g., classrooms, school support offices and services, technology, parents, and community members, of

the educational system to student learning, and (3) helping learners whose cultural backgrounds differ. Research related to these and other issues should be a joint venture between university professors and school practitioners for the greatest promise of transforming education (Holmes Group, 1995).

The twelve standards proposed by the National Board for Professional Teaching Standards (1996) profiled exemplary vocational education teachers and identified important facets of the art and science of teaching for future investigations. These are: (1) knowledge of students, (2) knowledge of subject matter, (3) learning environment, (4) advancing knowledge of vocational subject matter, (5) workplace readiness, (6) managing and balancing multiple life roles, (7) social development, (8) assessment, (9) reflective practice, (10) collaborative partnerships, (11) contribution to the professional community, and (12) family and community partnerships.

Universities and colleges are clarifying their missions and establishing priorities, and departments housing agricultural education programs are defining their roles in the higher education community. Such self-studies provide an opportunity for graduate students to select research problems based on local priorities. The involvement of people from other disciplines in planning and conducting research in agricultural education is needed to facilitate broader recognition of the discipline in the scientific community. This can be accomplished in part as agricultural education graduate students include professors from other disciplines on their program of study committees.

Study the Requirements of Positions

Graduate students should recognize that research competencies are needed in a growing number of positions. This development has been caused in part by efforts to connect research to practice, to speed the dissemination of new

discoveries, and to enhance technology transfer. Examples of such developments include: (1) Professional Development Schools that advocate a collaborative research role for K-12 teachers (Holmes Group, 1990); (2) Extension, in an effort to honor both its university and community bases, is integrating research and outreach agendas at the grass-roots level (ESCOPE and CSREES Report, 1995); and (3) the global push toward environmental and social sustainability has created special research needs with industrial and international implications (Leopold Center for Sustainable Agriculture, 1994).

Position announcements for agricultural education university professors commonly include an expectation that the successful applicant will develop a research program in a specified area. Completion of a dissertation that applies the scientific method in the study of a problem is a prerequisite to entering the professoriate. Academic careers not only require a doctoral degree and research credentials for entry, but expect a focused program of research and excellence in scholarship for success and advancement. Universities are developing clear expectations for individual productivity and are holding faculty accountable for meeting these expectations (Heydinger and Simsek, 1992).

Identify Mentors

As the discipline of agricultural education moves toward a structured research agenda, the need for mentors to guide graduate students in focusing their research becomes critical. Buriak and Shinn (1993) challenged the discipline to identify a research agenda for three reasons: (1) to maintain compatibility with the national priorities for the food and agricultural science system and the educational system, (2) to guide research investments, and (3) to communicate priorities to agencies and organizations that have national responsibilities for planning and budgeting research.

University professors are being challenged to develop long-term research programs that will systematically impact a specialized area in their discipline. As professors publish their research in focused areas over time, they become experts in that area and attract graduate students with similar interests to study with them. A team of graduate students working with an experienced researcher in a focused area creates an ideal environment for mentoring. Close work with an experienced scientist is an important aspect of a graduate student's scientific education. Similarly, work with graduate students in a focused area of research expands the contributions experienced researchers make to the discipline (National Academy Press, 1989). The mentoring environment not only nurtures graduate students' growth as researchers and helps professors develop research programs, it also helps departments, colleges, and universities achieve their missions, and further develops the discipline. Such developments are leading potential graduate students, especially those interested in Ph.D. programs, toward the selection of a university to attend on the basis of research programs emphasized in agricultural education and on the research specialization and scholarly reputation of faculty.

'Mentors can introduce graduate students to communications within the scientific community. At each stage in the research process, scientists submit their ideas, hypothesis, and observations to the scrutiny of others through informal and formal means. A visit in the hallway, over the telephone or over the internet can be helpful in focusing a research idea; discussions in seminars and conferences can provide additional interaction, and presentations at conferences allows for sharing of initial observations. Finally, submitting research findings for publication in a scientific journal allows for a critical review by peers who can detect mistakes, omissions, and enhance explanations. Mentors can help graduate students understand the rewards scholars experience when their work is acknowledged by others and incorporated into their

colleagues' research and practice (National Academy Press, 1989).

Build a Theoretical Base

Graduate student research should feature a strong theoretical base. A clear description of the frontier of knowledge in a defined area based on a synthesis of relevant literature is critical to the design of research and the interpretation of its findings. This phase of the research process, however, is often slighted in agricultural education research. Gall, Borg, and Gall (1996) advocated that the literature review helps focus research by (1) delimiting the research problem, (2) seeking new lines of inquiry, (3) avoiding fruitless approaches, (4) gaining methodological insights, (5) identifying recommendations for further research, and (6) seeking support for grounded theory.

“Scientists build on previous results because it is not practical (or necessary) to reconstruct all the observations and theoretical constructs that go into an investigation” (National Academy Press, 1989, p. 11). Citations place the research within its scientific context, relating it to the present state of knowledge (National Academy Press, 1989). Braben (1994) advanced that science “shall make substantial progress on the daunting list of problems facing the world today only when we begin to understand many things that we do not even know we do not understand” (p. 155). The point in time that a young researcher first recognizes that he or she is touching an area previously unexplored is a “rare precious moment” (Sindermann, 1985, p. 2).

The theoretical base for research in agricultural education can be strengthened by anchoring it in social, physical, and/or biological sciences (Williams, 1991a). An empirical analysis of the literature cited in the Journal of Agricultural Education revealed limited citations of journals outside the discipline (Radhakrishna, et al., 1994). While cross-referencing by authors in the same

field shows the identity of a discipline, it can also suggest a narrow focus and lack of depth in research. Researchers in agricultural education, including graduate students, must examine and cite more research conducted in other disciplines and incorporate those conclusions and recommendations in order to build a stronger theoretical framework for their investigations (Radhakrishna, et al, 1994). Citations, or the lack thereof, not only reflect a discipline, but also reflect the scope of literature reviewed and the scientific interest of authors (Berg, Broadus, and Crane, cited in Radhakrishna, et al., 1994).

Practice Good Science

Graduate students should practice good science in examining theories and creating new knowledge. In the research process, commonly called the scientific method, a problem is identified; hypotheses are formulated; relevant data are collected, which are then critically analyzed; and decisions are reached based on the data. Sindermann (1985) challenged researchers to practice good science, featuring seven core elements: (1) correct choice of a research problem, (2) logical design, (3) sustained productivity, (4) insights based on interpretation of research results, (5) contribution of the conceptual framework of a discipline, (6) knowledge of the developing literature in a chosen field, and (7) effective communication of findings in professional forums.

Buriak and Shinn (1993) proposed a format for structuring agricultural education research that can help graduate students apply the initial step in the practice of good science, selecting a research problem. The structure identifies four research problem areas for which the discipline of agricultural education is responsible: (1) knowledge base for teaching and learning, (2) curricula and program planning, (3) delivery methodologies, and (4) program relevance and effectiveness. Each problem area is further subdivided into research activities and research objectives. For example,

“experiential methods” is a research objective under the research activity “educational methodologies for learning and teaching” under the “delivery methodologies” research problem area. Research in this area could be further focused by identifying experiential learning methods applied in agricultural education and based on theory from the social sciences, naming an agricultural subject, and identifying a setting (schools, universities, etc.) for the investigation.

An understanding of the criteria used by funding agencies to evaluate the merits of proposed research can be useful in focusing graduate student research. For example, the following criteria are used by the North Central Regional Association of State Agricultural Experiment Stations (1996) in identifying regional research initiatives to fund: (1) addresses a priority problem, (2) features goals to solve a problem, (3) uses an interdisciplinary approach, (4) uses strengths of cooperating units, (5) includes performance indicators and measures to assure accountability, (6) identifies measurable impacts, (7) leverages support from other agencies, and (8) demonstrates how the results will be delivered to the users.

Become a Scholar

Graduate students are challenged to become scholars. Boyer (1990) defined scholars as “academics who conduct research, publish, and then perhaps convey their knowledge to students or apply what they have learned” (p. 15). He advanced that scholarship includes four separate, yet overlapping, functions: discovery, integration, application, and teaching. Being a scholar includes communicating in the discipline -- sharing one’s research findings and innovative ideas. Nonwriters have little to say in shaping a discipline; and when one is not heard, he/she may stop listening (Cano, Hall, and Martin, 1994).

Scholars are needed in agricultural education to provide leadership for the profession and further the scientific study of agricultural education

processes (McCracken, 1983 and Barrick, 1989). Recognizing that graduate programs are training the next generation of scholars in agricultural education, graduate students and their mentors are challenged to develop research programs with high impact, research that provides cumulative solutions to significant problems in a focus area of the discipline. “This will require teams of researchers pursuing relevant problems in a sustained manner . . .” (Williams, 1991a, p. 12).

To meet the need for small networks of scientists to address future research problems, the American Association of Agricultural Education (AAAE) is establishing scholarly work groups. Strategies for identifying research initiatives and teams of scientists within and across regions in the United States and internationally are being developed (AAAE Ad Hoc Committee, 1996). Such action will help graduate students focus their research and select mentors.

To become a scholar, graduate students should identify an area of research interest and plan to pursue it vigorously and programmatically while in graduate school and for years beyond. The discipline of agricultural education needs scholars conducting career-long, programmatic research in a focused area. Such efforts are needed to become an authority in an area important to the discipline of agricultural education. A person is unlikely to become an expert/scholar in more than one area. Cano, Hall, and Martin (1994) advised emerging scholars to develop a program of scholarship that focuses on a specific area in the discipline and to make writing a priority.

Summary

Focused research is rewarding and can bring great satisfaction to a graduate student. Moments of discovering new knowledge can be just as exhilarating to a researcher as seeing a student’s eyes light up when he/she first understands a new concept is to a teacher. Even though research does require the use of systematic methods and

procedures, it is not a dull, routine, cut-and-dried process. Research has its full share of human virtues and limitations. It involves judgments and even allows for the researcher's personal interest, personality, and style (National Academy Press, 1989).

Clearly, no single agenda can apply to the rich diversity of graduate students in agricultural education, nor should it. Yet, the need for focused research is evident. The purpose of this article was to help focus research by graduate students in agricultural education. The thoughts presented were intended to provoke discussions among graduate students and their mentors and to guide individualized action by graduate students. The plan presented included the following points: (1) assess professional experiences, (2) understand the discipline, (3) review trends and priorities, (4) study the requirements of positions, (5) identify mentors, (6) build a theoretical base, (7) practice good science, and (8) become a scholar. Action on these points has career-long implications for aspiring scholars in agricultural education.

References

- AAAE Ad Hoc Committee. (1996). A professional paradigm for research and scholarship in agricultural education. A draft monograph presented at the AAAE Business Meeting, December 7, 1996. Cincinnati, OH.
- Bar-rick, R. K. (1989). Agricultural education: building upon our roots. Journal of Agricultural Education. 30(4), 24-29.
- Boyer, E. L., (1990). Scholarship reconsidered: priorities of the professoriate. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.
- Braben, D. (1994). To be a scientist. New York: Oxford University Press.
- Buriak, P. & Shinn, G. C. (1989). Mission, initiative, and obstacles to research in agricultural education: a national Delphi using external decision makers. The Journal of Agricultural Education, 30(4), 14-23.
- Buriak, P. & Shinn, G. C. (1993). Structuring research in agricultural education: a national Delphi involving internal experts. Journal of Agricultural Education. 34(2), 31-36.
- Cano, J., Hall, D., & Martin, R. A. (1994). Establishing a productive research/development program. In Professional development of young members. An American Association for Agricultural Education Monograph.
- ESCOPE and CSREES Report. (1995). Framing: the future: strategic framework for a system of partnership. Urbana, IL: University of Illinois Cooperative Extension Service.
- Gall, M. D., Borg, W. R., & Gall, J. P. (1996). Educational research: an introduction. White Plains, N. Y.: Longman Publishers.
- Holmes Group. (1990). Tomorrow's schools: principles for the design of professional development schools. East Lansing, MI.
- Holmes Group. (1995). Tomorrow's schools of education. East Lansing, MI.
- Leopold Center for Sustainable Agriculture. (1994). 1994 annual report. Ames, IA.
- Heydinger, R. B. & Simsek, H. (1992). An agenda for reshaping faculty productivity. Denver, CO: Education Commission of the States.
- McCracken, J. D. (1983). A profession in need of academicians. The Journal of the American Association of Teacher Educators in Agriculture, 24(1), 2-12.

National Academy Press. (1989). On being a scientist. Washington, DC: National Academy of Sciences.

National Board for Professional Teaching Standards. (1996). (Draft) Standards for national board certification. Washington, DC.

Newcomb, L. H. (1993). Transforming university programs of agricultural education. Journal of Agricultural Education. 34(1), 1-10.

North Central Regional Association of State Agricultural Experiment Stations. (1996). Establishing: priorities for regional research: the processes, Madison WI: Office of the Executive Director North Central Regional Association of State Agricultural Experiment Station Directors, University of Wisconsin.

Radhakrishna, R. B., Eaton, D., Conroy, C. and Jackson, G. (1994). An empirical analysis of the literature cited in the Journal of Agriculture Education. The Journal of Agricultural Education. 35(1), 61-65.

Sindermann, C. J. (1985). The joy of science: excellence and its rewards. New York: Plenum Press.

U. S. Department of Agriculture. (1994). Opportunities to meet changing needs. Washington, DC.

Warmbrod, J. R. (1986). Priorities for continuing progress in research in agricultural education. A paper presented at the 35th Annual Southern Region Research Conference in Agricultural Education. March. North Little Rock, AR.

Williams, D. L. (1991a). Focusing agricultural education research: strategies for the discipline. The Journal of Agricultural Education. 32(1), 7-12.

Williams, D. L. (1991b). Focusing agricultural education research: strategies for the professor. The Journal of Agricultural Education. 32(3), 17-22.