

A PHILOSOPHICAL FRAMEWORK FOR AGRICULTURAL EDUCATION RESEARCH

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Abstract

The philosophy of science is examined to define the boundaries of research in agricultural education. The philosophies underlying research, the knowledge desired to be produced, and the kinds of research to be conducted are examined. This article is framed by the interest a researcher has in the production of knowledge. Methods of providing better communication with other agricultural researchers will be considered. A challenge is provided to graduate programs preparing future researchers for agricultural education.

Introduction

The heart of this article will feature the concepts of knowing and understanding; highlighted in the discussion will be to know more through research. Ray (1987) wrote that research is not a process of proving something but a process of discovering and learning; we may see problem solving, thinking, learning, research and discovery as one and the same process because each leads to more knowledge. Krathwohl (1985) noted that research will not always result in the ultimate goal of to know with certainty but as progressing down the road to knowing. That is, research moves toward the solutions to problems, but does not always solve the problem. Röling (1974) wrote that social science research is not geared to make conclusion (generalizations) but as decisions, a formula for action. Warmbrod (1993a) called for researchers to understand and know. Therefore, research is more a process of evolution than revolution and seeks to understand as well as know.

Agricultural Educators Compared to Experimental Researchers

Discipline-specific, basic agricultural research programs are needed and will continue. This article is not an attack upon the research in the agricultural disciplines. However, agricultural educators must think

beyond discipline-specific research, and relate to subject matter research or problem solving research (Johnson, 1986). Bonner (1986) reported that land grant universities undervalue subject matter and problem-solving research as compared to discipline-specific research. Enarson (1989) argued that the research university and the land grant mission may be incompatible. Research in agricultural education will not emanate from biotechnology, big-science, or macroeconomics but from our concerns about people, and could perhaps be termed as being conducted for "social good." Many departments are now comprised of several disciplines: agricultural education, Extension, leadership and/or communication. For the sake of brevity, the term "agricultural education" will be used to represent all of these disciplines.

Agricultural researchers and research administrators do not clearly understand or acknowledge the knowledge base of these disciplines. Agricultural education research tends to be toward the "soft" on a "soft-hard" continuum, and toward the "applied" on an "applied-basic" continuum. Warmbrod (1993b), quoting from Buriak and Shinn (1989), stated that research station directors perceived that:

Agricultural education research is "soft," does not have clearly defined objectives or hypothesis, lacks focus and rigor, is

not programmatic, and is not sufficiently funded. It is conducted by persons with weak training in research methodology who (1) cannot identify important research problems, (2) do not value research endeavors, (3) conduct research for promotion and tenure rather than for its importance and utility, and (4) have a limited amount of time assigned for research (pp. 14-23).

Given this low opinion of agricultural education research by experiment station directors, one would hardly be surprised if other agricultural colleagues would have similar views. These colleagues have a conception of what constitutes good research, and agricultural education research does not fit their concept. Their definition of research is based on their education and experience and they believe research is synonymous with experiments; and, as in positivistic research, all research must be driven by hypotheses. Agricultural researchers perceive that they "know" research! After all, they have been doing research throughout their professional careers, they learned from their mentors, and they are well-published, discipline-specific researchers – they know how to do experimental research. The problem with agricultural education

research is not always poor quality; the problem may be the lens through which agricultural researchers view the standards for quality research. Their lens is "positivistic," and has a discipline-specific focus.

Foundations from Philosophy of Science

Consider this problem from the perspective of "knowing" and the philosophy of science. Habermas (1972) proposed that what drives research is the specific interest a researcher has in the knowledge and that those interests take several forms. Oliga (1988) summarized the basic elements of Habermas' Interest Constitution Theory (Table 1) and noted that the three different knowledge types implied different methodological approaches -- namely, empirical, hermeneutic and critical methodologies. Table 1 can help one understand the position of agricultural educators relative to other agricultural disciplines populated by "empiricists" or "positivistic" researchers. The experimental researcher wants to produce "laws," the interpretive researcher wants to reach "consensus and meaning," and the critical scientist wants to achieve "emancipation" through reasoned choice.

Table 1. *Habermas' Interest Constitution Theory Diagrammed*

Knowledge (interest)	Basis of human interest	Type of interaction	Underlying paradigm	Method of approach
Technical (control)	Labor	Man -- Nature	Functionalist (Experimental)	Empiricism (Positivism)
Practical (understanding)	Communicative interaction	Man -- Man	Interpretative	Hermeneutics
Emancipatory (freedom)	Authority (power)	Man – Self [<i>sic</i>]	Radical/Critical	Critique

Van Manen (1977) noted that each of the three forms of inquiry is distinctive in terms of (a) its way of looking at people and society, (b) the form of knowledge it produces, (c) its logic in use, (d) its methodologies and techniques, and (e) the

use to which the knowledge can be put. Wardlow (1989) and Copa (1984) stated that most of agricultural education research has been positivistic, but many of our problems are too complex for just one mode of inquiry. In agricultural education, where are

the discoveries or patents? There are none! Our interests are primarily in interpretive and critical science. Yet, most of our preparation has been in learning to conduct empirical research. Our methods must be broadened and each interest area represented in departmental faculty. Broader interest-area-representation can be achieved by carefully selecting new faculty with prerequisite skills or through professional development of existing faculty.

Quantitative research achieves added clarity by examining research according to its purpose (Selltiz, Wrightman, & Cook, 1976). Their model addressed the purposes of the researcher in conducting the inquiry and Table 2 presents this cogent perspective. This model illustrates that quantitative research can be organized, by purpose, as studies that explore and describe “what is” (typically surveys), explain and predict phenomena (typically relational research -- correlational or *ex post facto*), and *control* (experimental research). To advance

knowledge in a discipline, to explore and describe “what is” is often important. At other times, researchers may wish to explain and predict phenomena. Researchers also wish to control – to do experimental research – but that is not the only way of knowing as some would propose. When dealing with people, control of the independent variable, manipulation (random assignment of experimental units – people -- to levels of the independent variable) is usually not feasible and often unethical. One purpose (or type) of research does not produce knowledge that is more important than another purpose of research. The accumulation of knowledge in a discipline necessitates that all types of research be conducted. Experiments and *ex post facto* studies are driven by hypothesis but correlational and survey research are most often directed by research questions or objectives. Thus, hypotheses are not sacrosanct to all research!

Table 2. *Purposes of Quantitative Research*

Explore/Describe	Explain/Predict	Control
To portray accurately the incidence, distribution and characteristics of a group or situation.	To investigate functional relationships among characteristics or variables.	To test causal relationships.
Surveys	Relational/Associational Research: Correlational or <i>Ex post facto</i>	Experimental Research: True/Pure and Quasi

Functionalists — Man Attempting to Examine Nature [*sic*]

The methodological approaches of empiricists (those who desire to *control*) are used to produce objective knowledge that is independent of the researcher, and replicable in other settings. The knowledge also has value freedom in that it is ethically neutral. The knowledge or “discoveries” produced add to the knowledge base in a discipline or, as in the case of hard systems methods, such as engineering, provide technology that produces increased output or more efficient systems of doing things. The philosophy

underlying this purpose is positivism. The premise of positivism is that science alone represents a genuine form of human knowledge, and many researchers further believe that any other form of science is non-science and produces pseudo-knowledge or even cognitive meaninglessness or nonsense (Keat, 1981). Popper (1959) argued that while science could be distinguished from non-science this did not imply an equivalent distinction between sense and nonsense. The second doctrine of positivism posits that knowledge is the explanation and prediction of observable phenomena through the

demonstration that such phenomena constitute instances of universal laws that remain invariable in all regions of space and time (Olga, 1988). While science-politics seeks to "scientize" ends, the doctrine of value freedom opposes this, seeking instead a sharp distinction between means and ends, fact and value, science and politics. Keat pointed out that political issues or moral judgments cannot be justified solely by means of knowledge produced by experimentation. Eisner (1992) explained that positivists believe research is that:

which separates value from fact, that embraces methodological monism, that rests on a foundationalist view of knowledge, that possesses a particular conception of meaning, that regards ethical claims as meaningless utterances, that believes science to be the sole source of knowledge that seeks to explain "reality" through an appeal to universal laws and that regards measurement as the quintessential means through which reality whatever it may be, can be represented (pp. 8-9).

**Interpretative (Practical Understanding)
– Man Understanding Man [*sic*]**

The methodology of hermeneutics, or interpretative science, includes the "naturalistic," "hermeneutics as method," and "historical-hermeneutics." Olga (1988) wrote that the naturalistic perspective seeks to explain how social order, as phenomena, emerges from social action and interaction processes, from which shared meaning in turn emerges. Interpretative science takes several forms. Ethnomethodology seeks to explain how people employ various cognitive resources to order and make sense of their everyday activities and make some activities accountable to others. Existentialism is concerned with the central lived qualities of individual human existence and seeks to understand the individual "life-world" from the point of view of those involved, using constructs and explanations that are intelligible in terms of common-sense interpretations of everyday life. A belief of hermeneutics is that social reality is

distinctive in character and contains a component missing from natural phenomena; they require a mode of analysis different from that of mere experimentation (Olga). Lakes (1993) suggested that interpretative science would liberalize a discipline by presenting the field with socio-cultural understandings of human relations (Lewis, 1990).

Jax (1984) related that interpretive science was conducted to interpret and give meaning to a given situation and that to provide broad generalizations to a larger population was not the intent. The researcher takes on the role of the people or group studied and attempts to understand the context of the situation within the framework of the participants. Van Manen (1975) stated the purpose was to understand the ways people subjectively experience life and the world, and Geertz (1973) called for "thick description" that was interpreted as a search for meaning and not laws. Each of these may be highly important in improving the quality of life of people. These studies often see hypotheses emerge from the investigation, but are driven by research questions or objectives, and their outcome is often "problem-fixing" (identification) instead of problem solving. Agricultural education has had few interpretive researchers and those operating in this paradigm may have experienced difficulty in gaining acceptance among peers.

**Radical/Critical (Emancipatory) – Man
Understanding Self [*sic*]**

Critique, or critical hermeneutics, is an attempt to mediate the objectivity of historical processes with the motives of those acting within them; the aim being the freeing of emancipatory potential. The approach seeks to remove barriers to understanding that may be operative, without the individual or groups concerned being aware of them: a critique of ideology (Bleicher, 1980). The task is to render individual and social processes transparent to the people involved so that they can pursue their further development with consciousness and will rather than remaining the end product of a causal chain

operative behind their backs (Olga, 1988). Habermas (1972) noted that tradition, as a context that includes work and domination, enables as well as restricts the parameters within which we define our needs and interact in order to satisfy them. Such research interests are, thus, driven by the desire to "emancipate" people. Lakes (1992) suggested that the critical theory approach would democratize groups by affirming the contributions of social movements. Freire (1987), referring to the purpose of Extension in agriculture, stated that the clients become objects of persuasion which renders them more susceptible to propaganda, but this cannot happen if they have the alternative option of liberalization (emancipation), i.e., if they are critically aware of their situation, and then they can act on it. He noted, referring to the real work of Extension educators, their task is communication, not extension.

Coomer (1984) related that critical science is conducted to address normative and value questions. She noted that such research is conducted to reduce frustrations experienced by people as they attempt to deal with technical and political controls (e.g., EPA, USDA) or regulations; for example, the frustrations being felt and expressed by people about rural/urban interface issues. Critical scientists are needed to contribute to the resolution of these problems. Again, these researchers' potential contributions may not be valued by traditional "positivistic/experimental" researchers. Likewise, our discipline has not been welcoming to critical researchers; yet, the underlying purpose of our educational efforts is often in creating emancipatory potential.

Habermas (1973) provided a definition of "critical" as the potential people have for self-reflection and self-determination in a social structure where the institutions (family, government, education) appear to acquire an invisible compulsion of their own and become a part of the individual's view of what is real, i.e., institutions merge with nature: what is real, what exists, and what is not likely to change. New knowledge would address whether or not these institutions are appropriate and, because they are

operationalized by people, they can be studied and changed. Such research really asks whether or not these existing norms are absolute, i.e., contrasts the way things are with the way things could or should be. Land-grant university faculty should remember a goal has always been to prepare people to achieve self-determination, self-realization and self-integration (Broudy, 1962).

Kinds of Research Knowledge Sought

Johnson (1986) and (Miller, 1989) presented a view of research that had an integrative perspective. Their discussions of the interrelationships among the kinds of research conducted, the philosophies used, and the kinds of knowledge generated helps one understand the differences in the orientation of researchers. The kinds of research were disciplinary, subject matter and problem solving. The kinds of underlying philosophical orientations were logical positivistic (reductionism), normative, and pragmatic. The kinds of knowledge produced were described as positivistic, normative (about values) and normative prescriptive. One can expand this terminology and borrow from the Greeks, who described the impulses behind science as *scientia*, *techni*, and *praxis* (Table 3). *Scientia* was the drive to know and find out how and why the world is as it is, and has led to the reductionism idea that to understand a problem, researchers break it down into small bits, i.e., Descartes' second theorem (Pritchard, 1968) provided the impetus for the scientific method and can be summarized as to divide each of the difficulties into as many parts as might be possible and necessary in order to solve it. This principle of analytical reduction has characterized the Western research tradition (Checkland, 1981), and, thus, has evolved into the way researchers think about doing science and some would say constitutes the most celebrated proposition in the history of humankind. The *techni* component is our drive to do things better; to achieve practical ends. This component is the basis of research in areas like engineering, management, systems analysis,

economics, and the process-product research in education as described by Gage (1989). The *praxis* component is our desire to transform the direct experiences of people, places, events and things, and is essentially experiential in nature. This component is based on certain issues and situations that cannot be

unequivocally described, is unstructured and subject to continuous change and dependent on the perceptions of the individuals or groups. Much of social and behavioral science research has evolved as a result of this impetus. Reductionism (*scientia*) is often non-productive to address this component.

Table 3. *Some Distinctions among Research and Educational Traditions*

Tradition	<i>Scientia</i>	<i>Techni</i>	<i>Praxis</i>
Focus	Learning for Knowing	Learning for Doing	Learning for Being
Knowledge Produced	Propositional	Practical	Experiential
Structure	Disciplines	Crafts	Issues
Teaching Style	Exposition	Demonstration	Facilitation
Teacher Role	Expert on subject	Master of craft	Co-learning collaborator
Teaching Strategy	Lectures on propositions	Demonstrations and "hands-on"	Practicum & internship
Basic Philosophy	Positivism	Utilitarian (Pragmatic)	Constructivism
Research Style	Basic (Experimental)	Applied (Developmental)	Action (Participative)
Research Goal	Abstract general knowledge	Solutions to work place problems	Local theory and action for change
Researcher Role	Producer of knowledge	Solver of technical problems	Co-creator of situation improvements

Burkhardt (2001) and Burkhardt and Schoenfeld (2003) relabeled these in more modern terms as the *scientia* being science research, the *techni* being engineering research and the *praxis* being humanities research. They noted that science research is done to understand how the world works, engineering research is done to help the world work better, and humanities research

is done to add new insights without empirical tests.

Disciplinary research is that research designed to improve a discipline and may be of known or unknown relevance for immediate practical problems. The researcher is often very much positivistic in philosophy and is most often seeking positivistic knowledge, i.e., *scientia*:

reductionism or science research. Subject matter research is multidisciplinary research on a subject of interest to a set of decision makers facing a set of practical problems. Problem solving research is designed to solve a specific problem for a specific decision maker (Johnson, 1986).

The kinds of knowledge sought by the researcher presents another perspective on research. The reductionists most often seek positivistic knowledge: discovery, fact, principle or law. This is synthetic knowledge that deals with characteristics of conditions, situations or things in the real world (Johnson, 1986). When researchers want to know about the goodness/badness of conditions, situations or things; they pursue knowledge of values. Prescriptive knowledge deals with rightness/wrongness - what ought to be or what ought to be done, in the future tense; or what should not have been done in the past tense.

The philosophical orientation of researchers dictates, to a large extent, how they view a problem: their *weltanschauungen* (world view or world image). Normativism is a collection of philosophies addressing value, goodness/badness and rightness and wrongness and generally result in prescriptive knowledge about what would be the best thing to do. Pragmatic philosophy is familiar to all vocational educators who have studied John Dewey. Runes (1961) noted that pragmatism is always a doctrine of meaning. Copa (1984) reaffirmed this contention about "meaning" when he stated that the three categories of questions to be addressed by agricultural education researchers are: (1) meaning, (2) ends, and (3) ways and means. Pragmatists believe that the hypothesis that "works" is the "true" one (Runes, 1961). William James [1907 (1955)] noted that pragmatic philosophy implies an attitude of looking away from first things, principles, categories, and supposed necessities; and to looking toward last things: fruits, consequences, facts.

Conflicts

With this backdrop from philosophy, ascertaining why some researchers in

agricultural education have difficulty in communicating about their research is clearer. Our traditions, our philosophies, and our learning related to research methods are couched in the quantitative method, but the issues about the kinds of knowledge to be produced and the kinds of research to conduct is seldom addressed. Further, agricultural educators most often seek knowledge that results in practical understanding and our interest is most often in communicative interaction or emancipation. Agricultural education researchers seldom are trying to investigate the Man-Nature dialectic, but are concerned about the Man-Man and/or Man-Self [*sic*].

The vocabulary used by agricultural educators will not always clearly communicate with those from the positivistic paradigm. How is the "quality of a proposal" judged? Judgments of quality are couched in the philosophy of the evaluator and the preponderance of the faculty members in agriculture are positivists. The standards they use to judge quality will not be appropriate for most agricultural education research. Simply stated, two important questions related to judging the quality of research are: (1) So what? (Importance) and (2) Are the methods appropriate? Could an agricultural educator judge the quality for a study of "Development of a Novel Metagenesis System for Identification of Virulence-Associated Genes in *Campylobacter jejuni*?" The answer is no! Could the director of this titled study assess these questions as related to a study in agricultural education? The answer again is probably "no."

The Quantitative/Qualitative and Other Debates

Another misunderstanding-problem arises as a debate/war between quantitative/qualitative paradigms. Most agricultural education research is quantitative. Yet, qualitative research has value and includes interpretive and critical inquiry. Schmidt (1992) recognized that qualitative studies are valid and useful to increase knowledge in a discipline and believed that a wealth of information could

be gathered through qualitative methods. Hillison (1990) advocated qualitative research as a way to nuance cultural factors that usually are controlled by the clinical trial. Lewis (1990) believed critical theory's approach to research reveals ideological distortions. For instance, by stating that education is burdened with the inherent dilemma of a capitalistic society, he illustrates the contradictions between economic efficiency and social equity -- assumptions about social reality that do not enter into the positivistic paradigm. Lakes (1993) also noted that others (Gregson, 1992; Rehm, 1989) have written that critical theory is valuable in constructing an emancipatory pedagogy.

Another debate can be framed by those comparing hard to soft science. Positivists propose that they are hard scientists. They deem any other way of knowing as soft science, implying that such research is of some lesser quality than theirs. The soft sciences of interpretation and critique add to understanding. For educators, positivistic research (Lakes, 1993; Garrison, 1989; Wirth, 1983) upholds rationalistic premises upon which historic industrial practices and labor-management relationships are conducted. Critical theories of feminism, Freirean pedagogy, and neo-Marxism, for instance, attempt to illuminate ideologically-

frozen assumptions embedded in normative cultural practices that promote racism, classism, and sexism in work and labor (Lakes, 1993). The critical theory paradigm is openly ideological and advocacy-based research (Lather, 1991). Swanson (1991) observed that thinking in agriculture tends to be for one way of doing things and implied that it is time that other ways of knowing be considered, and others have noted similar concerns (Lewis, 1990; Oakes, 1986; Matthews & Campbell, 1983; Copa & Smith, 1983; Pratzner, 1985; Ertel & Neveu, 1987). Lather (1991) (Table 4) in describing post-positivistic (qualitative) inquiry, also adds a perspective which might prove helpful in clarifying these ideas. From this perspective, the reader can see that when researchers wish to understand what is occurring in schools or communities, and then to communicate such knowledge to experimental researchers difficulty will arise when the receivers are knowledgeable of only the positivistic traditions and methods. Schön (1983) stated that in the United States, more than any other country, except Germany, the very heart of the university was given over to the scientific enterprise, to the ethos of the Technological Program and to Positivism.

Table 4. *Inquiry Purpose by Type*

Predict	Understand	Emancipate	Deconstruct
Positivism	Interpretative Naturalistic Constructivist Phenomenological Hermeneutic	Critical Neo-Marxist Feminist Praxis-oriented Educative Freirean participatory Action research	Poststructural Postmodern Post-paradigmatic diaspora

Most of the research that agricultural educators should be doing is not positivistic. Krebs (1976) challenged agricultural educators, nearly 30 years ago, to conduct more theoretical, programmatic research. The goals of agricultural education researchers may not be problem solving but "problem setting" (problem identification, or

problem specification). Such an approach is often an appropriate one, because in many cases what is needed is prescriptive, how-to, knowledge for understanding (Miller, 1989). Improving practice might be achieved by simply providing good, solid descriptions of program activities and outcomes. Schön (1983) pointed out the sense of unease and

confusion that emerges among people who deal with new ideas. He noted that such professionals are most at ease in decision making when they can model established techniques and processes they have learned to apply to recurrent problems. However, he explained, social reality has shifted from the nineteenth-century division of labor, creating new zones of complexity and uncertainty, and created messy problems. Professional practice has at least as much to do with finding the problem as with solving the problem found.

A Perspective on our Future Agenda

The nature of a research program in agricultural education may be problem setting instead of problem solving. Problem setting is a process in which, interactively, researchers name the things to which they will attend, and frame the context in which they will attend to them (Schön, 1983). Positivism and technical rationality depends upon agreements about ends, but when ends are confused and conflicting, there is, as of yet, no problem to solve, because one has to make sense of situations that initially make no sense. Positivists tend to see science, after the fact, as a body of established propositions derived from research (ends/products), but when their limited utility in practice is recognized then a dilemma of rigor or relevance is experienced.

Most agricultural research will always be discipline-specific, and conducted by positivistic researchers. Researchers in agricultural education must become better able to articulate their possible contributions to the research missions of a college and communicate clearly and persuasively. Likewise, federal and state agricultural research administrators must look at their professional practice/philosophy and be ready to bolt from the traditional, the archaic, and consider new ways of knowing and the importance of problem setting and pragmatic inquiry -- make systemic change. They, too, must learn to seek out the social science researcher and understand why they must do so! They must learn about other ways of knowing in order to address the messy problems of today.

Implications for Curricula and Professional Development

Considerations of other approaches to inquiry beyond the traditional positivistic approach are not often included in the graduate programs preparing future agricultural education researchers. Should future agricultural education researchers be prepared so that they have an appreciation for and understanding of other ways of knowing and understanding? One could purport the answer is "yes" as their future research may be interdisciplinary and employ multiple-methods. Students receiving graduate degrees and wishing to enter academia should have a broader view of the ways of knowing. A new preparation model will benefit them when they are working in interdisciplinary programs or projects; they will not find either their philosophy or understanding lacking. Further, current faculty and administrators should broaden their perspectives of research paradigms by participating in training programs to enhance their world view and increase their appreciation for the contributions that interpretive and critical science can make. Change is not an event, but a process. The process must begin.

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