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AN ASSESSMENT OF SELECTED ATTITUDINAL CHANGES AMONG UNDERGRADUATES IN THE KELLOGG RURAL RESOURCES EDUCATION PILOT PROGRAM

By

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ABSTRACT

AN ASSESSMENT OF SELECTED ATTITUDINAL CHANGES AMONG UNDERGRADUATES IN THE KELLOGG RURAL RESOURCES EDUCATION PILOT PROGRAM

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The problem based on the review of related literature and rersearch indicated the following: (1) Land Grant Universities were seeking to adopt more broadly based curricula; (2) instructional strategies were needed which provided greater awareness of career opportunities in the agriculture and natural resources industry; and (3) more integration was needed between classroom theory and field laboratory experience for undergraduate agricultural majors.

The problem objectives included the following: (1) to provide field-based educational experiences to complement abstract theoretical study; (2) to provide an introduction into the interrelationships between managed agriculture systems and natual systems; and (3) to provide field study and field work to meet the backgrounds and career goals of nonfarm students.

The purpose of the study was to assess attitudinal changes among sixteen undergraduates enrolled in the pilot program. The demographic variables included: minority status, gender, place of residence and agriculture major.

The attitudes assessed were interdisciplinary thinking, experiential education and career opportunity. The resulting baseline information would be used for future research about the demographic patterns of undergraduate participants.

The methodology included a one group pretest/posttest design. A stratified sample of the sixteen undergraduates was used. Data for the study were collected through an attitudinal questionnaire and a structured open-ended interview schedule. Anecdotal reports and participant observation were used to collect data on the instructional process in relation to undergraduate attitudinal change.

An analyses of pretest and posttest mean scores were computed from the questionnaire data. The pre and post open-ended interview responses were categorized through content analysis. Percentage analyses were conducted on these response patterns. Verbal interactive processes relating to the attitudes of the study were described and interpreted.

In conclusion, the greatest attitudinal change ocurred in interdisciplinary thinking. Minority, large city, female and agricultural production undergraduates changed the most. While nonfarm students asked more critical question, not all nonfarm students developed positive attitudes about production agriculture.

Recommendations included: (1) replication of the study with program saff conducting evaluation measures; (2)

develop inservice workshops to improve attitudinal evaluation; (3) provide more individual skill training; (4) provide strategies to deploy undergraduate resource persons; and (5) development of follow-up studies.

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CHAPTER I

INTRODUCTION

The Kellogg Biological Station Undergraduate Rural Resources Education Pilot Program provided the basis for exploring the attitudinal changes of undergraduates involved in a program of interdisciplinary courses; applied skill training; and career and leadership development activities. Increasing the knowledge base on changes in attitudes about interdisciplinary thinking, experiential education, and career opportunity will be helpful in answering the larger more general question regarding the effectiveness of integrated higher education programs in agriculture and natural resources. It would be particularly important in respect to students with nonfarm backgrounds and those students limited to speciality farm backgrounds. Moreover, it is important to assess the attitudinal changes among these categories of students who would assume primary leadership roles in moving towards the development of a sustainable agriculture as we reach the 21st Century.

Several Land Grant Universities have conducted expanded experiential education programs for undergraduates in the colleges of agriculture and natural resources. Yet, very few have utilized a pre-post study design to assess attitudinal changes among undergraduate participants. A major purpose of this study was to assess the program process and the instructional strategies which impacted on the attitudinal changes of undergraduate participants. This information would serve as a nucleus for which further research could be conducted and as a basis for improving agriculture and natural resources education programs. This information can provide a basis for improving agriculture and natural resources education programs.

Description of the Kellogg Biological Station Undergraduate Rural Resources Education Pilot Program

The pilot program for undergraduates in agriculture and allied fields was established by Michigan State University. The program was financed by a five year grant from the W.K. Kellogg Foundation and was known as the Kellogg Biological Station (KBS) Undergraduate Rural Resources Education Program. The program started with 16 students in residence at the KBS site, about 70 miles from the main campus, during the fall term 1984. It was expected that approximately 40 students would participate in each subsequent spring and fall terms. Each term was 10 weeks in duration.

The program was designed to develop future leaders through an introduction to agriculture and natural resources systems. The goal was to provide a broad, intergrated and meaningful framework at an early stage of training upon which more disciplinary focused courses could be superimposed throughout the student's Bachelor degree program. Another goal was to assist the student in clarifying and identifying career interests.

A course of study was designed by a faculty group to provide a philosophical framework that transcended traditional views and approaches of instruction in agriculture and natural resources. It was felt that hands-on activities would make educational experiences more effective and interactive. The curriculum had been developed to meet the needs of a broad student body having divergent career orientations. Such a curriculum provided an opportunity to bridge differences in closely allied fields. The instructional strategies included lecture, small group discussion, laboratory practicums and field trips.

The course content included basic coverage of crop and soil sciences, animal science, farm management, agricultural mechanics, forestry, natural resources, resource management, computer applications and programming, and leadership development. A KBS Student Club was established and organized around a series of committees including a leadership committee, a promotional committee, a savings and earnings committee, and a social committee. The club meetings were conducted democratically, and they were based on the parliamentary procedures patterned after the Future Farmers of America student organization.

Thus, the more specialized aspects of agriculture were integrated along with the introductory concepts of social interactions. The resources and facilities at KBS provided an opportunity to integrate coursework in a manner that was limited at the campus setting.

The program staff which provided the planning, implementation, coordination and specified areas of instruction included a program coordinator, lead instructor, curriculum assistant, an agricultural engineering laboratory instructor and animal science laboratory instructor. Most of the resource persons were Michigan State University faculty members, but several outside resource people such as farmers and Agricultural Extension workers made presentations to the participants. There also were presentations in the form of a lecture or discussion or practicums provided by various resource people at the KBS site. They were directors, supervisors or technicians who were employed at KBS and provided learning activites at the recently completed Dairy Center, the Farm learning Center, the Forest and the Bird Sanctuary.

The basic curriculum and time allocation of the KBS Undergraduate Rural Resources Education Pilot Program are presented in Tables One and Two. In addition, Table Two describes how these hours were structured. For a more complete account of the curriculum and instructional activity schedule of the pilot program see Appendix A.

The data in Table Two show that each student was

TABLE 1

Resident Study Curriculum and Instructional Activities for the Period September, 1984 - December, 1984

Topics	Classroom lect./sm. groups	Laboratory pract./chores	field trips	TOTAL HOURS
Forestry	12 hours	9 hours	3 hours	24
Animal Science	18 hours	15 hours	10 hours	43
Horticulture	6 hours	4 hours	1.5 hours	11.5
Crops and Soil Science	9.5 hours	11.5 hours	3 hours	24
Agricultural Engineering	15.5 hours	33.25 hours	-------	48.75
Parks and Recreation	6 hours	3 hours	3 hours	12
Resource Development	8 hours	3 hours	9 hours	20
Agricultural Economics	6 hours	1.5 hours	-------	7.5
Entomology	1.5 hours	1.5 hours	-------	3
Agricultural Education	3 hours	---------	-------	3
Waste Treatment	------------	---------	5 hours	5
Leadership Development	26 hours	5.5 hours	-------	31.5
Computer Science	18.75 hours	13.75 hours	-------	32.5
TOTALS	142.25 hours	116.5 hours	34.5 hours	293.25

TABLE 2

Student Hours per Week

Courses	Lecture and Small groups	Practicum and Chores	Field Trips	TOTAL HOURS
* ANR 200, 201 nine credits	9.8 hours	9.7 hours	3.5 hours	23
** Leadership Dev. three credits	2.7 hours	0.5 hours	-------	3.2
*** Computer Science three credits	1.9 hours	1.4 hours	-------	3.3
Totals	14.4 hours	11.6 hours	3.5 hours	29.5

* ANR 200 and 201 included all the agricultural and natural resources topics found in table one, not including Leadership Development or Computer Science.

** Leadership Development included personal, professional, and career development.

*** Computer Science included basic programming skills, and applications to farm enterprise and resource development planning.

enrolled in ANR 200 and 201, leadership development and computer science for a total of fifteen credits; practicums and chores included maintenance and construction activities. Each participant was scheduled for a minimum number of hours of chores and maintenance activities. Chores would include such activites as milking cows, feeding animals, constructing lambing pens and constructing cement slabs for farrowing pens. All students were assigned to learning teams to facilitate cooperative work effort among them.

Kellogg Biological Station Undergraduate Rural Resources Pilot Program Objectives

The researcher reviewed the original W.K. Kellogg Foundation proposal ("Rural Resources",1980) to identify the objectives of the program. The following objectives were identified:

1. To provide field-based educational experiences in a realistic framework to complement otherwise abstract theoretical study.
2. To provide an introduction to agriculture and natural resource systems and functional interrelationships of managed and natural systems.
3. To provide courses and workshops to meet the

particular backgrounds and career goals of nonfarm students.

Purpose of the Study

The main purpose of the study was to assess attitudinal changes among undergraduates enrolled in the KBS Rural Resources Education Pilot Program. The major thrust of this assessment was centered on the undergraduates' changes in attitudes about interdisciplinary thinking, experiential education, and career opportunities as they participated in the instructional activities at the KBS site. It is the researcher's feeling that this information would be utilized as a baseline study for future interpretation about patterns that may develop among different groups of undergraduates participating in the subsequent terms of the KBS program.

Need for the Study

There was a need for the clarification of curricula among administrators and faculty at Land Grant Universities today. Policy choices range from supporting specialized or differentiated curricula to supporting holistic or interdisciplinary curricula, or even to integrate both conepts in the curricula. However, at what mixture will specialized and holistic curricula optimize the learning outcomes of Agriculture majors. Despite substantial adaptions in the philosophy and mission of Land Grant Universities, the curricula has not substantially changed. Russell K. Mawby (1976, p.2) President of the W.K. Kellogg Foundation had observed:

> The colleges of agriculture have narrowed their scope of concerns to an almost exclusive preoccupation now with agricultural production ... with lesser concern for problems of the family of health care delivery, of social institutions and services of education.

Future agriculture and natural resources leaders will need analytic abilities to intergrate knowledge, both empirical and theoretical, that extend insights into man/environment systems (Morrison, 1974).

The requirements for a career in agriculture and natural resources continues to shift. As reported in Agriculture 2000, A Look at the Future (Production Credit Association, 1983) greater demands will be placed on graduates to become not only skilled technical managers, but they must become leaders highly skilled in the management of human relations. For example, plant breeders working for seed companies must have good interpersonal skills so that they can talk one-on-one with farmers about their problems (Production Credit Association, 1983). Knowledge about the attitudes of undergraduates in colleges of agriculture and natural resources could assist program planners to identify and direct curricula toward human relation skills.

The demographic backgrounds of today's agriculture and natural resources undergraduates are distinct from those of the past decade. Over half are now now female. Several years ago less than 50% of the undergraduates majoring in dairy science at Michigan State University had any substantial dairy farm background. Twenty-five percent of the undergraduates at the time of the study had no farm background. Traditional formal classroom learning is inadequate to provide farm experiences necessary to perform effectively in agriculture related employment ("Rural Resources", 1980). There was a need, then, for a study which analyzed changes in attitudes among nonfarm undergraduates through a program of directed form production experiences.

Finally, there was a need for an evaluation study using both quantitative and qualitative evaluation methods to assess the attitudinal changes among different categories of undergraduates in the KBS Undergraduate Rural Resource Education Pilot program. Quantitative methods include the techniques of randomized experiments, quasi experiments, paper and pencil objective tests, multivariate statistical analysis and sample surveys. In contrast, qualitative methods include ethnography, case studies, in-depth interviews and participant observation (Reichardt and Cook, 1978). When used together the two methods can build upon each other to offer insight that neither method could alone provide (Reichardt and Charles, 1978). The utilization of qualitative methods permits the researcher to understand the attitudes about Interdisciplinary Thinking during the one-term program interval, and if changes did occur, to determine if the changes were associated with participation in the KBS Undergraduate Rural Resources Education Pilot Program.

2. To determine if undergraduate subjects changed attitudes about Experiential Education during the one-term program interval, and if changes did occur, to determine if the changes were associated with participation in the KBS Undergraduate Rural Resources Education Pilot Program.

3. To determine if undergraduate subjects changed attitudes about Career Opportunity during the one-term program interval, and if changes did occur, to determine if the changes were associated with the participation in the KBS Undergraduate Rural Resources Education Pilot Program.

4. To determine if changes in the attitudes of undergraduate subjects were on the basis of Minority Status during the one-term program interval.

5. To determine if there were differences in the attitudes of undergraduate subjects at the beginning and the end of the one-term program interval on the basis of Minority Status.

6. To determine if the changes in the attitudes of undergraduate subjects were on the basis of Place of Residence during the one-term program interval.

7. To determine if there were differences in the attitudes of undergraduate subjects at the beginning and the end of the one-term program interval on the basis of Place of Residence.
8. To determine if the changes in the attitudes of undergraduate subjects were on the basis of Gender during the one-term program interval.
9. To determine if there were differences in the attitudes of undergraduate subjects at the beginning and the end of the one-term program interval on the basis of Gender.
10. To determine if the changes in the attitudes of undergraduate subjects were on the basis of Agriculture Major in the one-term program interval.
11. To determine if there were differences in the attitudes of undergraduate subjects at the beginning and the end of the one-term program interval on the basis of Agriculture Major.

Assumptions

1. It was assumed that differences among undergraduates occur often due to social demographics such as minority status, gender or sex, place of residence and academic major.
2. It was assumed that lectures, practicums, chores and

field trips as various instructional strategies impact student outcomes in terms of attitudes, knowledge and skills.

3. It was assumed that if the researcher followed procedures prescribed by reputable researchers in the field of qualitative or ethnographic research methods that objective research data could be collected, analyzed and reported.

4. Living with students on a continuous basis by the researchers was a requirement for collecting data on attitudinal changes.

Limitations

1. Since all the students were Michigan residents, generalizations of the findings about the population in the study were thus limited.

2. The program evaluation design utilized in the study was formative. While such designs are well suited to small-scale pilot studies and experiments with newly developed programs, it is difficult to measure the pace and the depth of student progress (Fitz-Gibbon and Morris, 1978).

3. A before-and-after or pre-post design in the absence of a control group to compare outcomes have been proven inadequate. Such a design, according to

(Fitz-Gibbon and Morris, 1978, P. 20) has difficulty in answering questions: "How good are the results, and is it the program which is causing them?"

4. The study, for the most part, focused less on program implementation and more on the differential impact of the program on undergraduates with different characteristics. That is, the study focused more on an analysis of various demographic groups. This addressed assessing the undergraduates for whom the program was working best or worst.
5. The study concentrated on changes in undergraduate attitudes rather than changes in their cognitive or psychomotor abilities concerning agriculture and natural resources competencies.

Definition of terms

Interdisciplinary: The interaction among two or more different disciplines. This interaction may range widely in areas such as: sharing ideas, intergration of organized concepts, methodology, procedures, epistemology, terminology, data and organization of research and education in a fairly large field (Conway, 1977, P.50).

<Experiential learning: Learning attained through casual work experiences before or during, but not as a formal part of an individual's academic career (Thomas, 1977, P.1).

Experiential education: Learning activities outside the normal classroom environment. The objectives are planned and articulated prior to undertaking the experience. The activity is meaningful and "real" and the learner has the assistance of another person (most often a faculty advisor) in expanding the learning taking place in nonclassroom environments (Thomas, 1977, P.2).

Competency: Behavioral characteristics of knowledge, skill, attitude and judgement generally required for the successful performance of a task(s) or the sum total of attitudes, knowledge and skills which enable a person to perform efficiently and effectively a given function (McClay, 1978, P.7).

Agricultural competencies: Required knowledge, skills and attitudes which enable a person to perform efficiently and effectively in animal science, plant science, soil science, forestry, agricultural mechanics, agribusiness, and farm business management.

Natural resource competencies: Required knowledge, skills, and attitudes which enable a person to perform efficiently and effectively in fishery and wildlife, resource development and parks and recreational resources.

Career opportunity: The processs of the individual moving along one of a number of possible pathways through the educational system and into and through the work system (Super, 1972, P.16).

Career exploration: Examination of the self and of the environment, the differentiation of the self from others, identification with others who can serve as models and the playing of these selected roles with more or less conscious evaluation of the results; reality testing (Super, 1972, P.26).

Attitudes: As defined by the Council for Advancement and Support of Education (CASE), they are the full range of impressions a person holds towards a social object, including what the person says (verbal expressions), what the person knows and thinks (mental expressions), what he or she feels (emotions), and how the person is inclined to act (motivational or drive tendencies) (CASE, 1981, P.3).

Minority: A designated category or group that is less than half of a specified population (Mitchell, 1979, P.127).

Ethnography: Requires a period of intimate study and residence in a small well defined community, knowledge of the spoken language and the employment of a wide range of observational techniques including prolonged face to face contacts with members of the local group and direct participation in some of that groups' activities (Sills, 1968, P.172).

Summary

The first section of this chapter offered an introduction to the KBS Undergraduate Rural Resources

Education Pilot Program. The second section described the KBS Undergraduate Rural Resources Education Pilot Program. This included an out line of the purpose of the program, the course of study, the program staff, and basic curriculum and time allocation of the cources. The third section outlined the general objectives of the program, and the fourth section included the purpose of the study. The fifth section addressed the need for the study which included curriculum clarification at Land Grant Universities, requirements for a career in agriculture and natural resources, the demographic background of today's agricultural majors, and the usefulness of combining both qualitative and quantitative methods in evaluation studies. The sixth section described the specific research objectives including a description of the independent and dependent variables in the study. The seventh, and eighth sections specified the assumptions and limitations of the study, and the definition of terms. This summary completes the organization of Chapter I.

Chapter II

Review of Related Literature and Research

Introduction

Colleges of agriculture and natural resources have been in a state of transition throughout the second half of the twentieth century. The economic forces in place during the 1950's were the stimulus for spreading specialization in agriculture and expanding the scale of farm enterprises. Career opportunities shifted to the urban sector and to agribusiness and related areas outside the "farm gate." Higher education programs kept pace with this direction through a policy of increasing the differentiation of subject matter and specialized training in science and technology. By 1985, however, economic forces such as the substantial rise in the real cost of energy favored selective integration of farming operations which reduced synthetic energy inputs in the form of fuels, fertilizers, pesticides and capital.

The literature indicated that these concerns may have served to influence fundamental changes in education programs. Colleges of agriculture and natural resources were seeking to adapt courses and curricula which would provide new and expanded systems perspectives and analytical capabilities. More broadly-based training in the basic sciences and an awareness of changing career opportunities were needed ("Rural Resources", 1980).

Explicit in this emergent strategy was the remediation of highly specialized training. More balance between classroom programs of study theory, and field laboratory experiences were needed to allow the principle of integrated systems management to be documented, practiced and evaluated ("Rural Resources", 1980).

Demographically, agriculture and natural resources undergraduates were more likely to be heterogeneous in the 1980's. A large pool were from urban and suburban areas with little farm or related agriculture and natural resources experiences. They often were attracted to agriculture and natural resources through an appreciation for rural life. Increasingly, they were women and minorities. This was at variance with the more homogeneous agriculture undergraduates of the past who were generally non-minority, and males with extensive farm experience (Cosby, 1979).

Knowledge about the attitudes of undergraduates with non-traditional backgrounds was especially important for two reasons: 1) differing orientations toward agriculture and natural resources competencies may exist, and 2) these differing orientations would have to be adapted to the emerging systems thrust in agriculture and natural resources when developing appropriate programs and supportive curricula. This was especially crucial when prospective farm and related agribusiness employers consistently favored graduates with farm or related agricultural experiences (Wood, 1969).

For structural purposes, the review of literature and related research was concerned with (1) The Nature of Attitudes and Implications for Higher Education in Agriculture, (2) Experiential Education: Theory, Concepts and Models, (3) The Challenge of Experiential Education in Agriculture and Natural Resources, (4) Experiential Education in Agriculture: Attitudes of Instructional Administrators, (5) Attitudes About Career Opportunity, (6) Attitudes About Interdisciplinary Thinking in Agriculture, (7) The Systems Perspective in Modern Agriculture, and (8) Production Agriculture and Farmer Attitudes.

The Nature of Attitudes and Implications for Higher Education in Agriculture

In much of the literature, there was a consensus among experts in attitudinal research that measuring attitude-related concepts is a difficult scientific activity. A paramount reason for this difficulty can be attributed to the belief that there was no commonly accepted

definition of the concept, attitude. The apparent inconsistencies and controversies in the area were largely created by conceptual ambiguity. Still, conceptualists and theorists on attitudes continue to search for a common definition (Yahya and Moore, 1984).

Agricultural Education research studies largely emphasized the measurement of attitude-related concepts such as opinion, perceptions and beliefs. Research in the profession relied mainly on survey designs in order to measure psychosocial phenomena (Yahya and Moore, 1984).

Perhaps Shaw and Wright (1967) provided one of the most seminal treatments concerning the hard to define concept, attitude. Shaw and Wright (p. 3) cited a number of traditional definitions of attitude:

> 1. An enduring learned predisposition to behave in a consistent way toward a given class of objects.
>
> 2. An enduring system of positive or negative evaluations, emotional feelings, and pro or con action tendencies with respect to a social object.
>
> 3. A mental and neural state of readiness organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related,
>
> 4. ...the attitude toward an object is the sum of the strength of beliefs about the object and the evaluative aspect of these beliefs.

In synthesizing the above commonalities Shaw and Wright (1967) limited the theoretical construct of attitude to:

> an effective component which is based upon cognitive processes and is an antecedent of behavior... We consider an attitude to be an evaluative reaction based upon evaluative concepts which are closely related to

other cognitions and to overt behavior.

Shaw and Wright's (1967) framing of the concept attitude has important implications for the future of undergraduate agricultural majors. Attitudinal studies (Cosby, 1979) offer an opportunity to study certain aspects of the structure of the agricultural profession: how it recruits its members; how it socializes them into the profession; how they are placed and rewarded; what activities are viewed as having prestige; what stresses are placed on the system of professionals and what agriculture may be like in the future.

Experiential Education: Theory, Concepts and Models

Experiential education implied that learned knowledge will be applied in a practical and meaningful way by the learner. Some of the more popular concepts associated with the term included vocational education, apprenticeships, cooperative education and internships. More recently, the concept experiential education had been linked to the concept, career development. While experiential education is rooted in human history, the roots of the movement to recognize it as an educational tool for higher education comes from John Dewey's theories and philosophies about experience in education in the late 1930's:

An experience may be immediately enjoyable and yet

> promote the formation of a slack and careless attitude; this attitude then operates to modify the quality of subsequent experiences so as to prevent a person from getting out of them what they have to give. . . experiences may be so disconnected from one another that, while each is agreeable or even exciting in itself, they are not linked cumulatively to one another. Energy is then dissipated and a person becomes scatter-brained (Dewey, 1938, p. 26).

The linkage between one experience with another was an important principle in Dewey`s theory (Dewey, 1938, P.35) of habit:

> The basic characteristic of habit is that every experience enacted and undergone modifies the one who acts and undergoes, while this modification affects, whether we wish it or not, the quality of subsequent experiences... the principle of habit so understood...covers the formation of attitudes, attitudes that are emotional and intellectual; it covers our basic sensitivities and ways of meeting and responding to all the conditions that we meet in living. The principle of continuity of experience means that every experience both takes up something from those which have gone before and modifies in some way the quality of those which come after.

Despite Dewey`s contribution in developing the theoretical thrust of experiential education, it had not been widely accepted at higher education institutions in the 1980`s. Chickering (1977) reported there had been acceptance in some areas of professional and general education, but experiential education had not become a major art or science. Comprehension and sustained practice among institutions and programs across the country were highly variable. Chickering further observed that, for the most part, experiential education was still "primitive", but interest in it was widespread and not likely to diminish.

According to Chickering (1977) experiential education involves a sequence: one carries out an action and sees the effects of that action; observed effects in specific instances reappear; general principles are understood about the specific instance; and then, the general principles are applied through action in a new circumstance.

A slightly similar four-stage experiential education model was developed by Kolb and Fry (1975). The first stage entails undergoing a concrete experience, and in the second stage this experience is a basis for observation and reflection. In the third stage, abstract concepts and generalizations are formed from the observations. In the final stage the implications of the concepts are hypothesized and tested.

> Kolb and Fry (1975, p. 1) have also observed: Experiential learning attaches major importance to ideas. When ideas are used as hypotheses and tested in action, their significance and attention given to them is greater than when they are simply memorized or left as unexamined abstractions. . . an idea as a working hypothesis must undergo continual scrutiny and modification.

Given the view that experiential education encompasses continuous scrutiny and modification it becomes a complement to career development. Career development, while not a major focus for this research, overlaps experiential education since there is continuous movement by individuals through related occupational clusters which are spurred by trial and error interactions over an individual`s life-time. The resesrcher assumed the trial and error process can be equated to a working hypothesis that undergoes constant revisions.

Van Aalst (1979, p. 33) recommended an approach for combining education with meaningful work for college students:

> Integrate learning and working no later than the last two years of the individual`s formal education. By adding an intentional learning component to work experience, the issues of work attitudes, occupational level, and skill development can be systematically addressed, and the process of career development solidly begun.

Van Aalst (1979) also delineated the theoretical goals of experiential education:

1. to learn how to apply theory learned in the classroom,
2. to enhance personal development through taking charge of one`s own learning, and
3. to understand other cultures.

The theoretical constraints of experiential education appear to be variable, yet they complement each other. Van Aalst (1979, P.34) further stated:

> How else can one really learn about a career without experiencing the physical work environment, or the work ethic in an organization. How else can one realy learn the hidden dimension of a theory without leaving the classroom. While the goals and theory of experiential education may vary, what is common throughout is the principle of real life experiences.

The Challenge of Experiential Education in Agriculture and Natural Resources

Many undergraduate agriculture majors in the past ten to twenty years entered higher education in agriculture with personal childhood experiences on the farm. These may have included animal care, crop production, food production and processing on the farm. Such experiences today are extremely limited or absent. The comparatively few agriculture majors today with farm backgrounds are more likely to obtain their food from the same supermarkets as those from urban communities. Many have little farm experience beyond that of operating farm machinery. These shortcomings in personal skills and hands-on experiences present serious challenges to the education of the next generation of leaders in agriculture, natural resources, and home economics unless formal education programs can find a solution to these barriers ("Rural Resources", 1980).

Inner city or urban students potentially interested in production agriculture careers and more integrated modes of family living may find their inadequacy in personal experiences with rural living and rural resources an absolute barrier. For urban agriculture majors and even those from rural areas, an opportunity for supervised hands-on experience as an integral part of their formal education program may be the only way to break down these barriers. The possibility of providing work-study pay, may be a commensurate incentive and motivation for acquiring the necessary attitudes that are expected to result from the supervised hands-on experiences. The 85 percent or more of undergraduates enrolled in agriculture not planning to pursue careers directly related to farming activities should also be supported with field-based educational experience to provide a real life framework for otherwise abstract theoretical study ("Rural Resources", 1980).

A study of agricultural students at Southern Land Grant Universities (Adrian, Dunkelberger, and Molnar, 1981) evidenced the following: 1) the growth in student enrollment in the agriculture and natural resources major comes largely from students lacking farm background and experience; 2) during the past decade increased attention has been focused on the enrollment of women with majors in agriculture and natural resources; 3) students' place of origin can have important implications for curriculum design and alternative teaching methods; 4) as the majority of agricultural students do not have farm backgrounds, the acquisition of practical skills and knowledge of farm production practices is a concern for curriculum planners and potential employers; 5) the majority of all students desired a professional and technical career; 6) residential preferences of agriculture students are of interest as the background of students becomes more diverse; and 7) only a small proportion of students desired or expected occupations in production agriculture.

Programs at the University of Auburn (Eaddy, 1975) and Southern Illinois University (Wolff, Reneau, Stitt, and Legacy, 1985) sought to provide experiential education in agriculture for students who lacked a practical understanding of agriculture. Both of the studies involved agriculture education majors. Eaddy reports that an internship program at the University of Auburn was designed to provide a supervised practicum for graduate students to familiarize them with technological changes and to become acquainted with the job competencies found in a typical agribusiness concern. The internship was developed not in response to the students` lack of viable farm experience, the participants were generally from farms. Instead, the program planners and managers were responding to the broader non-farm competencies required by teachers of vocational agriculture and agribusiness. This was significant since much of the literature addresses issues associated with the more recent non-farm students.

Conceptually, the internship program at the University of Auburn was a method of extending the classroom to the factory and marketplace. Teachers spent three weeks in a selected agribusiness. The criteria for selecting an agribusiness was that it be a "progressive" concern which specialized in products or services closely related to the "interests" and "needs" of the teacher`s program. The interns shared in the planning of their experiences; they were required also to observe and perform the skills or activities required of persons within each of the job titles in the business. Experience would then be gained in the job titles ranging from very elementary to the managerial levels of responsibility (Eaddy, 1975).

In the internship program at Auburn University (Eaddy, 1975, p. 59) concluded the following:

1. The internship was found to be a most beneficial and practical learning experience for teachers of agribusiness education.
2. An excellent opportunity was provided interns and agribusinessmen to communicate their needs and unique problems.
3. A more effective internship experience will result where interns have obtained a sound undergraduate foundation in the discipline studied.

Wolff, et al. (1985) reported that a summer course was designed in farm machinery, maintenance and operations to provide international and urban students with hands-on experience in agricultural technology. The summer course was in response to the trial stage of the individual adoption process which also includes awareness, interest, evaluation, and adoption stages. Heretofore, the trial stage was learned on the home farm of many vocational agriculture and extension professionals. Conversely, many international and urban students enrolled in agricultural teacher education had not experienced the trial stage.

The four week summer course in farm machinery, maintenance and operations at the University of Southern Illinois provided each student with the opportunity to operate equipment in the field. Machinery maintenance, calibration and adjustment was accomplished in small groups. Briefly, the sequence of the course was learning tractor safety and driver operation, then tractor maintenance activities, tillage preparation, and mechanical weed control techniques (Wolff, et al., 1985).

The program planners involved in the summer course at Southern Illinois University did not provide evaluation data other than to state: "...the major value of the experience gained in this course is that each student has a clearer understanding of steps in the adoption process" (Wolff, et al., 1985, p. 3).

Experiential Education in Agriculture: Attitudes of Instructional Administrators

A study by Thomas (1977) focused on the increasing requests by students for experiential activities as part of their undergraduate curriculum. The purpose of the study was to ascertain what policies should be adopted by Colleges of Agriculture and Natural Resources for experiential activity in the academic program. The findings indicated that 39 out of 41 administrators of agriculture and natural resources colleges responded positively to the concept that experiential activity comprises an integral component of the students' educational program. Nevertheless, most respondents recognized the potential for negative or positive aspects depending on the nature of the experiential activity.

The main benefit associated with experiential education most mentioned by respondents were the practical and real life experiences. These experiences were felt not to be readily available in the typical classroom or laboratory. Some open-ended responses reflecting positive attitudes were:

> . . . helps the student bridge the gap between fundamental understanding and practical application.
>
> It exposes students to practice, technologies, and for most a world unknown to them.
>
> . . . it may give the student an opportunity to relate to the world of work; to become involved, to acquire a better perception of an object, principle, theory, etc.
>
> . . . it gives students first hand experiences with the world in which he is showing a career interest" (Thomas, 1977, P.8).

Thirty-six of 41 respondents reported that student demand for experiential education was increasing on their campuses. Students` interests reflected the same concerns reported by instructional administrators. However, the value of such education to the student in the job market was rated much higher than that of the instructional administrators. This could be construed to mean that the student has a more intense attitude about the employment advantages provided by experiential education than do the institutions in which they study (Thomas, 1977).

Also, in the Thomas study (1977, P. 15), instructional administrators were asked to respond to the open ended question, "What is the role of experiential education in relation to the conventional lecture method ?" Their responses were reported as the following:

> Experiential education should be encouraged but not required as a part of the student's total educational experience.
>
> Experiential education programs should be academically articulated , i.e., they must be carefully preplanned, well defined and presented, adequately supervised and evaluated and administered with vigor.
>
> The granting of academic credit for experiential education activities that meet the above criteria should be considered. Although other types of experiential activities are not discouraged, they should not be considered for academic credit.

Attitudes About Career Opportunity

The literature on career opportunities in agriculture and natural resources reflects the dual concern of choice and demand. Realistic choices according to Hall (1976) contain three stages: (1) the exploratory period in which a person examines several possible career options; (2) a crystallization period in which preferences become more sharply focused; and (3) a specification period in which the person chooses a particular occupation. The demand for new members in a given occupation is determined by the number of vacancies that exist at a point in time; and the size of the occupational group, its tendency to expand, and its turnover rate influence the demand for new recruits, (Hall, 1976).

A strongly held attitude about career exploration activities was that students may at one time or another be discouraged or encouraged in deciding on their initial career choice. Career exploration activities should provide students with a basic familiarity with the agriculture and natural resources industry so that realistic choices are improved (Thomas, 1977). Another widely held attitude was that the failure to provide career exploration activities may result in a graduate having only a cursory understanding of the nature of the industry (Adrian, Dunkelberger and Molnar, 1981).

The purpose of a study by Wessels (1977) was to assess placement and career opportunities for graduates from Land Grant Colleges. The findings of the study indicated that students interested in the traditional production areas of agriculture should have a wide variety of opportunities to choose from. Also, currently, students in the agricultural service industry, such as food science and agricultural communication, should have minimal difficulty in locating employment. However, students in natural resources and related areas such as forestry, wildlife management, conservation and fisheries in the past faced placement problems.

The growing student interest that society should take action to clean up the air, streams and rivers, and to improve the total environment was not necessarily correlated with job demands in these fields (Wessels, 1977). Thus, an important consideration when advising students about career opportunities was to bring student attitudes about a career in line with job market realities. Informed students then can make decisions based on their values and their perceptions about the rewards associated with a career such as high earnings, social prestige and interesting, challenging work (Durham, 1977).

Petty and Stewart (1983) in a study from Missouri focused on the affective skills needed for successful job employment and retention. They found that wage earnings of agricultural workers in production and agribusiness did not differ significantly. However, significant differences were found among age groups. They concluded that younger agricultural workers perceive factors related to affective competencies differently than older workers. The five factors were ambition, self control, organization, enthusiasm, and conscientiousness. In each case workers 25 years of age or under scored lower on these factors. Some of the more provocative sub-categories of the above factors in which these younger workers scored low constitute what is commonly termed the "work ethic." They were:

1. working toward new goals;
2. pride in accomplishments;

3. accepting challenging assignments;
4. adjusting to change;
5. self starting; and
6. being on time.

The Petty and Stewart (1983, p. 58) study raised a central question related to the function of maturation versus that of education:

> Will the young workers grow in terms of affective skills as they become older and have experience in the work force, or is this difference to be noted in the new generation of workers?

Bowen and Lee (1984) in a study concerning the educational and occupational aspirations of students in agriculture majors at Mississippi State University revealed students chose their major to prepare for a specific career and to lead a desired lifestyle. Other highly ranked factors were the desire to help others, prior experiences, and good income.

The selected characteristics of students in the study pursuing agriculture majors were compared from 1977 to 1982 and indicated several important demographic trends. Males pursuing agriculture majors declined by 5 percent, from 81 percent to 76 percent. In terms of residential status, the percentage of agriculture majors from towns greater than 10,000 in population increased by 4 percent, from 39 percent to 43 percent. The percentage of majors from rural non-farm populations declined by 1 percent, from 27 percent to 26 percent. Finally, the percentage of majors from rural farm populations declined by 3 percent, from 34 percent to 31 percent (Bowen and Lee, 1984).

Frank (1978) in a study concerned with the prestige structure of agriculture occupations sought to determine, using undergraduate agriculture majors in fourteen southern universities, whether sex and past farming experience were significant determinants of how they rated agriculturally related occupations. The findings of the study indicated agriculture students rated agricultural occupations similar to the way others rated the general occupational hierarchy. That is, professional, managerial, and scientific occupations were given the highest priority and manual labor given the lowest priority. The respondents' sex and farm background proved to be insignificant variables. This was at variance with Frank's assumption:

> that different access to, and different experience with, the occupational structure of agriculture would result in markedly different assessments of the prestige of these occupations as well as different levels of knowledge about them and their places in society (1978, P.2).

Results from the analysis of variance of prestige scores by sex and farm background (Frank, 1978) showed the top ten Agriculture and Non-agriculture occupations to be the following:

1. Veterinarian
2. Physician

3. U. S. Secretary of Agriculture
4. Dean of College of Agriculture
5. Nuclear Physicist
6. Professor in Agriculture
7. Landscape Architect
8. USDA Researcher
9. Wildlife Refuge Manager
10. Farm/Ranch Manager

Attitudes About Interdisciplinary Thinking

William Bousma (1975) contended the knowledge revolution created the age of the specialist and sent into decline the idea ot general education. Mayville (1978) contended, however, in the present day college curriculum students should receive a liberal or interdisciplinary undergraduate education and simultaneously pursue a career through specialized study.

The above attitudes have implications for developing analytic ability among agricultural majors which might be specialist or interdisciplinary in nature. Implicit in the interdisciplinary approach was an anticipated trade-off between comprehensiveness and depth of analysis. A narrow disciplinary mix may lead to analytic depth at the expense of comprehensiveness (Swanson, 1982).

Russell (1982, P. 1) has observed:

In most cases the important problems (in agriculture do not have easy or perfect solutions. Solutions to critical issues involve trade-offs, and balancing those trade-offs requires both an understanding of the individual aspects of the problem, as well as an understanding of how each aspect relates to all others. In this balance between the parts and the whole lie the importance of interdisciplinary research.

In attending to the suitablity of and the major constraint of the interdisciplinary approach in agriculture, Russell (1982, P. 2) also observed:

> These real problems for which interdisciplinary research is well suited are complex because of their interrelatedness. Most of the important problems are, at one level or another, connected. Yet the tradition of reductionism in science has lauded the practice of reducing problems to their simpler components studying these components as separate entities and then summing those outcomes as explanation of the problem. This categorization of phenomena into smaller and smaller units has narrowed the scope of each field of study and has moved the study of phenomena further and further away from real problems.

In an effort to reduce the specialist emphasis in undergraduate professional training we should not think in terms of one-discipline majors. That is, biochemistry, soil science, and agricultural economics should be replaced with crop-soil system, the plant-animal systems, the production system, the communication system, and the rural political system as subsystems of the agricultural system. The systems approach, thus recognizes that the overall agricultural system is an interactive one, involving physical, biological, and social parts. It operates within an environment having significant interactive components (Swanson, 1982).

The Systems Perspective in Modern Agriculture

The systems perspective is an alternative to current research specific approaches because it accommodates resource-induced changes in modern agriculture. Most agricultural research contend Edens and Haynes (1982) addresses questions at the level of proficiency of specific investigation. For example, Edens and Haynes (P. 369) reported:

> Plant pathologists often focus on specific diseases, and entomologists often concern themselves exclusively with specific insects or interactions between several insects. The overall structure of the production and marketing system is generally assumed to be nonvarying. Thus, the experiments undertaken have value in the context of a particular system. If a basic input to the production process becomes limiting, such as resource constraints, the structure of the system changes, and a completely new set of experiments must be conducted.

Edens and Haynes (P. 369) further provided a working definition of the systems perspective:

> If we are to adopt a systems perspective, we must recognize that "systems" in the real world are characterized by components, linkages, and functions (either physical or abstract

as defined by our view of the real world however conceived. Therefore, a system is a collection of objects or components, such as tractors, crops, insects, pests, diseases, weeds, pesticides, capital, and energy that interact synergystically to perform a given function or functions.

Farming systems research is a complement to the systems perspective and as a research and development strategy has been implemented in the U. S. and in less industrialized countries. Farming systems research is at variance with farm management research which assumes that successful farmers utilize judiciousness and skill to manage a farm and are motivated through profit maximization (Flora, 1982). Such successful farmers in the U. S. are heavily dependent on fossil fuel inputs which include grain drying and pesticides, capital intensive machinery which reduce labor, and they tend to specialize in farm enterprises driven by market forces (Edens and Koenig, 1980). Flora (P. 5) observed that Farming Systems Research and Development (FSRD) was:

> The totality of crops and animals, and their byproducts, for both subsistence use and for market, as well as temporary off-farm employment, are included. FRS&D involves formal interdisciplinary problem identification in participation with the farm family, taking into account the needs of Society as a whole...FRS&D implies a two-way flow of knowledge between farm families and researchers... an attempt to use social and production sciences to approximate the condition of research and extension that exists in our country...

A major difficulty in establishing a systems perspective in identifying and developing solutions to problems in agriculture and natural resources is establishing effective interaction among people representing divergent disciplines. Francis, Arnold, Deshazer, Hanway, and Omtvedt (1982) note that interdisciplinary teams often have problems in communication. Scientists` specialization in discrete disciplines has led to the development of specialized languages or dialects. For example, an agronomist`s or plant breeder`s field experiment may appear superficial to the biochemist or extension specialist. Moreover, each discipline tends to see most problems as resolvable through the body of knowledge and approach offered by their own discipline.

Production Agriculture and Farmer Attitudes

Besides grappling with the rationality of Farming Systems Research or Farm Management Research, the attitudes of the human actors in production agriculture must be adequately discerned. The attitudes of farmers and rural people are dynamic. Understanding why they do what they do is important for creating effective policies which are compatible with their goals, yet support a sustainable agriculture. This requires the "new agriculture major" and future leaders to be proficient at identifying and analyzing farmers` attitudes.

Napier, Kohl, Hansen and Hooks (1979) in an Ohio study assessed farmer attitudes toward land use controls, pollution from agricultural sources, agriculture as a way of life, farming as a business and government involvement in agriculture. Agriculture was viewed as the natural way of life for human beings. The family farm was viewed as an excellent place to raise a family and a powerful source for maintaining a democratic form of government. It also was viewed as an optional means of providing the U.S. population with enough food at reasonable prices. Nevertheless, the farmer respondents were undecided on whether a return to rural living could solve the nation`s problems.

Napier, et al. (1979) also found the most successful farmer may not make the most profit even though most farmers viewed farming as strictly a business. Thus, profit margin was not the only criteria for success which suggested to the researchers that: farmers judge farming success in terms of decision making relative to risk.

The summary of findings by Napier, et al. (1979) across attitudinal measures reveal the following:

1. Ohio farmers had extensive agricultural training in the form of farm work experiences, as well as formal agricultural training.
2. Farmers seemed to want the benefits of land use controls without internalizing the cost of such

controls.

3. Among farmers in Ohio there was a tendancy for a very positive attitude toward agricultural production and a slightly negative attitude toward environmental issues.

4. Some profits tended to have a higher positive attitude than assuming risks for possible higher profits.

5. Farm policies and the structure of the agricultural system were attributed to being a major factor of farmers` problems.

6. Expected savings in time and money, initial costs, and the ease of repair were the most highly considered factors contributing to the adoption of new farm technologies.

7. Farmers believed farm equipment has increased in size and complexity during the past ten years.

8. Farmers felt that small businesses and consumers` interest were compatible with their interest, more so than environmentalists, the poor of the inner cities, big businesses and organized labor.

9. The most commonly used farm practices were herbicides, custom blended fertilizers and crop rotation.

10. Ohio farmers did not view farming as contributing to environmental degradation and the researchers suggested that any programs designed to reduce non point water pollution would meet with resistance. However, farmers believed that pesticides harmful to

wildlife should be banned and farming should not be exempt from environmental laws.

Overall Napier, et al. (1979) findings clearly show that farmers in Ohio are not a homogeneous group relative to farming issues and socio-demographics. The researcher feels this lack of homogeneity among Ohio farmers may be representative of farmers on a national scale.

Summary

The review of related literature and research indicated that more integrated agricultural education programs in higher education along with the knowledge about attitudes among students, farmers, researchers and instructional administrators are needed to contribute toward a more sustainable agriculture in the future. The review of attitudes concerning Experiential Education, Career Opportunities and Interdisciplinary Thinking, provide a basis for outlining the needs of today's undergraduate agriculture majors. The systems perspective in modern agriculture and production agriculture, and the attitudes of farmers provided additional emphasis and the completion of this chapter.

CHAPTER III

Design and Methodology

Introduction

The methodology was structured to discover attitudinal patterns among different groups of participants while the Kellogg Biological Station Undergraduate Rural Resources Education Pilot Program (KBS) was in operation. The methodology included assessments of interpersonal relationships among participants and resource people during periods of programmed instruction. That is, the research evaluation measures were used to address the program process. The study also, in a limited fashion, addressed the extent to which participants involved in and affected by the KBS Program were in agreement with its intent (Wentling, 1980). Thus, the research evaluation measures attended to both program process and program impact in relation to attitudinal change. The methods and procedures were designed to assess attitudinal changes that were directly related to the instructional strategies. While Wentling (1980) identified problems in design and implementation, the design and methodology of the study does not address these.

The study was designed to coincide with the three stages of the KBS Program. An assessment of the undergraduates' perspectives concerning the three stages of the KBS Program provides a framework for the methodology. In stage One, the undergraduate perspective would consist of expectations and benefits associated with the KBS Program. Stage Two represented the actual KBS Program experiences or reality testing (Super, 1972). Stage Three was the impact stage, the difference between expectations and actual experiences which represented the changes in attitudes.

The researcher felt the three stage evaluation design during the formative period of the KBS program would provide the program staff with an opportunity to evaluate the effectiveness of the program as it related to positive changes in participants' attitudes about agriculture and natural resources. That is, it would enable the program staff to rethink assumptions about the instructional strategies used in the program (Fitz-Gibbon and Morris, 1978).

Population

The population consisted of 16 undergraduates enrolled in the College of Agriculture and Natural Resources at Michigan State University. Included in the non-random stratified sample was the Minority status variable: there were seven minority and nine Non-minority participants. In respect to the Place of Residence variable, the minority participants also comprised the total number of Large City participants from residential areas of over 50,000 or more in population. Four participants were from Small City Suburban residential areas of 5,000 to 50,000 in population. Five participants were from Rural Open Country residential areas of less than 5,000 in population.

In terms of the Gender variable, five participants were male and eleven participants were female. The Agricultural Major variable consisted of five participants who were agricultural production majors. This included crops and soil science, agricultural engineering, animal science and horticulture. Eleven participants were agricultural service majors. This included resource development, agricultural packaging, food systems management, agricultural and natural resources education, agricultural biochemistry, agricultural communications, and agriculture non-preference.

Development of the Instrument

A Likert-type questionnaire on agriculture and natural resources was used. A one-to-five point scale was developed to collect statistical data on participant attitudes concerning Experiential Education, Interdisciplinary Thinking, and Career Opportunity in agriculture and natural resources (see Appendix C). About one-half of the questionnaire items were from other related attitudinal studies about undergraduate agricultural majors at Land Grant Universities. The remaining items were drawn from issues found in the literature on Experiential Education, Interdisciplinary Thinking and Career Opportunity in agriculture and natural resources.

There were thirty-five item statements in the questionnaire. Ten were related to Experiential Education; thirteen to Interdisciplinary Thinking; and twelve to Career Opportunity. All item statements in the given categories were designed to be mutually exclusive. The procedures for developing the instrument were outlined in How to Measure Attitudes (Henderson, Morris and Fitz-Gibbon, 1978).

The attitudinal questionnaire consisted of two parts: Part One collected demographic data which included Gender, Minority status, Agriculture Major and Place of Residence; Part Two contained instructions and examples for answering the thirty-five item statements. The questionnaire was administered in the first week and in the last week of the program interval at the KBS site.

Instrument Validity

The validity of the instrument's content was established by a jury of selected Michigan State University faculty members in the departments of Agricultural and Extension Education, Teacher Education, Resource Development, and selected administrative personnel in the Academic and Student Affairs Office in the College of Agriculture and Natural Resources (CANR). Additionally, the instrument was field tested with a group of undergraduates during the 1984 CANR Freshman Orientation and with undergraduates who were currently matriculating in the CANR. The field test was conducted to determine where refinements were needed. A feedback/discussion was held with the matriculating students shortly after they completed the questionnaire. These field test subjects reported on what was unclear, offensive and obvious, and item statements were deleted or reworded accordingly. An internal consistency coefficient was calculated for the Agriculture and Natural Resources Questionnaire. A Cronbach's alpha of .76 resulted.

Qualitative Data Collection Procedures

The qualitative or ethnographic procedures used in the study consisted of interviews, observations and Participant Observation. The face-to-face interviewing techniques suggested by Gorden (1975) and Patton (1980) were closely followed. These interviews occured in Stages One and Three of the study and included asking open-ended questions and probing to clarify facts and attitudes. The interviews were

structured; each participant was asked the same sequence of questions to lend precision to the resulting data (Henderson, et al., 1978). See Appendix D and E for the structured interview format of Stages One and Three.

Interviews were conducted during the first week of the KBS Program, Stage One, and during the week immediately following the end of the KBS Program interval, Stage Three. In addition, spontaneous informal conversation between the researcher and participants relating to instructional strategies and program activities took place in Stage Two. During the first week of interviews, in Stage One, both the researcher and the program coordinator collaborated. The program coordinator asked the questions and both the researcher and program coordinator recorded the participants' responses. The participant's responses were compared and then integrated into a single statement. This two-people-involvement procedure (Henderson, et al., 1978) also provided greater validity in the data presented from the Stage One interviews. During the final week of the KBS Program interval, Stage Three, the interviews were conducted exclusively by the researcher. These interviews were tape recorded and transcribed, and notes were taken during the interviews as suggested in Patton (1980).

Based on the informal conversations in Stage Two, additional open-ended questions were structured to better understand the patterns associated with the attitudes under investigation in Stage Three interviews. These additional open-ended questions in the Stage Three interviews also were related to item statements found in the Agriculture and Natural Resources Questionnaire. Table Three illustrates the intrinsic strengths and weaknesses of the informal conversational interviews in Stage Two, and the structured open-ended and the closed-ended quantitative interviews utilized in Stages One and Three of the study. Table Three also serves as an overview concerning questions of validity and reliability in interviewing.

The information collected during the structured interviews conducted in Stage One and Three were extrapolated into categories using the content analysis method outlined by Krippendortf (1980). Knight (1984) makes a major assumption about content analysis: that you can make valid and document categories that were meaningful to the people in the event. Moreover, a quantitative description of the communicated content can be meaningful. According to (Knight), the basis of effective content analysis concerns the identification of categories for the purpose of grouping the data. The categories must be clearly formulated and well adapted to the problem and content under study. The criteria for categories were: accurate fit to the study so that research questions can be answered, categories should be exhaustive, and they should be mutually exclusive.

TABLE 3

Variation in Evaluation Research Interview Instrumentation

Type of Interview	Characteristics	Strengths	Weakness
Informal Conversational Interview	Questions emerge from immediate context	Interviews are built on and emerge from observations	Less systematic and comprehensive
Standardized Open-ended Interview	Questions are determined in advance. Interviewees asked same questions.	Respondents answer same questions, thus increasing comparability of responses.	Standardized questions limit relevance of questions and answers.
Closed Quantitative Interview	Questions are determined in advance. Respondent chooses from fixed responses.	Data analysis is simple. Many questions can be asked in a short time.	Can distort what respondents really mean or experienced.

note: Adopted from Qualitative Evaluation Methods (P. 206) by Michael Quinn Patton, 1980, Beverly Hills, California: Sage Publications, Inc. Copyright 1982 by Sage Publications, Inc.

Observational Procedures

The main purpose of the observational procedures were to collect data that showed a relationship between the instructional strategies and interactions among undergraduate participants and resource people during Stage Two. The criteria for presenting these interactions were that they related to Experiential Education, Interdisciplinary Thinking, and Career Opportunity.

The observational data (Pelto and Pelto, 1978) (Henderson, et al., 1978) (Patton, 1980) were collected through field notes or anecdotal reports and through tape recordings of interactions that took place during the KBS Program interval. Those tape recordings with high audio quality that met the above criteria were transcribed. While these observational data were the fabric of Stage Two of the study, it is for clarity that these data were presented in Appendix B. Reference will be made to these observational data in Chapter Four.

Patton (1980, PP. 124-126) summarizes several purposes of observation:

1. To learn in what context the program takes place;
2. To provide an opportunity for an inductive discovery approach;

3. To provide an opportunity to see things that may routinely escape conscious awareness among participants and staff; and
4. To learn about things program participants and/or staff may be unwilling to talk about in an interview.

Participant Observation

Gorden (1975, PP. 36-37) states:

> Participant observation differs from the interview in that the research situation involves more than two interacting participants, and the researcher participates in some role other than interviewer.

Gorden (P. 37) further states:

> One apparent dilemma of participant observation is that, if the researcher does not succeed in getting into the group in an acceptable role, he/she limits the opportunity to observe; but if he/she is fully accepted as an equal member of the group, he/she is in danger of losing the objectivity needed to carry out valid observations and interpretations.

The researcher shared known similarities to the participants: he was taking several of the KBS courses under special conditions for graduate credit and fully participated in all program activities. The researcher was different from the participants in the following ways: He was a graduate student at Michigan State University and in a different stage of life and status.

The nature of participant observation requires residence in the research community. Residency enhances the probability that the researcher observes details of daily life and the activities of the participants become relatively indifferent to and uninhibited by the presence of the researcher. Much of the field notes developed through participant observation in Stage Two provided the researcher with insights and clues about the feelings of the students (Pelto and Pelto, 1978).

Patton (1980, PP. 127-128) summarizes the assumption of the participant observation method:

> In participant observation the evaluator shares as intimately as possible in the life and activities of the program under study. The purpose of such participation is to develop an insider's view of what is happening. This means that the evaluator not only sees what is happening but feels what it is like to a part of the program. . . . Experiencing the program as an insider is what necessitates the participant part of the participant observation. At the same time, however, there is clearly an observer side to this process. The challenge is to combine participation and observation so as to be capable of understanding the program as an insider while describing the program for outsiders.

Observational Setting

The researcher observed important activities and events in the program. These events occured at various KBS sites. They included Classroom C near Gull Lake where the bulk of the lectures took place, the Farm Learning Center, the Agricultural Mechanics Shop, the Kellogg Forest, the Bird

Sanctuary, and other sites at KBS. In addition, observation procedures were conducted during field trips away from the KBS site. See Appendix F for the layout of the KBS facilities and resource areas.

Summary

Figure One provides a working model for the measurement, design and analysis of the study in the KBS Pilot Program. The attitudes that were assessed were Interdisciplinary Thinking, Experiential Education and Career Opportunity in Agriculture and Natural Resources. The researcher makes the assumption that such a mixture of methods were interrelated and complementary.

The research methods and design used in this study were an attempt to provide a holistic yet limited analysis of attitudinal change. The purpose for using the variable methods was to provide an analysis of attitudinal change among undergraduate participants on the basis of instructional strategies and interaction among participants and resource people in the KBS Pilot Program.

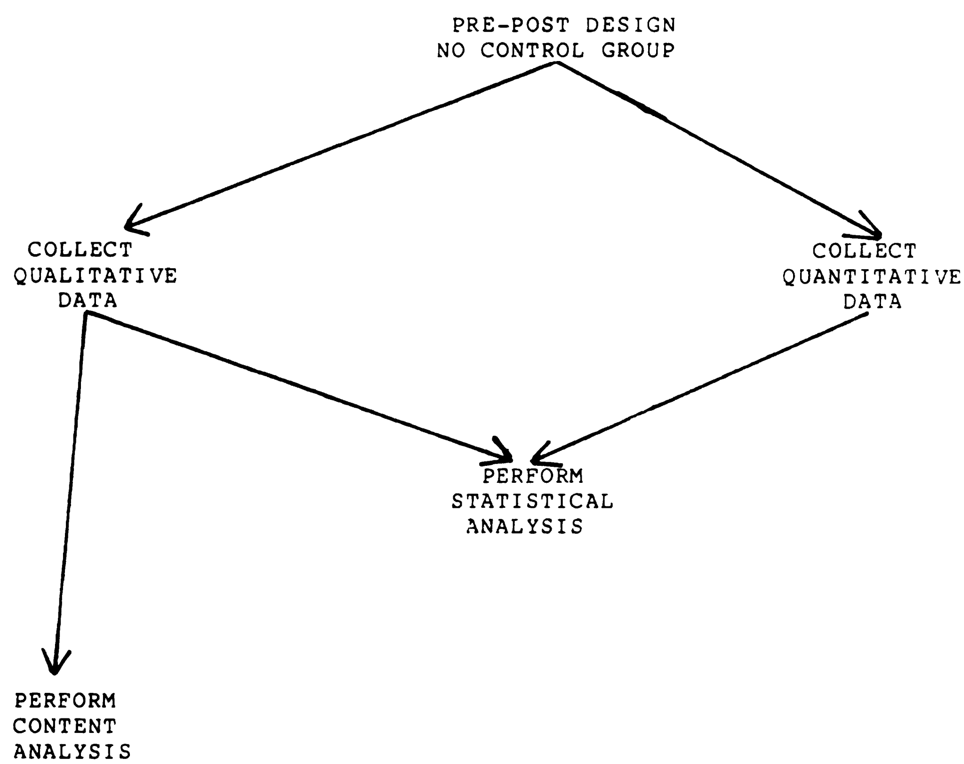

FIGURE 1. Measurement, Design, and Analysis

Note: Adopted from Qualitative Evaluation Methods (P.115) by Michael Quinn Patton, 1980, Beverly Hills, California: Sage Publications, Inc. Copyright 1982 by Sage Publications, Inc.

Chapter IV

Analysis and Presentation of Data

Stage One

1. Questionnaire Data- Mean Score Results by Demographic Groups

The mean score data by demographic groups in Stage One were related to Research Objectives Four, Six, Eight and Ten discussed in Chapter I. Research objectives are appropriately related to the data throughout the chapter to facilitate reader understanding.

Research Objective Four

Determine if changes in the attitudes of undergraduate subjects were on the basis of Minority Status during the one-term program interval.

Research Objective Six

Determine if changes in the attitudes of undergraduate subjects were on the basis of Place of Residence during the one-term program interval.

Research Objective Eight

Determine if changes in attitudes of undergraduate subjects were on the basis of Gender during the one-term program interval.

Research Objective Ten

Determine if changes in attitude of undergraduate subjects were on the basis Agriculture Major in the one-term program interval.

Mean Analysis by Group Demographic Variables

Table Four data shows that in three of the four demographic groups, Minority Status, Place of Residence and Agriculture Major, a mean score difference of at least 3.2 resulted among the subgroups. A subgroup mean difference of 11.9 resulted when Minority and Non-minority participants were compared. A subgroup mean difference of 9.2 resulted when Large City participants and Small City/Suburban participants were compared. It should be noted that all of the Minority participants were Large City participants. A Subgroup Mean Difference of 14.1 resulted when Large City and Rural/Open Country participants were compared. A Subgroup Mean Difference of 4.9 resulted when Small

TABLE 4

Stage One KBS Participant Mean Scores on Attitudinal Questionnaire

Mean Scores N = 16 Demographic Groups	N	Subgroup Mean	Subgroup Mean Diff.	Group Mean Difference (D)
Minority Status				
Minority	7	125.3		- 6.7
Non-minority	9	137.2	11.9	5.2
Place of Residence				
Large City (A)	7	125.3	14.1	- 6.7
Small City/Suburban (B)	4	134.5	9.2	2.5
Rural/Open Country (C)	5	139.4	4.9	7.4
Gender				
Male	5	131.6		- 0.4
Female	11	132.0	0.4	
Agricultural Major				
Agricultural Production	5	129.8		- 2.2
Agricultural Service	11	133.0	3.2	1.0
Total Group	16	132.0		

(A) 50,000 or more in population (C) 5,000 or less in population
(B) 5,000 to 50,000 in population (D) Total Mean minus Subgroup Mean

City/Suburban and Rural Open Country participants were compared. A Subgroup Mean Difference of .4 resulted when Male and Female participants were compared. A Subgroup Mean Difference of 3.2 resulted when participants who were Agricultural Service majors and Agricultural Production majors were compared.

In Stage One, Table Four data shows, Non-minority participants achieved a higher mean score at 137.2 than did Minority participants. Rural/Open Country participants achieved a higher mean score at 139.4 than did Large City and Small City/Suburban participants. Female participants achieved a slightly higher mean score at 132.Ø than did Male participants. Agricultural Service Majors achieved a higher mean score at 133.Ø than did Agricultural Production Majors.

2. Questionnaire Data-Mean Score Results by Attitudinal Items

The mean score data by attitudinal items in Stage One were related to Research Objectives One, Two, and Three discussed in Chapter One.

Research Objective One

To determine if undergraduate subjects change attitudes about Interdisciplinary Thinking during the one-term program interval and, if changes did occur, to determine if the changes were associated with participation in the Kellogg Undergraduate Rural Resources Education Pilot Program.

Research Objective Two

To determine if undergraduate subjects changed attitudes about Experiential Education during the one-term program interval and, if changes did occur, to determine if the changes were associated with participation in the Kellogg Undergraduate Rural Resources Education Pilot Program.

Research Objective Three

To determine if undergraduate subjects changed attitudes about Career Opportunity during the one-term program interval and, if changes did occur, to determine if the changes were associated with the Kellogg Undergraduate Rural Resources Education Pilot Program.

Mean Analysis by Interdisciplinary Thinking Attitudinal Items

Table Five shows that a mean score range of 4.56 to 2.38 occured within the thirteen Interdisciplinary Thinking attitudinal items in Stage One. Two items (15.4 percent) had a mean score at or above 4.00 and eleven items (84.6 percent) were below this mean score, and the Grand Mean was

TABLE 5

Stage One Mean Scores of KBS Participants on Interdisciplinary Thinking Attitudinal Items (A)

Interdisciplinary Thinking Items	Mean Scores N = 16		
	Mean	SD	Rank
1. Forming an effective Interdisciplinary Team *	4.56	0.629	1
2. Factors in designing a grazing system	4.06	0.680	2
3. Working with other disciplines to solve problems	3.94	0.573	3
4. Reducing energy costs in farming	3.88	0.718	4
5. Expansion of foreign Agri. Markets ...	3.75	1.060	5
6. Environmentalists and chemical company settlements *	3.63	0.957	6
7. Professors' degrees in one discipline*	3.44	0.892	7
8. Broad vs. specialist training in Ag...	3.44	0.892	7
9. Identity sacrifice to work with other disciplines	3.38	0.957	8
10. Farmers have broad knowledge	3.33	0.816	9
11. Mechanized agriculture and small farms	2.81	0.910	10
12. Farmers have broad educational exp...	2.56	1.090	11
13. Reducing farmer dependency with small machines	2.38	0.806	12
GRAND MEAN	3.47		

(A) 5 = Strongly Agree; 4 = Agree; 3 = Undecided; 2 = Disagree; 1 = Strongly Disagree

3.47. It is interesting to note that there was a wide variance among the mean scores as indicated by the Standard Deviations in Table Five.

As noted by (A) in Table Five, the mean scores for items ranked 1 and 2 show that participants' attitudes generally ranged between Agree and Strongly Agree. Items ranked between 3-9 show participants' attitudes generally ranged between Undecided and Agree. Items ranked between 10-12 show participants' attitudes generally ranged between Disagree and Undecided.

Based on the review of literature and related research in Chapter II, three sub-categories were selected to index the thirteen Interdisciplinary Thinking attitudinal items. These were (1) Working with Other Disciplines, (2) Interrelated Factors of Agricultural Production, and (3) Broad Based Training. Table Five shows three items, #1, #3, and #9 that were indexed as Working With Other Disciplines. Six items, #2, #4, #5, #6, #11, and #13, were indexed as Interrelated Factors of Agricultural Production. Four items #7, #8, #10, and #12 were indexed as Broad Based Training.

Table Five shows participants had more positive attitudes about Working With Other Disciplines than they did about the Interrelated Factors of Agricultural Production and Broad Based Training.

When the Interdisciplinary Thinking items were grouped by sub-categories in Stage One the Grand Means scores were the following: Working With Other Disciplines with a score of 3.96 ranked 1; Interrelated Factors of Agricultural Production with a score of 3.41 ranked 2; and Broad Based Training with a score of 3.41 ranked 3. Thus, in Stage One participants had more positive attitudes about working with other disciplines than they did for the Interrelated Factors of Agricultural Production and Broad Based Training.

Mean Analysis by Experiential Education Attitudinal Items

Table Six shows that a mean score range of 4.81 to 3.13 occured within the ten Experiential Education attitudinal items in Stage One. Five items (50.0 percent) had a mean score at or above 4.00 and five items (50.0 percent) were below this score, and the Grand Mean was 4.04. It is again interesting to note that there is a wide variance among the mean scores as indicated by the Standard Deviations in Table Seven.

As noted by (A) in Table Seven, the mean score items ranked between 1-5 show participants' attitudes generally ranged between Agree and Strongly Agree. Items ranked between 6-9 show participants' attitudes generaly ranged between Undecided and Agree.

Based on the review of literature and related research in Chapter II, two sub-categories were selected to index the ten Experiential Education attitudinal items. These were (1) relating Experiential Education to Competency and (2)

TABLE 6

Stage One Mean Scores of KBS Participants on Experiential Education Attitudinal Items (A)

Experiential Education Items	Mean Scores N = 16 Mean	SD	Rank
1. Work experience and classroom in developing competence	4.81	0.403	1
2. Applied skills improves problem solving	4.56	0.512	2
3. Applied skills training and meeting influential people	4.38	0.718	3
4. Farm work gives insignt on farm problems *	4.25	0.577	4
5. More competency when industry is a classroom	4.00	0.816	5
6. Value clarifacation from real life work experiences *	3.94	0.853	6
7. Farm work enhances nonfarm employment	3.94	1.230	6
8. Hands-on work improves career consciousness	3.89	1.020	7
9. Administrators should require applied skills	3.50	0.816	8
10. Those without extensive Ag. exp. can become as competent as those with..	3.13	1.080	9
GRAND MEAN	4.04		

(A) 5 = Strongly Agree; 4 = Agree; 3 = Undecided; 2 = Disagree; 1 = Strongly Disagree

* negatively stated item in questionnaire; reverse scale used

relating Experiential Education to Career Development. Table Six shows six items, #1, #2, #4, #5, #9, and #10 that were indexed as Experiential Education related to Competency. Four items, #3, #6, #7, and #8 were indexed as Experiential Education related to Career Development.

When the Experiential Education items were grouped by sub-categories in Stage One, the Grand Mean Scores were the following: Both Experiential Education as Competency and Experiential Education as Career Development had scores of 4.04 and ranked equally among particpants.

Mean Analysis by Career Opportunity Attitudinal Items

Table Seven shows that a mean score range of 4.56 to 2.81 occured within the twelve Career Opportunity attitudinal items in Stage One. Eight items (66.7 percent) had a mean score at or above 4.00 and four items (33.3 percent) were below this score, and the Grand Mean was 3.86. Again, it is interesting to note that there was a wide variance among scores as indicated by the Standard Deviations in Table Seven.

As noted by (A) in Table Seven, the mean score items ranked (between) 1-6 show participants' attitudes generally ranged between Agree and Strongly Agree. Items ranked (between) 7-8 show participants' attitudes generally ranged between Undecided and Agree. The item ranked 9 shows

TABLE 7

Stage One Mean Scores of KBS Participants on
Career Opportunity Attitudinal Items (A)

Career Opportunity Items	Mean Scores N = 16		
	Mean	SD	Rank
1. Importance of comm. skills in Agric *	4.56	0.629	1
2. A career in farming is less rewarding than other careers *	4.31	1.010	2
3. Ag. problems are not as important as health problems *	4.31	0.793	2
4. A familiar job is better than a new job *	4.25	0.577	3
5. The same job week after week is good *	4.19	0.544	4
6. The prestige in Ag. is equal to law ..	4.13	0.885	5
7. Ag. majors should have required communitation training	4.13	0.806	5
8. Farming is hard work with little reward *	4.06	1.120	6
9. The independence of farming appeals ..	3.50	1.320	7
10. Technical knowledge is more important than human relations in Ag *	3.13	1.400	8
11. Making money is more important than career contacts in Ag	3.13	1.200	8
12. Low material rewards are okay if high prestige exists	2.81	0.962	9
GRAND MEAN	3.86		

(A) 5 = Strongly Agree; 4 = Agree; 3 = Undecided; 2 = Disagree; 1 = Strongly Disagree

* negatively stated item in questionnaire; reverse scale used

participants' attitudes generally ranged between Disagree and Undecided.

Based on the review of literature and related research in Chapter II, three sub-categories were selected to index the twelve Career Opportunity attitudinal items. These were (1) Farming as a Career Choice, (2) Human Relation Demands in Agriculture, and (3) Career Rewards in Agriculture. Table Seven shows three items #2, #8, and #9 were indexed as Farming as a Career Choice. Four items, #1, #7, #10, and #11 were indexed as Human Relation Demands in Agriculture. Five items, #3, #4, #5, #6, and #12 were indexed as Career Rewards in Agriculture.

When the career opportunity items were grouped by sub-categories in Stage One, the Grand Mean Scores were the following: Farming as a Career Choice with a score of 3.96 ranked 1; Career Rewards in Agriculture with a score of 3.95 ranked a close 2; and Human Relation Demands in Agriculture with a score of 3.74 ranked 3. Thus, in Stage One particpants had more positive attitudes about Farming as a Career Choice than they did for the Career Rewards in Agriculture and the Human Relation Demands in Agriculture.

Summary of Mean Analysis by Attitudinal Items

In Stage One, as indicated by the Grand Means in Tables Five, Six and Seven, KBS Participants generally had more

positive attitudes about Experiential Education attitudinal items. A Grand Mean of 4.04 was obtained in Stage One for Experiential Education attitudinal items. Career Opportunity attitudinal items which obtained a Grand Mean of 3.86 were next. A Grand Mean of 3.47 shows KBS Participants generally had the least positive attitudes about Interdisciplinary Thinking attitudinal items in Stage One.

3. Extrapolated Open-Ended Interview Data

Utilizing content analysis, open-ended statements from interviews were extrapolated into categories A-H and summarized in Stage One. The data which follow in Categories A-H were related to the research objectives pertaining to the demographic variables discussed in Chapter I. These were the independent variables related to the dependent variables of attitudes about Interdisciplinary Thinking, Experiential Education, and Career Opportunities. Each participant's open-ended response statement was preceded by an alpha numeric code to ensure participant anonymity and reader understanding of the demographic variable being assesed.

The alpha numeric coding for the analysis of participant response to open-ended interview questions were the following:

Alpha = major

Agricultural Service)

AGCO = Agricultural Communications
RD = Resource Development
FSM = Food Systems Management
AGBI = Agricultural Biochemistry
ANRE = Ag. & Natural Resources Ed.
AGPK = Agricultural Packaging
AGNP = Ag No-Pref

ANS = Animal Science
HORT = Horticulture
CSS = Crop & Soil Sciences
AE = Ag. Engineering

Numeric = Gender, Status and Residence

1st numeral = gender (1 = female; 2 = male)
2nd numeral = status (1 = non-minority; 2 = minority)
3rd numeral = residence (1 = rural/open country; 2 = small city/suburban; 3 = large city)

Example: 12AGCO3 = A participant who is female, minority

It is strongly suggested that the reader see the Stage Two Field Observational Reports in Appendix D. It will provide greater clarity concerning the causal relationships between the results of the questionnaire and interview data presented and analyzed in this chapter.

Research Objective Four

To determine if changes in the attitudes of undergraduate subjects were on the basis of Minority Status during the one-term program interval.

Research Objective Six

To determine if changes in attitudes of undergraduate subjects were on the basis of Place of Residence during the one-term program interval.

Research Objective Eight

To determine if changes in attitudes of undergraduate subjects was on the basis of Gender during the one-term program interval.

Research Objective Ten

To determine if there were differences in attitudes of undergraduate subjects on the basis of Agricultural Major in the one-term program interval.

Analysis of Participant Response to the Concept System

The participants were asked, what do you feel the concept system means? They identified two categories: a system as the interrelations between process and product and a system as the interrelations between operational units.

A. A system as the interrelations between process and product (35.7 percent in Stage One)

Thirty-Six percent of participants stated that a system represented interrelations between process and product (IPP). The participants' paraphrased responses in this category included organizations producing a product for the community, working with others to create an end product, farming in relation to inputs and outputs and from conception to the table.

B. A system as the interrelations between operational unit (50.0 percent in Stage One)

Fifty percent of the participants stated that a system represented interrelations between operational units (IOU). The participants' paraphrased responses in this category included, working parts as a unit, functions working together, and crops and livestock operating together.

The KBS participants' paraphrased responses from both categories were as follows:

12AgCo4:	Big Industry combines everything we do.
12RD4:	The way something operates.
12AE4:	Organizations working together to help put out a product for the community.
12AgBi4:	Integral parts working together as a unit.
12Hort4:	Functions that work together.
22AgPK4:	Process a product goes through, like in dairy.
11ANS3:	Nothing (no response).
11RD3:	Working with others to create an end product.
11FSM3:	What happens on the farm with inputs and outputs.
11CSS1:	Means nothing (no response).
21AgNP3:	Personal order of work.
21FSM1:	Crops and livestock operating together.
21CSS1:	The way things are supposed to work.
21ANRE1:	From conception to the table and all products in between.

The participants' viewpoints about the concept system were used as an indication of attitudinal changes about Interdisciplinary Thinking in the study. Their responses were categorized as either Interrelations as Process and

Product (IPP), or as Interrelations as Operational Units (IOU). An analysis of participant response was conducted. In Table Eight, the results of this analysis were summarized in relation to Group Demographic Variables.

In Stage One, Table Eight shows the difference in responses between IPP and IOU was 34.4 percent among Minority participants. There was no difference in responses between IPP and IOU among Non-minority participants. Minority participants' attitudes were moderately in favor of the IOU category (66.7 percent. Non-minority participants' attitudes showed heterogeniety between IPP and IOU with (35.7 percent) in each category.

There were no differences between Large City Participants and Minority participants. In Stage One the difference between the IPP and IOU categories with 25.0 percent among Small City/Suburban participants. The difference between the IPP and IOU categories was 25.0 percent among Rural/Open Country participants. Small City/Suburban participants' attitudes slightly favored the IPP category 50.0 percent. Rural/Open Country participants' attitudes slightly favored the IOU category (50.0 percent).

In Stage One, the difference between the IPP and IOU categories was 20.0 percent among Male participants. The difference between the IPP and IOU categories was 11.1 percent among Female participants. Male participants' attitudes slightly favored the IOU category (60.0 percent). Female participants' attitudes also slightly favored the IOU

TABLE 8

Stage One Participant Response to the Concept
Concept system in Extrapolated Categories

Group Demographic Variables	N	Other No. Res	Other %	Interrelations as Process and Product (IPP) No. Res	IPP %	Interrelations as Operational Units (IOU) No. Res	IOU %
Minority Status							
Minority	6	0	0.0	2	33.3	4	66.7
Non-minority	8	2	25.0	3	37.5	3	37.5
Place of Residence							
Large City (A)	6	0	0.0	2	33.3	4	66.7
Small City/ Suburban (B)	4	1	25.0	2	50.0	1	25.0
Rural/Open Country (C)	4	1	25.0	1	25.0	2	50.0
Gender							
Male	5	0	0.0	2	40.0	3	60.0
Female	9	2	22.2	3	33.3	4	44.4
Agricultural Major							
Ag. Production	5	2	40.0	1	20.0	2	40.0
Ag. Service	9	0	0.0	4	44.4	5	55.6
Total Group	14	2	14.3	5	35.7	7	50.0

(A) 50,000 or more in population (B) 5,000 to 50,000 in population
(C) 5,000 or less in population

category (44.4 percent).

In Stage One, the difference between the IPP and IOU categories was 11.2 percent among participants who were Agricultural Service Majors. The difference between the IPP and IOU categories was 20.0 percent among participants who were Agricultural Production Majors. Agricultural Service Majors' attitudes slightly favored the IOU category (40.0 percent).

In summary, the Stage One difference between the IPP and IOU categories was 14.3 percent among the Total Group. As a Total Group, the participants' attitudes slightly favored Interrelations as Operational Units (IOU) (50.0 percent); as opposed to 35.7 percent for Interrelations as Process and Products (IPP). When the participant response of the Total Group were compared to those of the Demographic Groups, Minority and Large City participants' attitudes were most different from the Total Group.

Analysis of Participant Response to Observed Agricultural Systems

The participants were asked, what are some of the agricultural systems you have observed? They identified two categories: observed agricultural systems related to vertical integration and observed agricultural systems related to horizontal integration.

C. Observed agricultural systems related to vertical integration (21.4 percent in Stage One)

Twenty-one percent of the participants associated agricultural systems with vertical integration (VI). The participants' paraphrased responses in this category included listing the components of the forestry industry, listing the components of cherry farm enterprise and various operations on a dairy farm.

D. Observed agricultural systems related to horizontal integration (64.3 percent in Stage One).

Sixty-Five percent of the participants associated agricultural systems with horizontal integration (HI). The participants' paraphrased responses in this category included factors associated with crop production, various farm and non-farm sectors, the cost of production and mixed farming operations.

The KBS participants' paraphrased responses from both categories were represented by the following:

12RD4:	The forestry Industry--Divisions, Timber, Parks and Recreation and Soil.
12AE4:	The fertilization of crops--fertilization, weather and insect control.
12AGBI4:	Cherry Farm--trees, land, supervisors,

	pickers and Tractors.
12HORT4:	Could not or would not respond
12AGCO4:	Laws, other countries lack of food, food supplies we provide--farm people, business, politics, and every part of life.
22AGPK4:	Dairy Farms--cows are put in a stable, milked, the milk is cooled and trucked and inspected.
11ANS3:	Could not or would not respond.
11RD3:	Harvesting--farmer expenses, chances in marketing potential profit.
11FSM3:	Crops not sure, cattle from bull to market--seed fertilizer, plowing cultivation, rocks, plant, irrigate spray, harvest.
11CSS1:	Beef cattle and Cash Crops--weather and chemicals.
21AGNP3:	Beef operation--harvesting financing and labor.
21FSM1:	Swine, Beef, Dairy, Sheep, Muck--In the hog operation there are people, finances, storage and trust.
21ANRE1:	Retail seed and fertilizer--Management, inventory, sales, records.
21CSS1:	Small farms--Dairy farm, workers and suppliers they use.

Table Nine shows that participants across all Group Demographic Variables tended to view the Agricultural system in terms of Horizontal Integration. For example, instead of several related components of one sector as in Vertical Integration, the participants tended to relate the beef production sector to the marketing sector as components of the Agricultural system.

An analysis of participant response was conducted on the question of participants' attitudes about observed Agricultural systems in the extrapolated categories of Vertical Integration (VI) and Horizontal Integration (HI). This analysis was summarized in Table Twelve data in relation to Group Demographic Variables.

In Stage One the difference between the VI and HI

TABLE 9

Stage One Participant Response about Observed Agricultural Systems in Extrapolated Categories

Group Demographic Variables	N	Other No. Res	Other %	Vertical Integration (VI) No. Res	Vertical Integration (VI) %	Horizontal Integration (HI) No. Res	Horizontal Integration (HI) %
Minority Status							
Minority	6	1	16.7	2	33.3	3	50.0
Non-minority	8	1	12.5	1	12.5	6	75.0
Place of Residence							
Large City (A)	6	1	16.7	2	33.3	3	50.0
Small City/ Suburban (B)	4	1	25.0	0	0.0	3	75.0
Rural/Open Country (C)	4	0	0.0	1	25.0	3	75.0
Gender							
Male	5	0	0.0	2	40.0	3	60.0
Female	9	2	22.2	1	11.1	6	66.7
Agricultural Major							
Ag. Production	5	2	40.0	2	40.0	1	20.0
Ag. Service	9	0	0.0	1	11.1	8	88.9
Total Group	14	2	14.3	3	21.4	9	64.3

(A) 50,000 or more in population (B) 5,000 to 50,000 in population
(C) 5,000 or less in population

categories was 16.7 percent among Minority participants. The difference between the VI and HI categories was 62.5 percent among Non-minority participants. Minority participants' attitudes slightly favored the HI category (50.0 percent). Non-minority participants' attitudes were skewed toward the HI category (75.0 percent).

There were no differences between Large City participants and Minority participants. In Stage One, the difference between the VI and HI categories was 75.0 percent among Small City/Suburban participants. The difference between the VI and HI categories was 50.0 percent among Open/Rural Country participants. Small City/Suburban participants' attitudes were skewed toward the HI category (75.0 percent). Rural/Open Country participants' attitudes were slightly less skewed toward the HI category also (75.0 percent).

In Stage One, the difference between the VI and HI categories was 20.0 percent among Male participants. The difference between the VI and HI categories was 56.0 percent among Female participants. Male participants' attitudes slightly favored the HI category (60.0 percent). Female participants ' attitudes were skewed toward the HI category (66.7 percent).

In Stage One the difference between the VI and HI categories was 77.6 percent among participants who were Agricultural Service Majors. The difference between the VI and HI categories was 20.0 percent among participants who were Agricultural Production Majors. Agricultural Service Majors' attitudes were skewed toward the HI category (88.8 percent). Agricultural Production Majors' attitudes slightly favored the VI category (40.0 percent).

In summary, the Stage One difference between the VI and HI categories was 42.9 percent among the Total Group. As a Total Group the participants' attitudes were skewed toward Horizontal Integration (HI) (64.3 percent); as opposed to 21.4 percent for Vertical Integration (VI). When the participant response of the Total Group were compared to those of the Demographic Groups, the Agricultural Production Majors' attitudes were most different from the Total Group.

Analysis of Participant Response to the Concept Experiential Eduation

The participants were asked, what do you feel the concept of experiential education means? They identified two categories: experiential education related to learning by doing and experiential education in relation to a real life situation.

E. The concept Experiential Education related to Learning by Doing (38.Ø percent in Stage One)

Thirty-Eight percent of the participants associated Experiential Education with Learning by Doing (LBD). The participants' paraphrased responses in this category included hands-on work in a related tield, the supervised doing of things, learning to do and learning by performing.

F. The concept Experiential Education related to a Real Life Situation (53.Ø percent in Stage One)

Fifty percent of the participants associated Experiential Education to a real life situation (RLS). The participants` responses in this category included learning outside the classroom, knowledge gained in a real life situation and hands-on experience in basic skills on the job.

The participants` responses from both categories were represened by the following:

12RD3:	Learning by Doing
12AE3:	Students learn outside the classroom
12AGBI3:	Applying knowledge gained to a real life situation.
12HORT3:	Hands-on experience in basic skills used on the job.
12AGCO3:	On the job working and learning.

22AGPK3:	Practical skills in work study or an internship
11ANS2:	Hands-on experience in a related field.
11RD2:	Hands-on experience using stored knowledge in the real world.
11FSM2:	Getting dirty in work; supervised doing of things.
11CSS1:	Knowledge gained by using equipment in a real life situation.
21AGNP2:	Better experience and broad background of general knowledge to help a major focus.
21FSM1:	Applied operations, learning to do.
21CSS1:	Like the KBS program.
21ANRE1:	Learning by performing.

An analysis of participant response was conducted on the question of participants' attitudes about Experiential Education in the extrapolated categories of Learning by Doing (LBD) and a Real Life Situation (RLS). This analysis was summarized in Table Ten data in relation to Group Demographic Variables.

In Stage One the difference between the LBD and RLS categories was 66.7 percent among Minority participants. The difference between the LBD and RLS categories was 25.0 percent among Non-minority participants. Minority participants' attitudes were skewed toward the RLS category (83.3 percent). Non-minority participants' attitudes were moderately in favor of the LBD category (50.0 percent).

There were no differences between Large City participants and Minority participants in Stage One. The difference between the LBD and RLS categories was 25.0 percent among Small City/Suburban participants. The difference between the LBD and RLS categories was 25.0 percent among Rural/Open Country participants. Both Small

TABLE 10

Stage One Participant Response to the Concept Experiential Education in Extrapolated Categories

Group Demographic Variables	N	Other No. Res	Other %	Learning by doing (LBD) No. Res	Learning by doing (LBD) %	Real Life Situation (RLS) No. Res	Real Life Situation (RLS) %
Minority Status							
Minority	6	0	0.0	1	16.7	5	83.3
Non-minority	8	2	25.0	4	50.0	2	25.0
Place of Residence							
Large City (A)	6	0	0.0	1	16.7	5	83.3
Small City/ Suburban (B)	4	1	25.0	2	50.0	1	25.0
Rural/Open Country (C)	4	1	25.0	2	50.0	1	25.0
Gender							
Male	5	2	40.0	2	40.0	1	20.0
Female	9	0	0.0	3	33.3	6	66.7
Agricultural Major							
Ag. Production	5	1	20.0	1	20.0	3	60.0
Ag. Service	9	1	11.2	4	44.4	4	44.4
Total Group	14	2	14.3	5	35.7	7	50.0

(A) 50,000 or more in population (B) 5,000 to 50,000 in population
(C) 5,000 or less in population

City/Suburban participants and Rural/Open Country participants` attitudes slightly favored the LBD category (50.0 percent).

In Stage One, the difference between LBD and RLS was 20.0 percent among Male participants. The difference between the LBD and RLS categories was 33.4 percent among Female participants. Male participants` attitudes slightly favored the LBD category (40.0 percent). Female participants` attitudes were moderately in favor of the RLS category (66.7 percent).

In Stage One, there was no difference between the LBD and RLS categories among participants that were Agricultural Service Majors. The difference between the LBD and RLS categories was 40.0 percent among participants that were Agricultural Production Majors. The Agricultural Service Majors` attitudes resulted in heterogeniety (44.4 percent) when the LBD and RL categories were compared. Agricultural Production Majors` attitudes were moderately in favor of the RLS category (60.0 percent).

In Summary, The Stage One difference between the LBD and RLS categories was 14.3 percent among the Total Groups. As a Total Group the participants` attitudes slightly favored the Real Life Situation (RLS) category (50.0 percent); as opposed (35.7 percent) for the Learning by Doing LBD category. When the participant response of the Total Group were compared to those of the Demographic Groups, the Minority, Large City and Agricultural Service participants were more different from the Total Group.

Analysis of Participant Response to Experiential Education in Relation to Career Development

The participants were asked, How will experiential education assist in developing a career? They identified two categories: Experiential Education in relation to experience in a career and Experiential Education in relation to trial and error in a career.

G. Experiential Education in relation to Experience in a Career (35.7 percent in Stage One)

Thirty-Six percent of the participants related Experiential Education to Experience gained in a Career (EIC). The participants` repsonses in this category included experience you can use in a career, and hands-on experience provides experience needed in a job.

H. Experiential Education in relation to Trial and Error in a Career (57.1 percent in Stage One)

Fifty-Seven percent of the participants related

Experiential Education to the process of Trial and Error in making a Career choice (TEC). The participants' responses in this category included help in finding a career you like, awareness of career opportunities available and learning if you enjoy a particular career.

The participants' paraphrased responses from both categories

were represented by the following:

12RD3:	You know what to expect and know exactly what to do.
12AE3:	By understanding the field, challenges and insights into farming.
12AGBI3:	Helps you make a decision on if you're in the righ field.
12HORT3:	It gives you experience you can use in a career.
12AGCO3:	You get a better idea of what you want to go into.
22AGPK3:	Hands-on experience provides experience needed in a job.
11ANS2:	Better understanding of a job and how to get one.
11RD2:	Make me aware ot how many career opportunities are available.
11FSM2:	Helps you find out if you like a career.
11CSS1:	No comment.
21AGNP:	See what goes on in a career pro and con.
21FSM1:	Learn if you will enjoy doing a particular career.
21CSS1:	Provides you with trial and error interaction with people who know the field.
21ANRE1:	Learn whether to enter an occupation by trying it.

An analysis of participant response was conducted on the question of participants' attitudes about Experiential Education in relation to Career Development. This analysis was summarzied in Table Eleven data in relation to Group Demographic Variables.

TABLE 11

Stage One Participant Response to Experiential Education and Career Development in Extrapolated Categories

Group Demographic Variables	N	Other No. Res	Other %	Experience in a Career (EIC) No. Res	Experience in a Career (EIC) %	Trial and Error in a Career (TEC) No. Res	Trial and Error in a Career (TEC) %
Minority Status							
Minority	6	0	0.0	4	66.7	2	33.3
Non-minority	8	1	12.5	1	12.5	6	75.0
Place of Residence							
Large City (A)	6	0	0.0	4	66.7	2	33.3
Small City/ Suburban (B)	4	0	0.0	1	25.0	3	75.0
Rural/Open Country (C)	4	1	25.0	0	0.0	3	75.0
Gender							
Male	5	0	0.0	1	20.0	4	80.0
Female	9	1	11.2	4	44.4	4	44.4
Agricultural Major							
Ag. Production	5	1	20.0	3	60.0	1	20.0
Ag. Service	9	0	0.0	2	22.2	7	77.8
Total Group	14	1	7.2	5	35.7	8	57.1

(A) 50,000 or more in population (B) 5,000 to 50,000 in population
(C) 5,000 or less in population

In Stage One, the difference between the EIC and TEC categories was 33.3 percent among Minority participants. The difference between the EIC and TEC categories was 62.5 percent among Non-minority participants. Minority participants' attitudes were moderately in favor of the EIC category (66.7 percent). Non-minority participants' attitudes were skewed toward the TEC category (75.0 percent).

There were no differences between Large City participants and Minority participants. In Stage One the difference between the EIC and TEC categories was 25.0 percent among small City/Suburban participants. The difference between the EIC and TEC categories was 75.0 percent among Rural/Open Country participans. Small City/Suburban participants' attitudes were moderately in favor of the TEC category (75.0 percent). Open Rural Country participants' attitudes were skewed toward the TEC category (75.0 percent).

In Stage One, the difference between the EIC and TEC categories was 60.0 percent among Male participants. There was no difference between the EIC and TEC categories among Female participants. Male participants' attitudes were skewed toward the TEC category (80.0 percent). Female participants' attitudes resulted in heterogeniety at (44.4 percent) when the EIC and TEC categories were compared.

In Stage One, the difference between the EIC and TEC categories was 55.6 percent among partcipants that were

Agricultural Service Majors. The difference between the EIC and TEC categories was 40.0 percent among participants that were Agricultural Production Majors. The Agricultural Service Majors' attitudes were skewed toward the TEC category (77.8 percent). The Agricultural Production Majors' attitudes were moderately in favor of the EIC (60.0 percent).

In summary, the Stage One difference between the EIC and TEC categories was 21.4 percent among the Total Group. As a Total Group, the participants' attitudes slightly favored the Trial and Error (TEC) category (57.1 percent); as opposed to 35.7 percent for the Experience in a Career (EIC) category. When the participant response of the Total Group were compared to those of the Demographic Groups, the Male, Non-minority, Agricultural Service, Minority, Large City and Agricultural Production participipnts were most different from the Total Group. The Male, Non-minority and Agricultural Service participants' attitudes were skewed toward the TEC category (80.0, 75.0, and 77.8 percent) respectively. The Minority, Large City and Agricultural Production participants' attitudes moderately favored the EIC category 66.7 and 60.0 percent, respectively.

Stage Three

1. Comparative Questionnaire Data-Mean Score Results by Demographic Groups.

The mean score date by demographic groups in Stage One and Stage Three were related to research objectives Five, Seven, Nine and Eleven discussed in Chapter One.

Research Objective Five

To determine if there were differences in the attitudes of undergraduate subjects at the beginning and the end of the one-term program interval on the basis of Minority Status.

Research Objective Seven

To determine if there were differences in the attitudes of undergraduate subjects at the beginning and the end of the one-term program interval on the basis of Place of Residence.

Research Objective Nine

To determine if there were differences in the attitudes of undergraduate subjects at the beginning and the end of the one-term program interval on the basis of Gender.

Research Objective Eleven

To determine if there was differences in the attitudes of undergraduate subjects at the beginning and end of the one-term program interval on the basis of Agricultural Major.

Comparative Mean Analysis by Group Demographic Variables

The data in Table Twelve show that in Stage One, the Non-minority participants' mean score was 11.9 points greater than the Minority participants as evidenced by the Subgroup Mean Difference. While both groups of participants increased their mean scores the Subgroup Mean Difference between the Non-minority participants and the Minority participants was reduced to 3 points in Stage Three. The Minority participants' mean score increased by 13.7 points in Stage Three. The Non-minority participants' mean scores increased by 4.8 points in Stage Three.

The Large City participants were identical to Minority participants. Table Twelve shows that the Small City/Suburban participants' mean score was 9.2 points greater than the Large City participants as evidenced by the Subgroup Mean Difference. Also, in Stage One the Rural/Open Country participants' mean score was 14.1 points greater than the Large City participants. While all three groups of participants increased their mean scores in Stage Three, the Subgroup Mean Difference between the Large City participants and Small City/Suburban participants was reduced to zero in Stage Three. The Subgroup Mean Difference between Rural Open

TABLE 12

Stage One and Stage Three KBS Participant Mean Scores on Attitudinal Questionnaire

Demographic Groups	N	Stage One	Mean Dif.	Mean Dif. (D)	Stage Three	Mean Dif.	Mean Incr.
Minority Status							
Minority	7	125.3	---	-6.7	139.0	---	13.7
Non-minority	9	137.2	11.9	5.2	142.0	3.0	4.8
Place of Residence							
Large City (A)	7	125.3	14.1	-6.7	139.0	6.0	13.7
Small City/ Suburban (B)	4	134.5	9.2	2.5	139.0	---	4.5
Rural/Open Country (C)	5	139.4	4.9	7.4	145.0	6.0	5.6
Gender							
Male	5	131.6	---	-0.4	139.0	---	7.4
Female	11	132.0	0.4	---	142.0	3.0	10.0
Agricultural Major							
Ag. Production	5	129.8	---	-2.2	141.0	---	11.2
Ag. Service	11	133.0	3.2	1.0	141.0	---	8.0
Total Group	16	132.0	---	---	140.8	---	7.2

(A) 50,000 or more in population
(B) 5,000 to 50,000 in population
(C) 5,000 or less in population
(D) Total Mean minus Subgroup Mean

Country participants and Large City participants was reduced to 6.Ø points in Stage Three. The Subgroup Mean Difference between Rural/Open Country participants and Small City/Suburban participants was increased to 6.Ø points in Stage Three. The Small City/Suburban participants' mean score was increased by 4.5 points in Stage Three. The Rural Open Country participants' mean score was increased by 5.6 points in Stage Three.

In Stage One, the Male participants' mean score was only .4 points greater than the Female participants as evidenced by the Subgroup Mean Difference. While both groups of participants increased their mean scores in Stage Three, Subgroup Mean Differences between both groups was increased to 3 points in Stage Three.

The Female participants' mean score was increased by 1Ø.Ø in Stage Three. The Male participants' mean score increased by 7.4 points in Stage Three.

In Stage One, the Agriculture Service participants' mean score was 3.2 points greater than the Agricultural Production participants' as evidenced by the Mean Difference. While both groups of participants increased their mean scores in Stage Three, the Subgroup Mean Difference between both groups was reduced to zero in Stage Three. The Agricultural Production participants' mean score increased by 11.2 points in Stage Three. The Agricultural Service participants' mean score increased by 8.Ø points in Stage Three.

In Stage One, the Total Group's mean was 132 and in Stage Three the Total Group's mean was 140.8. This represented an increase in the Total Group's mean score of 7.2 points between Stage One and Stage Three.

Research Objective Seven

To determine if there were differences in the attitudes of undergraduate subjects at the beginning and the end of the one-term program interval on the basis of Place of Residence.

2. Questionnaire data-Mean Score Results by Attitudinal Items

The mean score data by attitudinal items in Stage Three were related to Research Objectives One, Two and Three discussed in Chapter I.

Research Objective One

To determine if undergraduate subjects changed attitudes about Interdisciplinary Thinking during the one-term program interval, and if changes did occur, to determine if the changes were associated with participation in the Kellogg Undergraduate Rural Resources Education Pilot Program.

Research Objective Two

To determine if undergraduate subjects changed attitudes about Experiential Education during the one-term program interval, and if changes did occur, to determine if the changes were associated with participation in the Kellogg Undergraduate Rural Resources Education Pilot Program.

Research Objective Three

To determine if undergraduate subjects change attitudes about Career Opportunities during the one-term program interval and, if changes did occur, to determine if the changes were associated with participation in the Kellogg Undergraduate Rural Resources Education Pilot Program.

KBS Participants' Comparative Mean Analysis on Interdisciplinary Thinking

Table Thirteen shows that a mean score range of 4.69 to 3.31 occured within the 13 Interdisciplinary Thinking attitudinal items in Stage Three as compared to a mean score range of 4.56 to 2.38 in Stage One. In Stage Three, seven items (53.8 percent) had a mean score at or above 4.ØØ. These included all of the top eight ranked items in Stage One except #5 and #7. Six items (46.2 percent) were below this mean score. In comparison, only the two items (15.4

TABLE 13

Stage One and Stage Three Mean Scores of KBS Participants on Interdisciplinary Attitudinal Items (A)

Interdisciplinary Items	Mean Scores: Stage One Mean	SD	Rank	Stage Three Mean	SD	Incr.
1. Forming an effective interdisciplinary team * ...	4.56	.629	1	4.69	.478	+.13
2. Factors in designing a grazing system	4.06	.680	2	4.13	1.02	+.07
3. Willing to work with other disciplines to problem solve	3.94	.573	3	4.69	.478	+.75
4. Reducing energy costs in farming	3.88	.718	4	4.50	.632	+.62
5. Expansion of foreign agricultural markets	3.75	1.06	5	3.56	1.31	-.19
6. Environmentalists and chemical co. settlements * .	3.63	.957	6	4.06	1.06	+.43
7. Professors' degrees in one discipline *	3.44	.892	7	3.81	1.04	+.37
8. Broad vs. specialist training in agriculture	3.44	.892	7	4.00	1.03	+.56
9. Identity sacrifice to work with other disciplines	3.38	.957	8	4.06	.680	+.68
10. Farmers have broad knowledge	3.33	.816	9	3.38	1.59	+.05
11. Mechanized agriculture over small farms *	2.81	.910	10	3.25	1.39	+.44
12. Farmers have broad educational experiences ...	2.56	1.09	11	3.06	1.48	+.50
13. Reduce farmers' dependency by using small machines ...	2.38	.806	12	3.31	1.40	+.93
GRAND MEAN		3.47			3.88	+.43

(A) 5 = Strongly Agree; 4 = Agree; 3 = Undecided; 2 = Disagree; 1 = Strongly Disagree

* Negatively stated in questionnaire; reverse scale used

percent) ranked #1 and #2 had a mean score at or above 4.00 and eleven items (84.6 percent) were below this score in Stage One.

It is interesting to note that while the mean scores increased considerably for the Interdisciplinary Thinking attitudinal items in Stage Three, the variance of the mean scores were more widely distributed. Nine out of thirteen or 69.2 percent of the mean scores had Standard Deviations that were higher in Stage Three.

Table Thirteen shows that with a mean increase of .75 points or from 3.94 to 4.69 for item #3, Willing to Work with Other Disciplines to Problem Solve, had the greatest positive change. In contrast, item #5, Expansion of Foreign Agricultural Markets, had the greatest negative change with a mean decrease of .24 points or from 3.75 to 3.56 in Stage Three.

The three sub-categories selected to index the thirteen Interdisciplinary Thinking attitudinal items were based on the Review of Literature and Related Research in Chapter Two. When the Interdisciplinary Thinking sub-categories were compared to Stage One and Stage Three, participants continued to have more positive attitudes about Working With Other Disciplines. The Grand Mean increase for the above sub-category was .52 points or from 3.96 to 4.48. The Grand Mean increased by .39 points or from 3.41 to 3.80 for items in the sub-category of Interrelated Factors of Agricultural Production. The Grand Mean increased by .37 points or from

3.19 to 3.56 for items in the sub-category of Broad Based Training.

KBS Participants' Comparative Mean Analysis on Experiential Education

Table Fourteen shows that a mean score range of 4.63 to 3.69 occured within the ten Experiential Education attitudinal items in Stage Three as compared to a mean score range of 4.81 to 3.13 in Stage One. In Stage Three, 6 items (60.0 percent) had a mean score at or above 4.00 and 4 items (40.0 percent) were below this mean score. In comparison, 5 items (50.0 percent) had a mean score at or above 4.00 and 5 items (50.0 percent) were below this mean score in Stage One. The Grand Mean was 4.11 as compared to a Grand Mean of 4.04 in Stage One.

It is interesting to note that while the mean scores increased slightly for the Experiential Educational attitudinal items in Stage Three, the variance of the mean scores were considerably more widely distributed. Eight out of ten or 80.0 percent of the mean scores had Standard Deviations that were slightly higher in Stage Three.

Table Fourteen shows that with a mean score increase of .56 points or from 3.13 to 3.69 in item #10, Those Without Extensive Agriculture Experience can Become as Competent as Those With, had the greatest positive change. In contrast,

TABLE 14

Stage One and Stage Three Mean Scores of KBS Participants on Experiential Education Attitudinal Items (A)

	Mean Scores					
	Stage One			Stage Three		
Experiential Education Items	Mean	SD	Rank	Mean	SD	Incr.
1. Work exp. and classroom in developing competence	4.81	.403	1	4.63	.500	-.18
2. Applied skills improves problem solving	4.56	.512	2	4.56	.813	+0.0
3. Applied skills training and meeting influencial people .	4.38	.718	3	4.69	.478	+.31
4. Farm work gives insights on farm problems *	4.25	.577	4	4.19	.655	-.06
5. More competency when industry is a classroom	4.00	.816	5	4.13	1.02	+.13
6. Value clarification from real life experiences *	3.94	.853	6	3.81	1.17	-.13
7. Farm work enhances nonfarm employment	3.94	1.23	6	4.00	.632	+.06
8. Hands-on work improves career consciousness	3.89	1.02	7	3.50	1.32	-.39
9. Administrators should require applied skills	3.50	.816	8	3.94	1.34	+.44
10. Those without extensive ag. exp. can be as competent as those with	3.13	1.08	9	3.69	1.14	+.56
GRAND MEAN		4.04			4.11	+.07

(A) 5 = Strongly Agree; 4 = Agree; 3 = Undecided; 2 = Disagree; 1 = Strongly Disagree

* Negatively stated in questionnaire; reverse scale used

item #8, Hands-on Work Improves Career Consciousness, had the greatest negative change with a mean decrease of .39 points or from 3.89 to 3.50 in Stage Three.

The two sub-categories selected to index the ten Experiential Education items were based on the Review of Literature and Related Research in Chapter Two. When Experiential Education sub-categories were compared to Stage One and Stage Three, particpants had more positive attitudes about Experiential Education as competency in Stage Three than they did about Experiential Education as Career Development. In Stage Three Experiential Education as competency had a Grand Mean increase of .15 points or from 4.04 to 4.19. In the same stage Experiential Education as Career Development had a Grand Mean decrease of .4 points or from 4.04 to 4.00.

<u>KBS Participants' Comparative Mean Analysis on Career Opportunity</u>

Table Fifteen shows that a mean score range of 4.89 to 1.13 occured within the twelve Career Opportunity Attitudinal items in Stage Three as compared to a mean score range of 4.56 to 2.81 in Stage One. In Stage Three, eight items (66.7 percent) had a mean score at or above 4.00 and four items (33.3 percent) were below this mean score. In comparison, the same percentage distribution at or above

TABLE 15

Stage One and Stage Three Mean Scores of KBS Participants on Career Opportunity Attitudinal Items (A)

Career Opportunity Items	Mean Scores					
	Stage One			Stage Three		
	Mean	SD	Rank	Mean	SD	Incr.
1. Importance of communication skills in agriculture *	4.56	.629	1	4.89	.341	+.33
2. A career in farming vs. other careers *	4.31	1.01	2	4.31	1.20	+0.0
3. Problem solve in ag. over health *	4.31	.793	2	4.56	.629	+.25
4. A familiar job is better than a new job *	4.25	.577	3	4.13	.885	-.12
5. The same job week after week is good *	4.19	.544	4	4.19	.750	+0.0
6. The prestige in agriculture is equal to law	4.13	.885	5	4.25	.755	+.07
7. Ag. majors should have required comm. training	4.13	.806	5	4.50	.516	+.37
8. Farming is hard work with little reward *	4.06	1.12	6	4.50	1.03	+.44
9. The independence of farming appeals	3.50	1.32	7	3.69	1.35	+.19
10. Tech. knowledge over human relations in ag. *	3.13	1.40	8	3.56	1.36	+.43
11. Making money is less impt. than career contacts	3.13	1.20	8	3.31	1.25	+.18
12. Low material rewards okay if high prestige exists ...	2.81	.962	9	1.13	.342	-1.68
GRAND MEAN		3.86			3.92	+.06

(A) 5 = Strongly Agree; 4 = Agree; 3 = Undecided; 2 = Disagree;
1 = Strongly Disagree

* Negatively stated in questionnaire; reverse scale used

4.00 occured in Stage One. The Grand Mean was 3.88 as compared to a Grand Mean of 3.86 in Stage One.

It is interesting to note that while the mean scores increased slightly for the Experiential Educational attitudinal items in Stage Three, the variance of the mean scores were less wide. Seven out of twelve or 58.3 percent of the mean scores had Standard Deviations that were lower in Stage Three.

Table Fifteen shows that a mean increase of .44 points or from 4.06 to 4.50 for item #8, Farming as Hard Work and Little Reward, had the greatest positive change. In contrast, item #12, Low material Rewards Okay if High Prestige Exists, had the greatest negative change with a mean decrease of 1.68 points or from 2.81 to 1.13 in Stage Three.

The three sub-categories selected to index the twelve Career Opportunity items were based on the Review of Literature and Related Research in Chapter Two. When Career opportunity sub-categories were compared to Stage One and Stage Three, participants continued to have more positive attitudes about careers in Farming. The above sub-category had a Grand Mean increase of .21 points or from 3.96 to 4.17. Career Rewards in Agriculture had a Grand Mean increase of .12 points or from 3.95 to 4.07. Human Relation Demands in Agriculture had a Grand Mean decrease of .9 points or from 3.74 to 3.65.

Summary of KBS Participants' Comparative Mean Analysis

Participants were again most positive about Experiential Education attitudinal items. Career Opportunity items again followed, and participants were least positive about Interdisciplinary Thinking attitudinal items.

In terms of the most positive change among the three attitudinal categories, Interdisciplinary Thinking showed the greatest Grand Mean increase in Stage Three. The Grand Mean increase was .41 points or from 3.47 in Stage One to 3.88 in Stage Three. Experiential Education followed with a considerably lower Grand Mean increase at .7 points or from 4.04 in Stage One to 4.11 in Stage Three. Career Opportunity showed the least Grand Mean increase in Stage Three. The Grand Mean increase was .6 points or from 3.86 in Stage One to 3.92 in Stage Three.

3. Extrapolated Open-Ended Interview Data

Utilizing Content Analysis, open-ended statements from interviews were transcribed and extrapolated into categories and summarized in Stage Three. The data in categories A-H which follow were related to the research objectives pertaining to the demographic variables discussed in Chapter

I. Each participant's open-ended response statement was preceded by an alpha numeric code to ensure participant anonymity and reader understanding of the demographic variables being assessed.

It is strongly suggested that the reader see the Stage Two Observational Reports in Appendix D. It will provide greater clarity concerning the causal relationships between the results of the questionnaire and interview data presented and analyzed in this chapter.

Research Objective Five

To determine if there were differences in the attitudes of undergraduate subjects at the beginning and the end of the one-term program interval on the basis of Minority Status.

Research Objective Seven

To determine if there were differences in the attitudes of undergraduate subjects at the beginning and the end ofthe one-term program interval on the basis of Place of Residence.

Research Objective Nine

To determine if there were differences in the attitudes of undergradute subjects at the beginning and the end of the one-term program interval on the basis of Gender.

Research Objective Eleven

To determine if there were changes in the attitudes of undergraduate subjects at the beginning and the end of the one-term program interval on the basis of Agriculture Major.

Analysis of Participant Response about the Concept System

The participants were asked, what do you feel the concept system means. They continued to identify two categories: a system as the interrelations between process and product and a system as the interrelations between Operational Units.

A. A System as the Interrelations Between Process and Product (62.5 percent in Stage Three)

Sixty-Three percent of the participants in the Stage Three interviews related a system to the Interrelations Between Process and Product (IPP). In this category, the participants felt a system included people from various systems working for a common goal. Other feelings in this category ranged from relations between farmers and business, to the overall goal people strive for, and a cycle in which missing components could ruin a system. A selection of the participants' quoted responses from the

Process and Product category represented the following:

12AGC03: Networking means there is a relationship between the farmer and business, the producer and consumer (that) kind of idea...without that farmer or without agribusiness nothing could work; we need them all working together.

11CSS1: Any system has to be made up of people in related fields working together for a particular goal. In the agriculture system it's so more obvious to me now that there are so many different fields that are interrelated. It's (a system) more or less people working for a common cause to get a common task done.

21ANRE1: A system is something that goes around like a circle or cycle and if you take anything out of the system you might ruin the cycle...take the way they're (farmers using groundwater) using up the water. They're using it up before it has a chance to replace itself. Its running out now; the farming cycle isn't going to keep going.

<u>B. A system as Interrelated Operational Units (37.5 percent in Stage Three)</u>

Thirty-Seven percent of the participants in Stage Three interviews related a system to Interrelated Operational Units (IOU). In this category the participants felt different systems revolved around each other, a system consisted of operations put together to perform a specific function, and a system was a series of small components that contribute to a central operation. Examples of the participants' responses in this category were as follows:

12AGNP3:	A network of things that interrelate to make up a whole. (A system is) a number of different components that make up one narrow integrated network.
12AE3:	A system is working together with a group of ideas from individuals...Agriculture is just not farming; other things go into making up agriculture.
11ANS2:	I guess (a system is) like a network of interrelating actions...you know how they correspond to one another and how they work for and against each other.

An analysis of participant response was conducted on the question of participants' change in attitudes about Interdisciplinary Thinking in the extrapolated categories of Interrelations as Process and Product (IPP) and Interrelations as Operational Units (IOU). This analysis was drawn from data in Table Sixteen in relation to Group Demographic Variables.

In terms of Minority Status, the data in Table Sixteen shows that Minority participants' attitudes which were moderately in favor on IOU in Stage One (66.7 percent) become slightly more moderate in favor in IOU in Stage Three (71.4 percent). Non-minority participants' attitudes which were heterogeneous in both IPP and IOU categories in Stage One (37.5 percent) became skewed towards IPP in Stage Three (88.0 percent).

In terms of Place of Residence, there were no diferences between Large City participants and Minority participnts. The data in Table Sixteen shows that Small City/Suburban participants' attitudes which were slightly in favor of IPP

TABLE 16

Stage One and Stage Three Participant Responses About the Concept System in Extrapolated Categories

Group Demographic Variables	N	Stage One: Interrel. as Process and Prod. (IPP) No. Res	%	Stage One: Interrel. as Operational Units (IOU) No. Res	%	N	Stage Three: Interrel. as Process and Prod. (IPP) No. Res	%	Stage Three: Interrel. as Operational Units (IOU) No. Res	%
Minority Status										
Minority	6	2	33.3	4	66.7	7	2	28.6	5	71.4
Non-minority	8	3	37.5	3	37.5	9	8	88.0	1	12.0
Place of Residence										
Large City (A)	6	2	33.3	4	66.7	7	2	28.6	5	71.4
Small City/ Suburban (B)	4	2	50.0	1	25.0	4	3	75.0	1	25.0
Rural/Open Country (C)	4	1	25.0	2	50.0	5	5	100.0	0	0.0
Gender										
Male	5	2	40.0	3	60.0	5	5	100.0	0	0.0
Female	9	3	33.3	4	44.4	11	5	45.5	6	54.5
Agricultural Major										
Ag. Production	5	1	20.0	2	40.0	5	4	80.0	1	20.0
Ag. Service	9	4	44.4	5	55.6	11	8	72.7	3	27.3
Total Group	14	5	35.7	7	50.0	16	10	62.5	6	37.5

(A) 50,000 or more in population (B) 5,000 to 50,000 in population
(C) 5,000 or less in population

in Stage One (50.0 percent) became skewed towards IPP in Stage Three (75.0 percent). Rural/Open Country participants' attitudes which were slightly in favor of IOU in Stage One (50.0 percent) became skewed toward IPP in Stage Three (100.0 percent).

In terms of Agriculture Major, the data in Table Sixteen shows that Agricultural Service participants' attitudes which were slightly in favor of IOU in Stage One (55.6 percent) become skewed toward IPP in Stage Three (72.7 percent). Agricultural Production participants' attitudes which also were slightly in favor of IOU in Stage One (40.0 percent) became skewed toward IPP in Stage Three (80.0 percent).

Analysis of Participant Response About Observed Agriculture Systems

The participants were asked, what are some of the agricultural systems you have observed? They continued to identify two categories: observed agricultural systems related to vertical integration and observed agricultural systems related to horizontal integration.

C. Observed Agricultural Systems Related to Vertical Integration (18.7 percent in Stage Three)

Slightly less than (19.Ø percent) of the participants in Stage Three interviews assocated agricultural systems with vertical integration (VI). In this category, the participants related their feelings to the milking industry and to wildlife management. Examples of the participants' responses in this category were:

12HORT3: How milk production goes...at Country Fresh we followed the milk from the farm to the processing plant where they homogenized and pasteurized it. Then you have a finished product, what you would have to do to that one gallon of processed milk found in the supermarket.

12AGCO3: The milking system...the farmers, the dairymen, gets the milk from the cow that's not contaminated with mastitis, he puts it in a large container and the inspector may come at any time and check and then some transporter takes all the milk to a processing plant. And the milk is processed into a form (suited) for human consumption and many other milk products and then that would be transported to the market where the consumer will buy it.

11ANRE3: The system with the waterfowl...the migration, the banding, the going to the point of being endangered to the point where they were actually becoming a pest.

D. Observed Agricultural Systems related to Horizontal Integration (81.3 percent in Stage Three)

Slightly less than (82.0 percent) of the participants in the Stage Three interviews associated agricultural systems with horizontal integration (HI). In this category the participants' expressions related types of farms by sector, a farming system to natural resources, agriculture to daily living, forestry to waste water treatment, soil conservation to agricultural engineering, forestry to wildlife and environmental contamination to farming practices. Examples of the participants responses in this category were:

12RD4: The different farms we visited (on field trips),all the farms were different, totally different. (For instance) the dairy business and the mink business, cash crops (were different), but they were all under agriculture...they stick out in my mind because they were different types of farms, but they had to depend on the land to survive even if it just meant growing crops for their animals.

12AGBI4: I had never really been exposed to the natural resources...I think a lot of times that's the fault of the professors or Michigan State. I always hear agriculture; I don't see natural resources coming into the picture.

12AGNP4: It all hit me...a general thing. I can see how things I've learned here (KBS) in agriculture and natural resources related with my life daily, my practical life, like where my food comes from and what types of food I eat...where I live, the condition of my water I drink.

11ANS3: The water system...the farming system, but that's part of the water system too...everything is all interrelated...like with the water system, you have the sources wherever it's (water) coming from. If it comes down as rain...or if it's a lake then somehow you use the water in say crops or we use it in our houehold or something like that. It goes to the waste treatment (system) and hopefully it's safe and clean to get back from the lakes.

11RD3: The water waste systems, the way that fertilizers and chemicals are being applied to our fields and its seeping through our ground water, then draining into a river, to a stream, to a lake (and) into an ocean. That sticks out in my mind a whole lot.

11CSS1: The soil conservation (field trip) when we went out to Nashville (Michigan) stands out in my mind because you had a soil conservationist there and you were dealing with natural resources, the watershed, the hydrological cycle. I've never had that much natural resources and it kinda integrated that into the soil conservation system. You had to deal with both, you first couldn't deal with one and not the other.

21CSS1: When we went to the sawmill (field trip) you could see where the wood comes from and how it goes to the sawmill and then it goes to the papermill as pulp. They each have their waste system which fits into waste water treatment.

An analysis of participant response was conducted on the question of participants' change in attitudes about Interdisciplinary Thinking in the extrapolated categories of Vertical Integration (VI) and Horizontal Integration (HI). This analysis was drawn from data in Table Seventeen in relation to Group Demographic Variables.

In terms of Minority Status, the data in Table Seventeen shows that Minority participants' attitudes which were slightly in favor on HI in Stage One, (50.0 percent) became moderately in favor of HI in Stage Three (71.4 percent). Non-Minority participants' attitudes which were skewed in

TABLE 17

Stage One and Stage Three Participant Responses About Agricultural Systems in Extrapolated Categories

Group Demographic Variables	N	Stage One: Vertical Integ. (VI) No. Res	%	Stage One: Horizontal Integ. (HI) No. Res	%	N	Stage Three: Vertical Integ. (VI) No. Res	%	Stage Three: Horizontal Integ. (HI) No. Res	%
Minority Status										
Minority	6	2	33.3	3	50.0	7	2	28.6	5	71.4
Non-minority	8	1	12.5	6	75.0	9	1	11.1	8	88.9
Place of Residence										
Large City (A)	6	2	33.3	3	50.0	7	2	28.6	5	71.4
Small City/ Suburban (B)	4	0	0.0	3	75.0	4	0	0.0	4	100.0
Rural/Open Country (C)	4	1	25.0	3	75.0	5	1	20.0	4	80.0
Gender										
Male	5	2	40.0	3	60.0	5	0	0.0	5	100.0
Female	9	1	11.1	6	66.7	11	3	27.3	8	72.7
Agricultural Major										
Ag. Production	5	1	20.0	2	40.0	5	1	20.0	4	80.0
Ag. Service	9	2	22.2	7	77.8	11	2	18.2	9	81.8
Total Group	14	3	21.4	9	64.3	16	3	18.7	13	81.3

(A) 50,000 or more in population (B) 5,000 to 50,000 in population
(C) 5,000 or less in population

favor of HI (75.Ø percent) become more skewed in favor of HI in Stage Three (88.9 percent).

In terms of Place of Residence, there were no differences between Large City participants and Minority Participants. The data in Table Seventeen shows that Small City/Suburban participants' attitudes which were skewed in favor of HI in Stage One, (75.Ø percent) became more skewed in favor on HI in Stage Three, at 1ØØ%. Rural/Open Country participants' attitudes which were moderately in favor of HI in Stage One, at 75%, became skewed in favor of HI in Stage Three, at 8Ø%.

In terms of Gender, the data in Table Seventeen shows that male participants' attitudes which were slightly in favor of HI in Stage One (6Ø.Ø percent) become skewed in favor of HI in Stage Three (1ØØ.Ø percent). Female participants' attitudes which were skewed in favor of HI in Stage One (66.7 percent) becom slightly less skewed in favor of HI in Stage Three (72.7 percent).

In terms of Agriculture Major, the data in Table Seventeen shows that Agricultural Service participants' attitudes which were skewed in favor of HI in Stage One (78.Ø percent) became slightly more skewed in favorof HI in Stage Three (81.8 percent). Agricultural Production participants' attitudes which were slightly in favor of HI in Stage One (4Ø.Ø percent) became slightly skewed in favor of HI in Stage Three (8Ø.Ø percent).

Analysis of Participant Response About the Concept Experiential Education

The participants were asked, what do you feel the concept Experiential Education means? They continued to identify two categories: Experiential Education related to learning by doing and Experiential Education related to a real life situation.

E. The Concept Experiential Education Related to Learning by Doing 56.3 percent in Stage Three.

Slightly more than (56 percent) of the participants in the Stage Three interviews associated Experiential Education with learning by doing (LBD). In this category the participants expressed feelings about theory and practice, learning before performing, experiencing what you learn and spcific learning through repetition. Examples of the participants' responses in this category were:

12AGCO3: ...if I would have read a book about castrating pigs, I would never, never compare the experience I has as far as the hands-on experience when I castrated a pig. I learned a lot; I learned how to make those incisions and even though I would have read it...never would I gain the experience that I had by doing it on-hands (with my hands).

22AGPK3: Experiential education...is something I actually got out there and really did with my hands...It's something that you do over and over again whereas you just become so experienced in that spcific area.

11ANS2: It means experiencing what you're learning...actually doing what you're learning.

21ANRE1: Learning by actually practicing the skills which may be the only real way you can master a skill...you can't learn anything strictly out of a book or lecture.

21CSS1: It would be like learning from your mistakes in a way...learning how from doing it. You may be doing it wrong the first time...You'd learn more even though you did it wrong the first time than you'd learn if someone had just told you and you never tried it.

11RD2: Getting hands-on experience (and) at the same time learning in the classroom...I think there has to be some teaching before that (hands-on). It goes down to when your grandfather was letting you sit on his lap and telling you how to pick flowers instead of picking poison ivy. He told you first and then he showed you...You can experience Poison Ivy without even knowing where you got it or what it is, but if you learn what it is (theory) and then experience it you really have an experience there (Practice).

11FSM2: If I could try everything I learned out of a book I think I'd know a lot more. I don't feel that I can sit in a class and learn things out of a book and then go back later and apply them realistically to things they should be applied to. I think there's a lot of angelic things written in a book about things...that are blown out of proportion.

F. The Concept Experiential Education related to a Real Life Situation 43.8 percent in Stage Three

Slightly more than 43.8 percent of the participants in the Stage Three interviews associated Experiential Education with a Real life Situation (RLS). In this category, the participants again expressed feelings about theory and practice. Additional expressions included concreteness versus abstraction; developing your own view and becoming proficient enough in a skill to teach others. Examples of the participants' responses in this category were:

12AGBI3: ...work experience, actually doing the work with some guidance and with supervision.

12HORT3: ...(I am) able to understand concepts better. Let me give you an example...actually seeing soil erosion rather than just seeing a book diagramed...it (experiential education) gave me a concrete grasp that I could actually see instead of somebody making a configuration...I could see the different colors of the horizon in the soil.

12AGNP4: . . . In a class you're learning one person's view of it (subject). You don't really get a chance. . . to develop your own view, but you're learning someone else's view. Even when you read the text book you are reading someone else's experience of different subjects. . . whereas hands-on experience is going to come all through you. It's not going to be something someone told you. I mean there will be people there who will tell their view, but it, (hands-on) gives you time to develop your own view of things.

11CSS1: It means getting the experience that you would need to be able to tell someone else how to do it (a skill) it being able to understand it (a skill) if confronted with it (doing it).

11ANRE1: It means you're not getting all of your knowledge and information out of a book. It's something more tangible, something you can see, something you feel and actually experience. . . you don't recall words, you recall actual pictures in your mind of things you've actually done. It makes your education more concrete.

21AGNP2: Hands-on type things. . . you have more actual and visual types of things. You're doing it . . . or you're seeing someone else actually doing it.

An analysis of participant response was conducted on the question of participants' change in attitudes about Experiential Education in the extrapolated categories of Learning by Doing (LBD) and a Real Life Situation (RLS). This analysis was drawn from data in Table Eighteen in relation to Group Demographic Variables.

In terms of Minority Status, the data in Table Eighteen shows that Minority participants' attitudes which were skewed in favor of RLS in Stage One (83.3 percent) became slightly in favor of RLS in Stage Three (57.1 percent). Non-minority participants' attitudes which were moderately in favor of LBD in Stage One (50.0 percent) became slightly more moderate in favor of LBD in Stage Three (66.7 percent).

In terms of Place of Residence, there were no differences between Large City participants and Minority

TABLE 18

Stage One and Stage Three Participant Responses to the Concept Experiential Education in Extrapolated Categories

Group Demographic Variables	N	Stage One: Learning by Doing (LBD) No. Res	%	Stage One: Real Life Situation (RLS) No. Res	%	N	Stage Three: Learning by Doing (LBD) No. RES	%	Stage Three: Real Life Situation (RLS) No. Res	%
Minority Status										
Minority	6	1	16.6	5	83.3	7	3	42.9	4	57.1
Non-minority	8	4	50.0	2	25.0	9	6	66.7	3	33.3
Place of Residence										
Large City (A)	6	1	16.6	5	83.3	7	3	42.9	4	57.1
Small City/ Suburban (B)	4	2	50.0	1	25.5	4	3	75.0	1	25.0
Rural/Open Country (C)	4	2	50.0	1	25.5	5	3	60.0	2	40.0
Gender										
Male	5	2	40.0	1	20.0	5	4	80.0	1	20.0
Female	9	3	33.3	6	66.7	11	5	45.5	6	54.6
Agricultural Major										
Ag. Production	5	1	20.0	3	60.0	5	2	40.0	3	60.0
Ag. Service	9	4	44.4	4	44.4	11	7	63.6	4	36.4
Total Group	14	5	37.7	7	50.0	16	9	56.3	7	43.8

(A) 50,000 or more in population (B) 5,000 to 50,000 in population
(C) 5,000 or less in population

participants. The data in Table Eighteen shows that Small City/Suburban participants' attitudes which were slightly in favor of LBD in Stage One (50.0 percent) became moderately in favor of LBD in Stage Three (75.0 percent). Rural/Open Country participants' attitudes which were also slightly in favor of LBD in Stage One (50.0 percent) virtually remained slightly in favor of LBD in

In terms of Gender, the data in Table Eighteen shows that Male participants' attitudes which were slightly in favor of LBD in Stage One (40.0 percent) became skewed in favor LBD in Stage Three (80.0 percent). Female participants' attitudes which were moderately in favor of RLS in Stage One (66.7 percent) became slightly in favor of RLS in Stage Three (54.5 percent).

In terms of Agriculture Major, the data in Table Eighteen shows that Agricultural Service participants' attitudes which were in heterogeniety in Stage One (44.4 percent) became moderately in favor of LBD in Stage Three (63.6 percent). Agricultural Production participants' attitudes which were moderately in favor of RLS in Stage One (60.0 percent) became slightly less in favor of RLS in Stage Three (60.0 percent).

Analysis of Participant Response about Experiential Education and Career Development

The participants were asked, how will Experiential Eduation assist in developing a career? They continued to identify two categories: Experiential Education in relation to experience in a career and Experiential Education in relation to trial and error in career.

G. The Concept Experiential Education in relation to Experience in a Career (37.5 percent in Stage Three)

Thirty-eight percent of the participants in Stage Three interviews associated Experiential Education in relation to Experience gained in a Career Choice (EIC). In this category, the participants expressed feelings about knowing how to apply skills in a career, having more options and a broader background in a career choice, and building self-confidence in a career choice. Examples of the participants' responses in this category were:

12RD3: Because I know what I'm doing. I know I have the applied skills. I don't have (just) the textbook knowledge. I will have known how to apply my skills.

12AE3: It will help me by (through) understanding my major. Teaching me what I will have to do and what other options I can do to help me (develop) within my major.

11ANRE1: Well since I am going into vocational agriculture it's pretty obvious that alot of the experiences I've had here I can transmit or transfer directly into a Vo Ag (Vocational Agriculture) program and use there (Vocational Agriculture profession) to benefit other people.

21AGNP2: It enables me to remember better, it gives me a broader understanding of a system.

21CSS1: I believe it gives you more background for your career than other kinds of learning experiences would. . . because you're going to get down in it and and you are going to be doing it yourself, more than than you would if someone was showing you. . . If you are doing it (learning) this way you are learning more. So its helping you as far as your career because you are . . . not afraid to try something different.

22AGPK3: In every firm people want to know if you've had experience in this and experience in that, but this right here (KBS) is a totally new type of experience . . . here is the experience with agriculture. . . that was a hands-on experience that I was getting out there (KBS). . . that was a different type of experience. . . You know where the products are actually coming from.

Category H. The Concept Experiential Education in relation to Trial and Error in a Career (62.5 percent in Stage Three)

Slightly less than (63.Ø percent) of the participants in the Stage Three interviews associated Experiential Education in relation to Trial and Error in a Career Choice (TEC). In this category, the participants expressed feelings about the crystallization stage in career development, broad experience as an asset in selecting a career, in-depth experience as an asset in selecting a career, and focusing on what you like and don't in a career. Examples of the participants' responses in this category were:

12HORT3: Well I thought I would go into Agronomy but we did some agronomy work (at KBS) I really didn't like. Soils, soils, soils, I want a variety like in flouriculture. I can work with different types of plants. . . The other experiences we had (at KBS) I know I don't want to go into.

12AgCO4: . . . It would help any student whether they had a career goal or not. . . you decide after studying this you don't like it as far as doing hands-on or doing it (work) out in the world. You'd know exactly what you'd have to do as a dairy farmer or if you want to go into Veterinary Medicine. It (those careers) might seem very good. However, you might not realize you might have to step in a lot of manure and so that might turn you off. So I think its important to get that broad experience of everything.

11ANS2: Already its helped quite a bit. . . I'm not only learning alot about animals (dairy animals), but I'm also working with them. That's something right there. I had thought about working with dairy animals. I like working with the animals but you can (only) read about them and like them. (However,) if you don't have the patience and the ability to work with them in everyday situations, it doesn't help much to know about them.

12AGNP3: I won't be so dependent on what I've just learned in a textbook or in a class. It builds up your self-confidence and you are able to develop your own view of things instead of taking someone else's word for it. . . Its something like this program. . . You get a chance to learn alot about yourself.

11RD2: (Experiential Education) it can show you what you like and what you don't like (about a career). It showed me that I love to milk cows in the night time, but I hate to milk cows in the morning. It showed me that I love to eat pork that isn't tough, but I couldn't castrate them (pigs) so they wouldn't be tough. . . It shows you what you learn about yourself . . . the bad along with the good.

11CSS1: I think the more experience you have the better you're going to be in whatever you're in. I think have an internship or work in something related to their field so know that's what they want to do. I'd hate to see anybody go to school for four years and decide that's not what they want. Experiential Education.. . would help you decide. . . I really think it benefits alot of non-farm students and farm students, especially farm students.

21FSM1: . . . (it) gives you an opportunity to get a feeling for the field so that you'll know if you like it or not. . . whether its something you want to do all your life or not. Because if you're just reading books about it, it might seem interesting, but if its something you don't enjoy doing then there's no sense trying to head your career towards it.

An analysis of participant response was conducted on the question of participants' change in attitudes about Experiential Education in relation to Career Opportunity. The extrapolated categories of Experience in a Career (EIC) and Trial and Error in a Career (TEC) were analyzed. The analysis was drawn from data in Table Nineteen in relation to Group Demographic Variables.

In terms of Minority Status, the data in Table Nineteen shows that Minority participants' attitudes which were moderately in favor of EIC in Stage One (66.7 percent) became slightly in favor of TEC in Stage Three (57.1 percent). Non-minority participants ' attitudes which were skewed in favor of TEC in Stage One (75.0 percent) became moderately in favor of TEC in Stage Three (66.7 percent).

In terms of Place of Residence, there were no differences between Large City participants and Minority

TABLE 19

Stage One and Stage Three Participant Responses to Experiential Education and Career Development in Extrapolated Categories

Group Demographic Variables	Stage One N	Stage One Experience in a Career (EIC) No. Res	Stage One Experience in a Career (EIC) %	Stage One Trial and Error in a Career (TEC) No. Res	Stage One Trial and Error in a Career (TEC) %	Stage Three N	Stage Three Experience in a Career (EIC) No. Res	Stage Three Experience in a Career (EIC) %	Stage Three Trial and Error in a Career (TEC) No. Res	Stage Three Trial and Error in a Career (TEC) %
Minority Status										
Minority	6	4	66.7	2	33.3	7	3	42.9	4	57.1
Non-minority	8	1	12.5	6	75.0	9	3	3.33	6	66.7
Place of Residence										
Large City (A)	6	4	66.7	2	33.3	7	3	42.9	4	57.1
Small City/ Suburban (B)	4	1	25.0	3	75.0	4	1	25.0	3	75.0
Rural/Open Country (C)	4	0	0.0	3	75.0	5	2	40.0	3	60.0
Gender										
Male	5	1	20.0	4	80.0	5	3	60.0	2	40.0
Female	9	4	44.4	4	44.4	11	3	27.3	8	72.7
Agricultural Major										
Ag. Production	5	3	60.0	1	20.0	5	2	40.0	3	60.0
Ag. Service	9	2	22.2	7	77.8	11	4	36.4	7	63.6
Total Group	14	5	35.7	8	57.1	16	6	37.5	10	62.5

(A) 50,000 or more in population (B) 5,000 to 50,000 in population
(C) 5,000 or less in population

participants. The data in Table Nineteen shows that Small City/Suburban participants' attitudes which were moderately in favor of TEC in Stage One (75.0 percent) remained moderately in favor of TEC in Stage Three (75.0 percent). Rural/Open Country participants' attitudes which were skewed in favor of TEC in Stage One (75.0 percent) became slightly in favor of TEC in Stage Three (60.0 percent). In terms of Gender, the data in Table Nineteen shows that Male participants' attitudes which were skewed in favor of TEC in Stage One (80.0 percent) became slightly in favor of EIC in Stage Three (60.0 percent). Female participants' attitudes which were in heterogeniety in Stage One (44.4 percent) became skewed in favor of TEC in Stage Three (72.2 percent). In terms of Agriculture Major, the data in Table Nineteen shows that Agricultural Service participants' attitudes which were skewed in favor of TEC in Stage One (77.8 percent) became moderately in favor of TEC in Stage Three (63.6 percent). Agricultural Production participants' attitudes which were moderately in favor of EIC in Stage One (60.0 percent) became slightly in favor of TEC in Stage Three (60.0 percent).

Chapter V

Findings, Conclusions, and Recommendations

The major items considered in this chapter were a Summary ot the Findings, Conclusions, General Discussion of the Study, Recommendations for Further Study and Recommedations for KBS Program Planning.

Summary of Findings

The summary of findings address the evaluation of: (1) Quantitative Findings in the Study: Questionnaire and Demographic Variables, (2) Quantitative Findings in the Study: Questionnaire and Attitudinal Items, (3) Qualitative Findings in the Study: Open-ended Interviews and Demographic Variables, (4) Qualitative Findings in the Study: Observational Reports.

Quantitative Findings in the Study: Questionnaire and Demographic Variables

Based on the Undergraduate Agriculture and Natural Resources Attitude Questionnaire (UANRAQ) in relation to the KBS Program's impact on the demographic variables in the study, the findings were summarized as follows:

1. Results on the Minority Status variable indicated the Non-minority participants achieved the highest mean scores. Both Minority and Non-minority participants increased their mean scores in Stage Three. The Minority participants' mean increase was significantly larger than that of the Non-minority participants.
2. Results on the Place of Residence variable indicated Rural/Open Country participants achieved the highest mean scores. All groups increased their mean scores in Stage Three. The Large City Participants' mean scores became equal to the Small City/Suburban participants'. The Large City participants' mean increase was significantly larger than the Small City/Suburban and Rural/Open Country participants'.
3. Results on the Gender variable indicated Female participants achieved the highest mean scores. Both Female and Male participants increased their mean scores in Stage Three. The Female participants' mean increase was larger than the Male participants'.
4. The results on the Agriculture Major variable indicated the Agricultural Service participants' mean scores were higher than the Agricultural Production participants' in Stage One. Both subgroups had equal mean scores in Stage Three. The Agricultural Production participants' mean increase was greater than the Agricultural Service participants'.

5. The results on the Total mean scores were higher in Stage Three when compared to Stage One. The Total group mean increase was moderate in Stage Three.

Quantitative Findings in the Study: Questionnaire and Attitudinal Items

Based on the UANRAQ measure, the KBS Program's impact on the positive attitudinal change of participants was assessed by the Interdisciplinary Thinking, Experiential Education and Career Opportunity variables in the study. The findings were as follows:

1. The results on the thirteen Interdisciplinary Thinking attitudinal items show the following: The item, Reducing Farmers' Dependency by Using Small Machines had the highest mean increase with .93 points or from 2.38 to 3.31 in Stage Three. Expansion of Foreign Agriculture Markets had the highest mean decrease with .19 points or from 3.75 to 3.56 in Stage Three.
2. Among the three indexed sub-categories of the Interdisciplinary Thinking attitudinal items, Working With other Disciplines had the greatest Grand Mean increase with .52 points or from 3.96 in Stage One to 4.48 in Stage Three. Interrelated factors of Agricultural Production with a Grand Mean increase of

.39 points or from 3.41 in Stage One to 3.80 in Stage Three ranked second. Broad Based Training with a Grand Mean increase of .37 points or from 3.19 in Stage One to 3.56 in Stage Three ranked third.

3. The results of the ten Experiential Education attitudinal items show the following: The item, Those without Extensive Agricultural Experience can become as Competent as Those With, had the highest mean increase with .56 points or from 3.13 in Stage One to 3.69 in Stage Three. Hands-on Work Improves Career Consciousness had the highest mean decrease .39 points or from 3.89 in Stage One to 3.50 in Stage Three.

4. Among the two indexed categories of the Experiential Education attitudinal items, Experiential Education as Competency had the highest Grand Mean increase with .15 points or from 4.04 in Stage One to 4.19 in Stage Three. Experiential Education as Career Development with a Grand Mean decrease of .4 points or from 4.04 in Stage One to 4.00 in Stage three ranked second.

5. The results on the twelve Career Opportunity attitudinal items show the following: The item, Farming as Hard Work and Little Reward (a negatively stated item) had the highest mean increase with .44 points or from 4.06 in Stage One to 4.50 in Stage Three. Low Material Rewards Okay if High Prestige Exists, had the highest significant mean decrease with 1.68 points or from 2.81 to 1.13 in Stage Three.

6. Among the three indexed sub-categories of the Career Opportunity attitudinal items, Careers in Farming had the highest Grand Mean increase with .21 points or from 3.96 in Stage One to 4.17 in Stage Three. Career Rewards in Agriculture with a Grand Mean increase of .12 points or from 3.95 in Stage One to 4.07 in Stage Three ranked second. Human Relation Demands in Agriculture with a Grand Mean increase of .9 points or from 3.74 in Stage One to 3.65 in Stage Three ranked third.

Qualitative Findings in the Study: Open-Ended Interviews and Demographic Variables

The findings on the KBS Program's impact from interviews in which participants identified dichotomous categories in relation to open-ended questions about the variables of Interdisciplinary Thinking and Experiential Education are summarized as:

1. When participants were asked for their feelings about the concept, System, they identified two categories: Interrelations as Process and Product and Interrelations as Operational Units.
2. In terms of Minority Status, Minority participants moderately favored Interrelations as Operational Units

throughout the program interval. Non-minority participants who had no clear preference during Stage One significantly favored Interrelations as Process and Product at the end of the program interval.

3. In terms of Place of Residence, Large City participants moderately favored Interrelations as Operational Units throughout the program interval. Small City/Suburban participants moderately favored Interrelations as Process and Product throughout the program interval. Rural/Open Country participants who slightly favored Interrelations as Operational Units during Stage One significantly favored Interrelations as Process and Product at the end of the program interval.
4. In terms of Gender, Male participants who had slightly favored Interrelations as Operational Units in Stage One slightly favored Interrelations as Process and Product at the end ot the program interval. Female participants slightly favored Interrelations as Operational Units throughout the program interval.
5. In terms of Agricultural Major, Agricultural Service and Agricultural Production participants slightly favored Interrelations as Operational Units in Stage One. Both participants significantly favored Interrelations as Process and Product at the end ot the program interval.
6. In terms of the Total Group, participants slightly

favored Interrelations as Operational Units in Stage One. Participants moderately favored Interrelations as Process and Product at the end of the program interval.

7. When participants were asked for their feelings about what Agriculture systems they had observed, they identified two categories: Vertical Integration and Horizontal Integration.

8. In terms of Minority Status, Minority participants who had slightly favored Horizontal Integration in Stage One moderately favored Horizontal Integration at the end of the program interval. Non-minority participants significantly favored Horizontal Integration throughout the program interval.

9. In terms of Place of Residence, Large City participants who had slightly favored Horizontal Integration in Stage One, moderately favored Horizontal Integration at the end of the program interval. Small City/Suburban participants significantly favored Horizontal Integration throughout the program interval. Rural/Open Country participants who had moderately favored Horizontal Integration in Stage One significantly favored this category at the end of the program interval.

10. In terms of Gender, Male participants who had slightly favored Horizontal Integration in Stage One, significantly favored Horizontal Integration at the

end of the program interval. Female participants significantly favored Horizontal Integration throughout the program interval.

11. In terms of Agriculture Major, Agricultural Service participants significantly favored Horizontal Integration throughout the program interval. Agricultural Production participants who had slightly favored Horizontal Integration in Stage One, significantly favored Horizontal Integration at the end of the program interval.
12. In terms of the Total Group, participants significantly favored Horizontal Integration throughout the program interval.
13. When participants were asked for their feelings about the concept Experiential Education, they identified two categories: Experiential Education related to Learning by Doing and Experiential Education related to a Real Life Situation.
14. In terms of Minority Status, Minority participants who had significantly favored a Real Life Situation in Stage One slightly favored a Real Life Situation at the end of the program interval. Non-minority participants moderately favored Learning by Doing throughout the program interval.
15. In terms of Place of Residence, Large City participants who had significantly favored a Real Life Situation in Stage One slightly favored a Real Life

Situation at the end of the program interval. Small City/Suburban participants who had slightly favored Learning by Doing in Stage One moderately favored Learning by Doing at the end of the program interval. Rural/Open Country participants were slightly in favor of Learning by Doing throughout the program interval.

16. In terms of Gender, Male participants who had slightly favored Learning by Doing in Stage One significantly favored Learning by Doing at the end of the program interval. Female participants who had moderately favored a Real Life Situation in Stage One slightly favored a Real Life Situation at the end of the program interval.
17. In terms of Agriculture Major, Agricultural Service participants who had no clear preference in Stage One moderately favored Learning by Doing at the end of the program interval. Agricultural Production participants who had moderately favored a Real Life Situation in Stage One slightly favored a Real Life Situation at the end of the program interval.
18. In terms of the Total Group, participants slightly favored a Real Life Situation in Stage One. Participants slightly favored Learning by Doing at the end of the program interval.
19. When participants were asked for their feelings about How will Experiential Education help in developing a career, they identified two categories: Experience in

a Career and Trial and Error in a Career Choice.

20. In terms of Minority Status, Minority participants who had moderately favored Experience in a Career in Stage One became slightly in favor of Trial and Error in a Career at the end of the program interval. Non-minority participants who had significantly favored Trial and Error in a Career in Stage One became moderately in favor of Trial and Error in a Career at the end of the program interval.

21. In terms of Place of Residence, Large City participants who had favored Experience in a Career in Stage One became slightly in favor of Trial and Error in a Career at the end of the program interval. Small City/Suburban participants remained moderately in favor of Trial and Error in a Career throughout the program interval. Rural/ Open Country participants who had significantly favored Trial and Error in a Career in Stage One became slightly in favor of Trial and Error in a Career at the end of the program interval.

22. In terms of Gender, Male participants who had significantly favored Trial and Error in a Career in Stage One slightly favored Experience in a Career at the end of the program interval. Female participants who had no clear preference in Stage One significantly favored Trial and Error in a Career at the end of the program interval.

23. In terms of Agriculture Major, Agricultural Service participants were significantly in favor of Trial and Error in a Career in Stage One became moderately in favor of Trial and Error in a Career at the end of the program interval. Agricultural Production participants who had moderately favored Experience in a Career in Stage One slightly favored Trial and Error in a Career at the end of the program interval.
24. In terms of the Total Group, participants moderately favored Trial and Error in a Career throughout the program interval.

Qualitative Findings in the Study: Observational Reports

The findings of the KBS program process on attitudinal change from the Stage Two Field Observation Reports in Appendix B are summarized as:

1. Observations indicated that participants, KBS program staff, and resource persons expressed more attitudes about Interdisciplinary Thinking than attitudes about Career Opportunity and Experiential Education.
2. Observations indicated participants generally had positive attitudes about working in interdisciplinary groups during the lab/practicums.
3. Observations indicated, the KBS participants as an

interdisciplinary group may observe a problem in agriculture and natural resources more comprehensively than a specialist group.

4. Observations indicated hands-on skills associated with Experiential Education provided an opportunity to develop and test hypotheses or provided a trial and error experience.
5. Observations indicated that participants expressed the attitude that hands-on skills associated with Experiential Education was repetitive learning. This was consistent with what participants expressed in Stage One and Stage Three interviews.
6. Observations indicated that nonfarm participants needed a transistional period to develop positive attitudes toward hands-on learning activities in production agriculture.
7. Observations indicated that hands-on skills associated with experiential education exposed individual participants to frustration. Frustration may have indicated a negative KBS program impact on attitudes about Experiential Education.
8. Observations indicated participants, in terms of Career Opportunity, had adequate chances to explore alternative career choices or gain insights into their selected career choices. This was attributed in the aggregate to lecture/small group discussions, field trips and lab/practicums.

9. The informal conversations related to observations indicated participants wanted more opportunities for individual decision making and exploration in the hands-on skills associated with career opportunity. This attitude was expressed more frequently among participants who were seniors.

10. Observations indicated, in general, participants' attitudes about career opportunity were more likely to be affected by informal discussions with a resource person rather than through the resource person's formal presentation.

11. Observations did not indicate that participants whose major more directly reflected the curriculum content of the KBS pilot program developed a strong sense of competence.

12. Observations indicated team teaching was practiced consciously by the KBS program staff with resource persons on field trips. It was observed that this instructional strategy stimulated participant expression of attitudes.

13. Observations indicated resource persons who were flexible, patient and created an interest approach to learning had a positive impact on attitudinal change among participants.

14. Observations indicated nonfarm participants who were Minority, Large City, and Female generally asked more questions than other categories of participants during

the instructional events. These participants, at the start of the program interval, asked comprehension or foundation questions. Over time critical thinking about agriculture and natural resources emerged and questions among these participants were directed toward evaluation, judgement and synthesis.

15. Observations indicated that farm participants who were non-minority frequently served as unofficial resource persons for nonfarm, non-minority and minority participants during instructional events. It was unclear whether this served as a positive or negative impact on attitudinal change.

16. Observations indicated external interactive effects occured during the program interval that may have limited positive change in participant attitudes to those solely associated with participation in the KBS program.

Conclusions Based on Questionnaire Data

The following conclusions were drawn from interpretation of the findings and observations:

1. The manifest and expressed attitudinal change of the KBS undergraduate participants did occur in the areas of Interdisciplinary Thinking, Experiential Education

and Career Opportunity in the one-term program interval. These changes were found to be associated with participation in the Kellogg Rural Resources Education Pilot Program.

2. The manifest and expressed attitudinal change of the KBS undergraduate participants did occur more significantly in the area of Interdisciplinary Thinking when compared to Experiential Education and Career Opportunity during the one-term program interval. These changes were found to be associated with participation in the Kellogg Rural Resources Education Pilot Program.
3. The manifest and expressed attitudinal change did occur more significantly among Minority participants when Non-minority participants were compared.
4. The manifest and expressed attitudinal change did occur more significantly among Large City and Rural/ Open Country participants when compared to Small City/Suburban participants.
5. The manifest and expressed attitudinal change did occur more significantly among the female participants when compared to Male participants.
6. The manifest and expressed attitudinal change did occur more significantly among Agricultural Production participants when compared to Agricultural Service participants.

Conclusions Based on Interview Data

1. The manifest and expressed attitudinal change did occur on the basis of Minority Status on (1) the concept, system, and (2) the concept Experiential Education.
2. The manifest and expressed attitudinal change did occur on the basis of Place of Residence on (1) the concept, system, and (2) the concept Experiential Education.
3. The manifest and expressed attitudinal change did occur on the basis of Gender on (1) the concept system, (2) the concept Experiential Education, and (3) Experiential Eduation related to career development.
4. The manifest and expressed attitudinal change virtually did not occur on the basis of Agricultural Major in the Qualitative Interview measures.

Conclusions Based on Observational Data

1. The interdisciplinary work teams formed in the laboratory/ practicums provided participants with an opportunity to see real life situations in agriculture

and natural resources more comprehensively.

2. It was unclear if experiential education associated with the laboratory/practicums had a positive impact on attitudes for all participants.
3. Nonfarm students with poor attitudes about production agriculture may not have developed positive attitudes about production agriculture during the KBS program interval.
4. More opportunities for individual mastery of hands-on skills were needed, especially for participants who were upperclassmen with more focused interests.
5. Team teaching was an effective instructional strategy which contributed toward positive change in participant attitudes.
6. Nonfarm students generally asked more questions which became progressively more critical in thought over the program interval.
7. The unpredicted interactive effects make it difficult to conclude positive change in participant attitude was due solely to the KBS pilot program.
8. The mixed evaluation research methods used in the study were effective in assessing the intended and unintended change in participant attitudes during the KBS pilot program.

General Discussion of the Study

The enthnographic aspects of the study provided the researcher with an opportunity to discover several patterns which were not originally a focus of the study's design. However, these findings were felt to have strong implications for the future success of the Kellogg Undergraduate Rural Resources Education Program.

1. Geographic Location

The researcher agrees that the Kellogg Biological Station offers an ideal rural learning environment for undergraduates. With the facilities at the Biological Station, meaningful, integrated Agriculture and Natural Resource Education took place during the pilot study. However, the Biological Station was isolated from the main hub of Michigan State University student activities.

For the participants, the inability to readily see friends or family or to loose oneself in a crowd at various times interfered with the rural learning environment at KBS. Of equal importance was the negative impact of interpersonal relationships among the heterogeneous participants and the KBS Program Staff.

2. Interpersonal Relationships

During the first two weeks of the program the harmony among participants was at a high level. There was cooperation during laboratory/practicums and social interaction among various groups of participants after scheduled program activities. Much of the initial interpersonal conflict evolved from students leaving on the weekends and failing to return on time for scheduled program activities. Becuase the group was small, at close quarters, and isolated, failure to arrive or participate fostered the issue of a lack of commitment among the participants. At various times a lack of commitment would be implied by the Program Staff. The researcher assumes the commitment issue would not have developed on the main campus. Similarly, when participants became ill or failed to meet the daily chore schedules the issues of avoidance and lack of commitment were raised.

The groups' interpersonal relations reached a low point in the middle of the program interval. Towards the end, reconcilation among participants took place, but the researcher suspects it was not genuine, merely diplomatic posturing. The group never regained the level of harmony that existed during the first two weeks. KBS Program Planning should thus address what may be called the three stages of culture shock: (1) the excitement stage when everything is new and interesting, (2) the disenchantment stage when one misses familiar symbols, established routines and significant others, and (3) the reality stage when one begins to balance the positive and negative and learns to negotiate in the new environment.

Random selection of future participants could be problematic because of the isolation which may impact negatively on the interpersonal relations of participants. However, random selection is not impossible if effective interventions are made in the area of group dynamics by the KBS Program Staff.

KBS Program Staff

The KBS Program Staff operated at a high level of enthusiasm. They believed strongly in the goals and philosophy of the program. However, it was disconcerting for the researcher to observe the repeated failure of the staff to effectely, resolve the conflicts which arose among the participants. In retrospect, the staff's technical skills were at a high level, but (for most staff members) their group dynamic skills were inadequate. Specifically, there was a lack of preparation in anticipating the negative and the unwanted behavior by participants. The different cultural and social orientations due to Minority Status and

Place of Residence began to polarize participants when conflicts remained unresolved. The researcher suggests that KBS Program Planning address updating the staff on group dynamic skills, particularly among multi-cultural groups.

The lack of effective group dynamic skills by the staff undermined the potential for nonfarm and farm, urban, suburban and rural, minority and non-minority participants to discover and learn each others' attitudes, world view and values in a substantial fashion. It was interesting, however, that at various times participants did take the responsibility for resolving conflict, and to some extent they did learn about each others' stereotypes and attitudes in the process.

4. Career Exploration

The instructional strategies provided career exploration and did have an impact on undergradutes rethinking or determining a career choice. Several participants discussed with the researcher the possibility of changing their agriculture major or going into a lateral career path within their agriculture major. Providing participants with greater insights into a career was an objective of the KBS Program.

The possible concern, by the faculty and administration in the College of Agriculture and Natural Resources, that

underaduates who participate in the KBS Program may decide to leave the college would be ill founded. The pilot study indicated students developed a greater appreciation for agriculture and natural resources. In addition, they received an opportunity to reflect and make inquiries on how to best use their talents, values and interests as young professionals in the agriculture and natural resources industry.

Recommendations for Further Study

The following evaluation research was recommended on the basis of the observations and problems identified by this study or encountered during the study:

1. A replication of the formative study involving the KBS Program Staff in the observation and interview methods should be conducted. It should reduce researcher bias and enhance reliability of future findings. In addition, it would assist Program Staff to rethink assumptions in the future about participant interests and feelings.
2. Research built around a summative true experimental design using a pretest/postest control group eventually should be conducted. This should provide greater generalizability of the future findings on

undergraduate attitudinal change in the KBS program.

3. Follow-up studies should be developed to trace students for the remainder of their undergraduate studies and initial employment after graduation. This should assist the KBS program to consider the connection between overt actions taken by participants after the program and their expressed attitudes about the value of what they learned during the program.

Recommendations for KBS Program Planning

1. Foster strategies to provide opportunities for undergraduates to become resource persons during and after the program interval. This would assist in institutional building and serve as a check against unintended external interactive effects.
2. Foster strategies to enhance more individualized, hands-on skill training. This would provide undergraduates with the opportunity to further explore careers through trial and error and gain experience in a career.
3. Develop inservice workshops for KBS program staff to enhance and develop skills in qualitative program evaluation. Having several KBS staff members conducting observations and interviews would enhance objectivity and provide greater insights about the patterns of attitudinal change among participants.

APPENDICES

APPENDIX A

CURRICULUM/ACTIVITY SCHEDULE

KBS INSTRUCTIONAL PILOT GROUP

FALL, 1984

Curriculum/Activity Schedule
KBS Instructional Pilot Group
Fall, 1984

Wednesday, September 19

Students arrive	4:00-6:00 p.m. at Orchard Dorms	Check in, receive keys.
Evening meal	6:00 p.m. at McCrary Hall	
Experience inventory	7:00 p.m. - Cabin C	B. Colley - questionnaire

Thursday, September 20

Breakfast	7:00 a.m. - McCrary Hall	
Gen. Orientation	8:00-10:15 a.m. - McCrary Hall	Lauff, Gardner, Ogline Tompkins, Kreuzer, Becker
Concrete Lecture	10:30-12:00 - Cabin C	Moore
Lunch	12:15	
Concrete Lect./ Leadership	1:00-2:00 - Cabin C	Moore/Gardner
Landscape Design Lecture	2:15-5:00 - Cabin C	Lauzun
Dinner	5:30 - McCrary Hall	
Room, Board, Fee Paym't	6:00-7:00 p.m. - McCrary Hall	Kreuzer, Ogline

Friday, September 21

Breakfast	7:00 a.m. - McCrary Hall	
Lab practicums - Concurrent work sessions		
- Landscaping	8:30 a.m. - 5:00 p.m. at Farm Learning Center	Lauzun and Bassett
- Concrete slab	(Pack lunch.)	Moore and Becker
(Individual Student Interviews during work sessions)		Gardner

Saturday, September 22

Breakfast	Conference Schedule - McCrary Hall	On your own tour with
Lunch	Conference Schedule - McCrary Hall	with Leadership curriculum guides - Gardner
Dinner	Outside Chicken BBQ - Gull Lake Beach	Tompkins

Sunday, September 23

Breakfast	9:00 a.m. - McCrary Hall	C. McLemore
Lunch	On your own	
Dinner	Conference Schedule	

Monday, September 24

(Lab #1) Animal Science	9-12 at FLC	(Animal Safety - Ogline, O'Neil)
(Lect. #1) Ag. Eng.	6:30-9:30 p.m. - Cabin C	(Equipment Safety, Types of Equipment) - Burkhardt

Library Orientation	1:30-2:30 - Library (Stack Bldg.)	Hammarskjold
Kellogg Forest Orient.	3:00-4:30 - Kellogg Forest	Stadt

<u>Tuesday, September 25</u>

(Lab #1) Ag. Eng.	8:30-11:30 - Farm Learning Center	(Hands-on Safe Tractor and Equipment Operation) Burkhardt and Moore
(Lect. #1) Anim. Sci.	1:30-4:30 - Cabin C	(Animal Industry in U.S. and World Economics) Henneman
(Lect. #1) Cp. Sc.	7-9:30 p.m. at Computer Lab	Quigley

<u>Wednesday, September 26</u>

(Lect. #1) Leadership	9-12:00 at Cabin C	Gardner
(Lect. #1) CSS	1:30-4:30 at Cabin C	(Basic Soil Properties) Foth

<u>Thursday, September 27</u>

(Lect. #1) Ag. Econ.	9-12:00 at Cabin C	(Understanding Michigan Agriculture) Hepp
(Lab #2) Ag. Eng.	1:30-4:30 at Farm Learning Center	(Tillage equipment and Operation) Moore
(Lect. & Lab) Cp. Sc.	7-9:30 p.m. at Computer Lab	Quigley

<u>'riday, September 28</u>

(Lab #1) CSS	9:12:00 at Farm Learning Center	(Soil Profiles) Ogline and Bey
(Lab #2) An. Sc.	1-4:00 at Farm Learning Center	(Feeding Livestock, Equip. Maintenance) Ogline and O'Neil

<u>Saturday, September 29</u>

Possible Football Game Excursion to MSU Campus

<u>Sunday, September 30</u>

WMU/KVCC & KBS-MSU Social Interaction (tentative)

<u>Monday, October 1</u>

(Lab #3) An. Sci.	8-11 a.m. at Farm Learning Center	(Milking Equipment - Setups and Operation) Ogline and O'Neil

(Homework) Comp. Lab Open	1-4:00	(Homework Assignment) Quigley and Tompkins (Student Intern ?)
(Lect. #2) Ag. Eng.	6:30-9:30 at Cabin C	(Tillage Equipment) Burkhardt

Tuesday, October 2

(Lab #3) Ag. Eng.	8:30-11:30 at Farm Learning Center Mechanics Skills	(Tillage Equipment - Demonstration/Operation) Burkhardt and Moore
(Lab #4) Ag. Eng.	1-4:00 at Farm Learning Center	
(Lect. & Lab) Cp. Sc.	7-9:30 p.m. at Computer Lab	Quigley

Wednesday, October 3

Study Time	8-12:00	Becker
Lect. & Lab Ldrship	~~1-4:00~~ at Cabin C 2:30 (Computer Lab)	(Help plan Thursday's skill development activities.) Gardner, Ogline, Tompkins
"	2:30 - 5:00 Bud Seery Farmer (Rod Peacock?) Hall Henry	

Thursday, October 4

Interdisciplinary Lab Activities	6:00 a.m.-5:00 p.m.	(Individual/Small Group Experiential Skill Development Activities) Ogline, Gardner, Tompkins, Moore, Becker, O'Neil, Colley
Lect. & Lab Cp. Sc.	7-9:30 p.m.	Quigley

Friday, October 5

(Lab #2) CSS	9-12:00	(Soil Surveys and Land Use Applications) Ogline, Bey
	Behavior - Anne Clark	
Lab Leadership	1:30-2:30	(Report Thursday's Experiential Activities) Gardner, Tompkins
Study Time	2:30-5:00	

Saturday, October 6

(Possible Seminar)

Curriculum/Activity Schedule
KBS Instructional Pilot Group
Fall, 1984

nday, October 8

(Lab #4) Anim Sci.	9-12:00 @ FLC (Para-vetic Skills & Equip.)	Ashley, Ogline, O'Neil
Computer Lab Open	1:30-4:30 (Homework)	Becker
Library Open	6:00-9:00 p.m. (Homework)	McLemore

esday, October 9

(Lect. #2) Anim. Sci.	9:00-12:00 @ Cabin C (Reproduction Records, Breeding)	Nelson
(Lab. #5 (Ag. E. & CSS	1:30-4:30 @ FLC (Calibration/Planting Corn)	Ogline, Moore/Becker
(Lect. & Lab) Comp. Sc.	7:00-9:30 @ Computer Lab	Quigley

dnesday, October 10

(Lect. & Lab) Hort. (tentative)	8:30-4:30 Possible tie-in with H. Liss' - Seminar (Tree Maintenance)	Liss and Campus Ext. Prof

Alternative)

(Lect. & Lab) Leadership	10:00-12:00	Gardner
(Lab #6) Ag. E. &CSS	1:00-3:30 @ FLC (Planting Corn)	Ogline, Moore, Becker
Computer Lab Open	3:30-5:00	Becker
Library Open	6:00-9:00	McLemore

ursday, October 11

(Lect. #2) Ag. Econ.	9:00-12:00 @ Cabin C (Using Credit)	Hepp
(Lab #7 Ag. E. & CSS	1:30-4:30 @ FLC (Calibration/Planting -Wheat)	Ogline, Moore, Becker
(Lect. & Lab) Comp. Sc.	7:00-9:30 @ Computer Lab	Quigley

iday, October 12

Field Trip (Lab) An. Sci.	8:30-12:00 (M. Kaercher etal, Farms)	Ogline
(Lect. #2) CSS	1:00-4:00 @ Cabin C	E. Erickson

turday, October 13

Library Open	?	McLemore

nday, October 14

Computer Lab Open	?	Becker

Curriculum/Activity Schedule
KBS Instructional Pilot Group
Fall, 1984

.iday, October 15 (~~Deer Season~~)

6:00 a.m. - 7:30 p.m.	Individual and Small Group Skills and Chores	Gardner, Ogline, Moore O'Neil
Leadership	1:00-2:30	Gardner
Computer Lab Open	2:30-4:30 p.m.	Updegraff/Stevens

esday, October 16

(Lect. #3) Ag. Eng.	9-12:00 @ Cabin C (Ag. Mechanics Skills)	Burkhardt
(Lab #8) Ag. Eng.	1:30-4:30 @ Shop (Ag. Mechanics Skills)	Burkhardt and Moore
(Lect. & Lab) Comp. Sc.	7-9:30 @ Computer Lab	Quigley

dnesday, October 17

(Lect. #1) Nat. Res. (RD)	9-12:00 @ Cabin C (Ramifications of Soil Erosion)	Edens, Witter, Lush
(Lab #1) Nat. Res. (RD)	1:00-4:00 @ Computer Lab (Micro-computers in Nat. Res.)	Edens, Witter, Lush

ursday, October 18

(Lect. #1) Forestry	9-12:00 @ Kellogg Forest (Land Stewardship and Forest Ecology)	Pregitzer & Tombaugh
(Lab #1) Forestry	1-4:00 @ Kellogg Forest (Composition, Structure & Tolerance)	Pregitzer & Tombaugh
(Lect. & Lab) Comp. Sci.	7-9:30 @ Computer Lab	Quigley

iday, October 19

(Lect. & Lab) Nat. Res. (F&W)	9:00-12:00 @ Bird Sanctuary (Land-use Planning)	D. Johnson
(Lect. & Lab) Nat. Res. (F&W)	1:00-4:00 @ Bird Sanctuary (Groundwater Contamination)	D. Johnson

turday, October 20

Leadership	Gardner

.nday, October 21

Curriculum/Activity Schedule
KBS Instructional Pilot Group
Fall, 1984

lay, October 22

(Lect. #2) Forestry	9-12:00 @ Kellogg Forest (Silviculture and Farm Management)	Dickmann and Koelling
(Lab #2) Forestry	1-4:00 @ Kellogg Forest (Mensuration and Regeneration)	Dickmann and Koelling

esday, October 23

(Lect. #3) An. Sci.	9-12:00 @ Cabin C (Growth and Nutrition; Lactation)	Thomas
Study Time	1-5:00	
(Lect. & Lab) Comp. Sci.	7-9:30 @ Computer Lab	Quigley

dnesday, October 24

Mid-term Exam	10:30-12:00	Ogline, Gardner
(Lect. & Lab) Leadership	1:30-4:30	Gardner
	("Future Fest" - Business/Industry Interviews)	Gardner

ursday, October 25

(Lect. & Lab) Ag. Econ. & Anim. Sci.	9-12:00 @ Computer Lab (Micro-computers in Agriculture)	Mulvany, Haywood, Halbert
	1-3:00 " " " " "	" "
(Lect. & Lab) Comp. Sci.	7-9:30 @ Computer Lab	Quigley

iday, October 26

Possible Interdisciplinary Field Trip	Ogline, Gardner

turday, October 27

nday, October 28

Curriculum/Activity Schedule
KBS Instructional Pilot Group
Fall, 1984

Monday, October 29

(Lect. & Lab) Nat. Res.	9-12:30 @ Bird Sanctuary (Orientation & Tour of Sanctuary and VanDeusen's land.)	VanDeusen/Johnson Mainone
	1:30-4:00 @ Bird Sanctuary (Canada Goose Research; Sex and Band Birds	Johnson
	Wild Duck Dinner @ McCrary Hall	(Provided by Joe Johnson.)

Tuesday, October 30

(Lect. #1) PRR	9-12 @ (location to be announced) (Forestry/Recreationn as Part of Land-use and Management)	Chuck Nelson
(Lab #1) PRR	1-4:00 @ (location to be announced) (Interpretation to Recreationists and Relationship to Agriculture)	Chuck Nelson
(Lect. & Lab) Comp. Sci.	Mid-term Exam	Quigley

Wednesday, October 31

(Lab) Nat. Res.	VanDeusen's Wetlands 9-10:00 Feeding routine at bird stations 10-12 Game & Non-game Bird Habitat Campfire - Hotdog Lunch 1-4:00 Recycling Resources, Pond Restoration, Erosion Control - Rip-rapping Stream	VanDeusen/Mainone/ Johnston

Thursday, November 1

(Lect. & Lab) Leadership	10-12:00 @ Cabin C	Gardner
(Lab) Ag. Eng.	1:30-4:00 (Shop Skills/Farm Machinery Operation, Combine Harvest Loss)	Moore and Becker
(Lect. & Lab) Comp. Sci.	7-9:30 p.m. @ Computer Lab	Quigley

Friday, November 2

(Lect. #2) F&W	9-12:00 @ Ornithology Lab (Land-use Patterns, Ecosystems & Energy Flow, Political/Economic Ramifications of Nat. Res. Mgt.)	D. Johnson

(Lab #2) F&W	1-4:00 @ Bird Sanctuary (Population Dynamics and Cropping Systems)	D. Johnson & T.A.'s

Saturday, November 3

Sunday, November 4

Curriculum/Activity Schedule
KBS Instructional Pilot Group
Fall, 1984

nday, November 5

Lab (Ag. Eng.)	9:00-4:00 Fence Layout and Construction @ Plant Ecology Field Study Area	T. Miller, M. Moor B. Becker
	Lunch 12:00-1:00 @ McCrary	

uesday, November 6

(Lect. #4) An. Sci.	9-12:00 @ Cabin C (Livestock Mgt. & Husbandry; Poultry) @ Cabin C	Ritchie and Colema
(Lect. #4) Ag. Eng.	1:30-4:30 (Farm Bldg. Plans & Layout) @ Cabin C	Burkhardt
(Lect. & Lab) Comp. Sci.	7-9:30 @ Comp. Lab	Quigley

ednesday, November 7

(Lect. #3) Forestry	9-11:00 @ Cabin C (Forest Products & Processing)	Suchsland
	11:30-12:00 Lunch	
(Lab #3) Forestry	12-4:00 Field Trip - Sawmill at Charlotte	Suchsland

ursday, November 8

(Lect.) Nat. Res. (Res. Devel.)	9-11:00 @ Computer Lab (Energy & Economics - policy decision-making)	Edens
(Lab) Nat. Res. (Res. Devel.)	11:30-5:30 Field Trip - Jordan College Energy Institute	Edens, Tompkins

Computer Class cancelled.

iday, November 9

Leadership	9-12:00 @ Cabin C	Gardner
Exams	1-3:00 @ Cabin A & C	Ogline/Gardner

day, November 10 — 9:30-4:00 ANRE Club Visit to KBS

nday, November 11

Curriculum/Activity Schedule
KBS Instructional Pilot Group
Fall, 1984

M ay, Nov. 12

Leadership	8:30-10:00 @ Cabin C (Resource Develop. and Mgt. in Developing Countries)	B. Colley, D. Lyvere
	10:15-12:00 @ Cabin A (Agr. Communications - Graphic Techniques & Equipment)	J. Tompkins
CSS Field Trip	12:45-4:30 @ Kellogg Cereal Co. - Battle Creek (Small Grains Marketing and Processing)	Tompkins/Ogline
	Library open	

Tuesday, November 13

(Lect. #2) PRR	9-12:00 @ Cabin C (Recreation Issues - Agriculture & Tourism	C. Nelson
(Lab #2) PRR	1-4:00 Field Trip (Marketing Tourism - Benefits to Agric. - Orchard/Winery	C. Nelson
Comp. Sci.	7-9:30 Microcomputer Lab	Quigley

Wednesday, November 14

Leadership	9-12:00 @ Cabin C	Gardner/Tompkins
(Lect./Lab) CSS	1-4:00 @ Cabin C (Land Use classes and characteristics)	D. Mokma
	Library open	

Thursday, November 15

Nat. Res. (Res. Dev.)	9-12:00 (Location & activity to be announced.) 1-4:00 " " " " " "	Humphries, Dursch, R
Comp. Sci.	7-9:30 Microcomputer Lab	Quigley

Friday, November 16

(Lect./Lab) CSS	9-12:00 @ Cabin C (Crop Cultural Practices)	L. Copeland
(Lab) Ag. Eng.	1-4:00 Small Group Skill Development	Moore, Becker

Saturday, November 17	Possible KBS Club Field Trip	Officers/Gardner/ Tompkins

Sunday, November 18

P.Cgline

CURRICULUM/ACTIVITY SCHEDULE

KBS Instructional Pilot Group

Fall, 1984

Monday, Nov. 19

Leadership	9-12:00 @ Cabin C Crops	Copeland ~~Gardner~~
Animal Sci	1-3:00 @ Cabin C (Sire Selection)	T. Ferris
Animal Sci	3-4:30 @ FLC (Juding Dairy Cattle)	J. Meyers

Tuesday, Nov. 20

Lect. (An. Sc.)	9-12:00 @ Cabin C (Marketing Plans/ Info.)	Atkeson, Rahn
Lect./Lab (Ag. E.)	1:30-4:30 @ Cabin C & Dairy Center (Building Design/Livestock Environment, Waste Mg't.)	Burkhardt, Parsons, Ashley

Wednesday, Nov. 21

Leadership	9-12:00 @ Cabin C	Gardner
Leadership	1-3:00 @ Cabin C (Committee Responsibilities)	Gardner/Tompkins

Thur-Sun, Nov. 22-25 Thanksgiving Vacation(HAPPY HOLLIDAY)

CURRICULUM/ACTIVITY SCHEDULE
KBS Instructional Pilot Group
Fall, 1984

Monday, Nov. 26		
Lab (Nat. Res.)	9:00-3:30 Field Trip (Kalamazoo Waste Treatment Plant, Paper Mill)	Ogline/Colley
	Library Open	
	Exam ??	
Tuesday, Nov. 27		
Ag. E. (Lect. & Lab)	9:00-4:00 Dairy Food Processing & Field Trip	Burkhardt/Partridge
Comp. Sci.	Final Class & Review @ Comp. Lab.	Quigley
Wednesday, Nov. 28		
Forestry (Lab)	9:00-4:00 @ Kellogg Forest (Felling Tree, Processing through Sawmill)	Suchsland/Stadt
	Library Open	
Thursday, Nov. 29		
Nat. Res. (R.D.)	9:00-12:00 @ Kellogg Forest	Humphries/Rule
Leadership	1:00-4:00 @ Cabin C	Gardner
Comp. Sci.	Final Exam @ Computer Lab	Quigley
Friday, Nov. 30		
	9:00-12:00 @ Cabin C (Inter-disciplinary Teaching Tips/Methods/Activities; Analysis of Fall Term)	Ogline
Leadership	1:00-4:00 @ Cabin C	Gardner
	1130 Banquet (?)	
Monday, Dec. 3		
	9:30-12:00 Final Exam @ Cabin C	Ogline/Gardner
Tuesday, Wednesday Dec. 4 & 5		
	Possible Chicago Field Trip	

APPENDIX B

FIELD OBSERVATION

REPORTS IN

STAGE TWO

Introduction

The field reports were developed through audio-cassette recordings and handwritten observational notes. Observations were anecdotal and conducted daily in the mornings and afternoons. The observations took place during lectures and other classroom activities, field trips, labs and chores. The works of Pelto and Pelto (1978), Henderson, et al.(1978), and Patton (1980) were used as general guidelines for developing the reports.

The field observation reports were an attempt by the researcher to present an "evolving picture" of the events that took place in Stage Two. Further, they were viewed as a representative sample of how the KBS program's instructional strategies served as a basis for impacting on th attitudinal changes of the undergraduate participants. The field observation reports were designed to strike a balance between description and interpretation in the interaction process between participants and resource people. The reports attend to the attitudes of participants and resource people.

Each report contains a setting, an interactive process, a designation of the attitude being assessed, an adjacent description and interpretation of the verbal and nonverbal interaction, and an integrative summary. The integrative summary provided the researcher with an opportunity to link and explore patterns in attitudinal changes from one instructional event to the next over the KBS program interval.

To ensure confidentiality, each participant statement was designated by an alpha-numeric code. These codes represented the demographic variables in the study: Minority Status, Place of Residence, Agriculture Major, and Gender.

Criteria

The criteria for presenting a field observation report were the following:

1. The audio-cassette recording of the instructional event was of relately high audio quality.
2. The audio-cassette recordings had complementary handwritten anecdotal observational notes to increase the accurary.
3. The opportunity for objectivity of the observed instructional event. The audio-cassette recording of the instructional event had to contain segments of dialogue that expressed attitudes related to Interdisciplinary Thinking, and/or Career Opportunity and/or Experiential Education.
4. If the observed instructional event was deemed a "good

session" by participants as verified through informal conversation, and, if the researcher through participant observation agreed, a report could be developed.

Procedures

Audio-cassette recordings which met the above criteria were transcribed as outlined in the literature cited in this section. Verbal interactions that addressed the demographic variables under investigation were organized around the attitudinal themes of Interdisciplinary Thinking, Career Opportunity, and Experiential Education. These themes were numbered consecutively as they evolved from the verbal interactions between participants and resource people.

In terms of the coding procedure, the first number in the code designated Gender. One represented Female and two repesented Male. The second number in the code designated Minority Status. One represented Non-minority and two represented Minority. The two numbers were followed by letters which designated the participant's major.

The following represents the majors of participants in the pilot study along with the number of students in that major:

RD	Resource Development(2)
AGPK	Agricultural Packaging (1)
AGNP	Agriculture no Preference (2)

AGCO	Agriculture Communication (1)
ANRE	Agriculture and Natural Resources Education (2)
ANS	Animal Science (1)
HORT	Horticulture (1)
CSS	Crop and Soil Sciences (2)
AE	Agricultural Engineering (2)
FSM	Food Systems Management (2)
AGBI	Agricultural Biochemistry (1)

The last number represents the particiant's Placeof Residence. One represents Open Rural Country Residence; two represents Small City/Suburban (less than 50,000 people); three represents Large City (50,000 or more people). Thus a participant code such as 22ANS3 would mean that the participants was Male, a Minority, majors in Animal Science and was from a Large City of 50,000 or more people.

A limitation of the observational procedures was the researcher did not utilize a second opinion to ensure greater objectivity. Often the Program Staffs' time constraints did not permit them to assist with the observations.

Field Observation Report 1

PLACE: Swine Operation, Odessa, Michigan
DATE: October 6, 1984
RESOURCE PERSON(S): Gordon and Pat Endsley
INSTRUCTIONAL STRATEGY: FIELD TRIP

Dr. Gardner, the KBS Program Coordinator, accompanied the participants to the farm of Gordon and Pat Endsley. Their farm was a 300 acre mixed operation. The crop enterprises were corn for silage, oats, wheat, barley, and some hay. The livestock enterprises were Charolais beef cattle and a swine operation dominated by Hampshire pigs. The Endsleys told us that they were the first to breed and raise Charolais cattle in Michigan also, their swine operation had over 200 sows farrowing in 1984.

The technology and equipment utilized included a continuous flow electric dryer for drying corn down to fourteen percent moisture for a two year storage period. A feed bunker silo system was utilized and an old dairy barn was converted into a finishing barn for the swine operation. The bulk of this report is limited to the activities and experiences of the participants related to the swine operation in the farrowing barn.

INTERACTIVE PROCESS	DESCRIPTION + INTERPRETATION
INTERACTION 1	EXPERIENTIAL EDUCATION 1
Dr. Gardner: "Is the humidity usually this high in here? Pat: "They (Gordon and her son) washed in here yesterday ...I'm still trying to get the fan adjusted. I turned it on this morning, but evidnetly, I didn't get it quite right yet." Dr. Gardner: "I'm not cirticizing you, but I'm raising some factors of importance."	Inside the farrowing barn the participants smell the strong odor of the hogs and feel the high humidity and heat. They were experiencing discomfort in a production agriculture environment. The participants were exposed to the importance of ventilation and heat during the growth and production of hogs. The stress that could develop among hogs when the balance heat and ventilation was not properly maintained was experienced through feeling it themselves.

INTERACTIVE PROCESS	DESCRIPTION + INTERPRETATION
Pat: "We do keep it warm. We try to keep it like this when we have little pigs (points at a recently farrowed litter)."	
Gordon: "It's less humid in here when we let a lot of natural air through and in the winter time when the heater is running a lot. Then, it's not as hard to keep the humidity down."	
Dr. Gardner: "But, right now you don't need any heat so..."	
Pat: "We do have the heater on because it does get cold at night."	
INTERACTION 2	CAREER OPPORTUNITIES 1
Pat: "I'm a convert from dairy farm and never again will I milk cows" (she laughs).	Pat may have been reacting to the predominance of women among the participants. She made several statements about her preference for running a swine operation instead of a dairy operation.
Dr. Gardner: "...Some of them can tell you about, they've been milking cows for a while now, Sue likt to" (laughter from the participants).	
Pat: "I said that Gordon's mistake was to let me raise hogs first...I found out (she laughst) that there were better things to do than get up at four or five in the morning to milk cows. You wait and do hogs after the kids get on the buss...I'll say to the gals hogs is a real nice job for a woman that wants to stay home...I don't come to the barn in the morning until my kids are on the bus, and I'm home at night when they are here."	Pat's comments here seemed to address the question: How does experiential education help you select a career?

INTERACTIVE PROCESS	DESCRIPTION + INTERPRETATION
INTERACTION 3	EXPERIENTIAL EDUCATION 2
22AGPK3: "What do you do when the pigs get older. You know like when they get medium size, where do you put those?" Pat: "We have several other buildings...an older barn that Gordon's dad converted...into a nursery and then we did build a finishing barn. We're kinda inclined to use what we've got and adapt to it." 12RD3: "If we petted one (a hog) would it bite us?" 11FSM2: "No, I just petted her head." Pat: "I won't say no, I've got one down here I watch." 12AGCO3: "What types and amount of pesticides are used in this building?" Pat: "About the only thing I use when the flies get real bad is thumble poison (wax like glue strips)...I also use some carbate for rats." 12RD3: "Are there rats in here?" Pat: "Rats and mice both... but they are both kinda nocturnal so I don't think you need to worry about it." 12AGCO3: "Do they eat the pigs or anything?" Gorden: "It's very hard to try and control them in here because they have access to get out and they have a place to live...there's a lot of	The participants began to adapt to the hog barn environment and started asking a series of questions. They utilized their sence of smell, sight, touch and hearing. They could see the different stages of growth designated by the size of the pigs by litters in various stalls. Many of the participants examined the feeding equipment including an auger for conveying grain. Some felt the hogs' backs and heads. Also, they could hear the piglets squeal and see them search for a sow's teat. They heard the grunts of boars and watched them engage in the behavior of establishing dominance.

INTERACTIVE PROCESS	DESCRIPTION + INTERPRETATION
food available to them because they'll eat the other food instead of the rat bait and I guess a lot of hog operations have trouble with rodents."	
INTERACTION 4	INTERDISCIPLINARY THINKING 1
12AGCO3: "I have a question, as far as the stress on the behavior of the pigs, will they produce so many litters or piglets because they're in a cramped area? To me it seems like it would be a very stressful area as far as comparing humans to pigs because you said they were the same" (similar in temperment to humans). Pat: "The reason we have gone to confinement is it has allowed us to raise more pigs. I've noticed, like the sows in the barn, when we run them in the lots most of the time the ones that pig (farrow) a week after they're in the barn will actually have a better pig than the one whose been outside right away (all the time) because I feed them a little more and they aren't running as much." 12AGCO3: "ooh!" 12RD3: "Do certain pigs get more money at market than others?" Pat: "Yeah, there is a difference in the grades of them. You have yield grades 1, 2, 3, and 4 with a 1 being ideal and a 4 being short, fat and squatty...the longer the loin, the better they are."	The questions became more rapid as participants began to explore more about Pat and Gordon's management practices in their swine enterprise. A chain of interrelated questions developed. These questions were related to sow confinement and weight gain, body structure and profit, and weight gain and marketing.

INTERACTIVE PROCESS	DESCRIPTION + INTERPRETATION
21ANRE1: "Do you take them to market every month or every two months or something like that?"	
Pat: "We usually ship three loads a month as an average, that's what it works out to."	
21ANRE1: "Do you take the biggest ones?"	
Pat: "We sort them by size, 220-230 (pounds is about right now). It kinda depends on the market. Sometimes it will pay us to run them up to 240 sometimes you don't want anything over 230."	
INTERACTION 5	CAREER OPPORTUNITY 2
12RD3: "I have a question, she (Pat) said you castrate the baby pigs, how do you know which ones to castrate, what if one is a good breeder?"	The Endsleys' attitudes that they were raising hogs as a business and not simply as a quality of life considera- tion, such as wholesome family living, was expressed.
Gordon: "Well we're not in the business of selling breeding animals. In the hog business we're just raising market hogs mainly and so we castrate them all, then buy boars from pure breed seed stock producers."	

INTERGRATIVE SUMMARY

Dr. Gardner's role in the field trip was one of joining the Endsleys as team teachers. He asked timely questions and made interjections throughout about the swine operation which served as a catalyst for participants' questions. Also this instructional strategy provided opportunities for related interjections by the Endsleys. For example, there was an interactive process (not presented) when Dr. Gardner interjected that pigs were able to balance their ration because unlike other farm animals,they were monogastrics. Pat Endsley related this anatomical quality of the pig to experiments conducted on them related alcoholisms and ulcers.

One pattern that was understood during the field trip was the chain of related questions be a participant about stress from confined hogs and their weight gain was followed by a question concerning the body structure of hogs in relation to market value. This was followed by a question related to the frequency of marketing hogs in relation to the frequency of marketing hogs in relation to their weight gain. The participants were consciously or unconsciously complementing each others thinking. These chain of related question patterns took place in the classroom, field trips and laboratory sessions.

The researcher observed a pattern of minority participants dominating the question and answer interactions. The researcher wondered was this pattern due to subjective observation. In the classroom participants were generally stationary, a captive audience. If a tape recorder was strategically placed on a table in the classroom, all the voices of the sixteen participants were relatively clear. However, on a field trip, the researcher held the tape recorder or had one of the participants hold the tape recorder while the researcher wrote note or participated in the activities. It was felt the problem of "fully covering" all the participants could be solved. An attempt to maximize objectivity could be fostered by closely following the resource people as they moved about rather than following the participants. Also this facilitated observing which students asked the resource person questions.

It was observed than in many instances the Non-minority participants with farm backgrounds would serve as resource persons for Non-minority without farm backgrounds and, at times, minority participants without farm backgrounds. Often during this, and other, field trips these groups of participants formed clusters away from the resource people. One limitation in the study was the failure of the researcher to probe for explanations about these participants clusters through informal conversation.

During this field trip it appeared that the participants gained insight into the complex decision making that occurs in managing a farm enterprise and that farmers could belike corporate managers who planned to maximize profits. The participants were exposed to production constraints such as rodents competing for the hog's feed. Also, inquiries were made concerning the ethical questions of farm production such as animal confinement for greater weight gain and profit.

In terms of attitudes about Experiential Education, the participants got insights beyond the classroom theory. How the hog smells, the hog's behavior pattern, what it feels like in a poorly ventilated hog barn, and the time, effort, and work that goes into producing feeder pigs were all first hand experiences. Now, the participants might be more objective in asking themselves if I wanted to go into farming would I want to invest in a hog operation: what are the benefits and what are the demands?

This field trip to the Endsleys' swine operation was one instructional strategy in learning about swine production. That afternoon the participants visited the swine operation of a high school Vocational Agriculture Education teachers and castrated, ear notched and clipped the tails of several three week old pigs. At the KBS Farm Learning Center the participants had, prior to visiting the Endsleys and the high school Vocational Agriculture Education teacher, constructed a cement slab for farrowing pens and throughout the program interval cared for two sows and observed them farrow. These related learning activities assisted in providing the participants with learning experiences about swine production that were practiced and sustained overmost of the program interval.

Field Observation Report 2

Place: KBS Farm Learning Center Dairy Barn
Dates: October 8, 1984 and October 30, 1984
Resource Persons: A KBS Participant and Dairy Herdsman
Instructional Strategy: Lab/Practicum (chores)

This field observational report covers a series of scheduled dairy chores which included milking and feeding dairy animals. Dairy chores were scheduled for two days in succession in both the a.m. from 5 to 6 and the p.m.from 5:30 to 6:30. This gave participants a reasonable simulation of the dairy operations for most dairy farmers in Michigan.

One of the participants was specializing in dairy science and spend most of the free time in the program schedule to work at the dairy barn. In effect, this participants (11ANS2) became an unofficial assistant during the scheduled dairy chores.

INTERACTIVE PROCESS	DESCRIPTION + INTERPRETATION
INTERACTION 1 OCTOBER 8, 1984	EXPERIENTIAL EDUCATION 1
12AGBI3: "I can't get used to this." (The comments were made as participant enters dairy barn) 12AGCO3: (To the herdsman) "can't you get rid of the flies?" 12AGBI3: "I'm a farm girl." (Participants makes the statement when picking up the Delval milking unit)	The participants expressed these feelings of displeasure as they were assisted by the herdsman in a strip cup test for mastitis. The herdsman shows both particpants how to position and hook up the Delval milking unit to the cow's teat.
Researcher: "Make sure you keep your...you got to watch out for the tail because you'll get hit in the eye." 12AGCO3: "Yeah, I felt it. (To the cow) Sucker!"	In one instance 12AGCO3 is tail whipped by a Holstein cow. There was no injury and 12AGCO3 maintained a sense of humor.
Researcher: "I'll hold her (cow) tail up."	The participants were immersed in an unfamiliar setting. They

INTERACTIVE PROCESS	DESCRIPTION + INTERPRETATION
12AGBI3: "I don't think this one likes me."	to contend with 1500 pound animals for the first time in their life. They had to adapt to the dairy barn with its many flies and cross odors of silage, manure and urine. They had experienced a first hand or real life situation which may have generally been uncomfortable.
INTERACTION 2 OCTOBER 30, 1984	EXPERIENTIAL EDUCATION 2
21ANRE1: "She's (cow) getting hungry. You better hurry up."	
12AGBI3: "I'm not a robot." (smiling)	
21ANRE1: "Every cow has a number." (above their stall)	21ANRE1 looks to see how many pounds of mixed ration and soybean meal to give the cow.
12AGBI3: "Come on (calls name) they're hungry. Move the hay so they can eat it (plays affectionately with a Jersey cow).	
Dairy Herdsman: "Such a nice cow." 12AGBI3: "Yeah, I like her."	During this interaction the participant that hooked up the Delval milking unit removed it and used the teat dip solution unassisted. Compared to 10/8/84, 12AGBI3 was more accepting of the setting, was more tolerant and seemed on 10/30/84 to enjoy the dairy chores. This confirms that some participants needed a transitional period to acclimate themselves to the demands of the unfamiliar dairy chores.
INTERACTION 3 OCTOBER 30, 1984	EXPERIENTIAL EDUCATION 3
12AGBI3: "Yesterday they (cows) were eating each others food like that one. Yesterday they wouldn't let me feed	The participant hand feeds a Holstein cow grain while talking. The participant informed the

INTERACTIVE PROCESS	DESCRIPTION + INTERPRETATION
Them because I was scared. These big old cows get on my nerves; they get 11 pounds.	researcher of a preference to feed rather than milk cows.
21ANRE1: "I like to feed and milk. How full should this bucket be?"	The participant filled the silage bin, turned on the silage conveyer and used a pitch fork to mix in a calcium feed supplement.
12AGBI3: "Number three doesn't produce as much."	
21ANRE1: "How come they get this amount?" 11ANS2: "They are going to calve (give birth) soon so we want to give them plenty of grain."	The participant searches for comprehension and a rationale for allocating feed mixtures to dairy cows. The participant who became an unofficial assistant responds to the question.
Herdsman: "Do you want to milk?" 12AGBI3: "No, but I will cooperate" (she washes cow's udder unassisted).	The herdsman asks the participant who doesn't like to milk. This confirms students made distinctions between what they did and didn't like when performing dairy chores.
INTERACTION 4 OCTOBER 30, 1984	EXPERIENTIAL EDUCATION 4
21ANRE1: "How come they (cows) get this amount?" 11ANS2: "They are going to calve soon so you want to give them plenty of grain."	This interaction illustrates how the unofficial assistant (11ANS2) may have been a valuable resource in creating an exploratory learning environment for other participants.
12AGBI3: "Does she know you?" 11ANS2: "I don't know."	12AGBI3 may have formed a hypothesis that diary dows have emotions like humans.
21ANRE1: (Talking to 12AGBI3) "Silage aids in digestion (and) provides roughage. Ask (11ANS2) about it. (You're supposed to) turn over (the calcium) in (the) silage so they (cows) won't notice it."	21ANRE1 used a pitch fork to mix the calcium supplement with the silage (fermented corn including grain, husks and stalks) while talking.

INTERACTIVE PROCESS	DESCRIPTION + INTERPRETATION
11ANS2: "(This) cow (a Holstein breed) wasn't milked all the way because she had mastitis and her teats were squeezed to drain all the milk to keep the udder deflated. It (animal health procedure) prevents mastitis from getting worse."	The researcher observed an interesting exchange about mastitis (a common udder infection) which leads to an exchange about genetics related to the domestication of dairy cows.
12AGBI3: "Do they like to be milked?"	
Herdsman: "Yes, it relieves the pressure."	
12AGBI3: "What are those other things (teats)?"	
Herdsman: "They are extra (teats). Some cows have them."	
12AGBI3: "Why do they have them (teats)?"	
Herdsman: "I don't know (really). (It) has something to do with the cow's evolution to domesticaton."	
12AGBI3: "Hi baby! I know you remember me."	The participant (12AGBI3) is talking to a Brown Swiss cow as if to test the hypothesis; cows have human emotions. The participant (12AGBI3) calmly milked the Brown Swiss cow unassisted. 12AGBI3 needed constant assistance on October 8 and on October 30 could milk cows unassisted. This confirms several of the participants' attitudes that you learn hands-on skills through repetition.

INTERACTION 5 OCTOBER 30, 1984	EXPERIENTIAL EDUCATION 5
12AGBI3: "How do you know when to treat for foot rot?" 11ANS2: "(You can see) swelling and discoloration."	(12AGBI3) is observing the unofficial assistant (11ANS2) treat a cow for foot rot (a problem which develops from constant standing on moist concrete in a stall).
12AGBI3: "That must sting a little." 11ANS2: "Yes! That's how you know it (the solution) is getting in."	12AGBI3 watches 11ANS2 pour a solution on the affected foot.
12AGBI3: "(States 11ANS2's name) I know you're going to miss (the) cows when you leave (KBS)."	12AGBI3 seems to respect 11ANS2's dedication to learning dairy science in a real life situation.
11ANS2: "I hope to work at (the) MSU Dairy Barn. I need the experience. That's why I'm here everyday."	11ANS2 seems to confirm a good experience and creates a desire for continuing that experience.
12AGBI3: "I thought you already had a farm."	12AGBI3 seems to compliment 11ANS2's proficiency and competence in dealing with dairy animals

INTEGRATIVE SUMMARY

During the interactive process of October 8th and October 30th in which participants performed dairy chores attitudes about Experiential Education were most widely expressed.

Many of the non-farm participants were placed in a new real life situation. They appeared to gain insights on whether they would want to work in animal science. They appeared to develop an appreciation for dairy farming. In this respect, the participants appeared to gain an appreciation for the rationale of why dairy farmers performed the tasks they performed. They had an opportunity to observe the vertical integration of the dairy industry. Opportunities to see calving, feeding, milking and health care, milk inspection and milk transportation and marketing took place during the overall scheduling of dairy chores.

Observing 12AGB13 and 12AGCØ3, especially 12AGBI3, indicated that; non-farm participants may need a transitional period to develop positive attitudes toward dairy chores. On October 8th, 12AGB13 and 12AGCO3 seemed to be experiencing displeasure with the smells present in the dairy barn. This included cross odors from silage, manure and urine. The huge number of flies appeared to be an irritant and they may have been intimidated by the 15ØØ pound dairy cows. 12AGCO3 was hit in the eye by the tail of a Holstein cow.

However, when 12AGBI3 was observed on October 3Øth thu seems to have been a significant change in attitudes. 12AGBI3 played a game of "hurry up and feed the cows" with 21ANRE1. 12AGBI3 now milked cows unassisted and told the dairy herdsman the cows were nice. It also appeared that 12AGBI3 developed a hypothesis about cows having emotions in terms of recognizing their milkers. Moreover, 12AGBI3 seemed to have informally tested this hypothesis.

The effectiveness of the KBS program versus the interactive effects of the unofficial assistant (11ANS2) can be brought into issue. Through informal conversation, it appeared the non-farm participants were more appreciative of 11ANS2's role that the farm participants. 11ANRE1 was raised on a dairy farm and 11FSM2 was engaged to a dairy farmer (they have since been married) and both had extensive farm experience. The two cited on separate occasions they felt 11ANS2 was inadequate.

The following are additional observational conclusions based on the interactive process in the dairy barn on October 8th and October 3Øth:

1. Real life learning situations provide participants with insights on whether they like or do not like a particular career.

2. Competency in a career can be viewed in terms of subject matter competency in practical application and subject matter competency in terms of theory.

3. The participants' expressed attitudes that hands-on learning was learning through repetition was confirmed.

4. Participants who performed hands-on skills got an opportunity to relate a skill to a rationale for performing the skill.

5. Hands-on skill training provided KBS participants with an exploratory learning experience.

6. Hands-on skills associated with Experiential Education

provided an opportunity to develop hypothesis testing through observation and application.

7. Hands-on skills associated with Experiential Education was essential to developing a feeling of competency.

Field Observation Report 3

PLACE: KBS Farm Learning Center Pavillion
DATE: October 9, 1985
RESOURCE PERSON(S): Mike Moore, Agricultural Engineering Instructor; Bill Becker, Lab Assistant.
INSTRUCTIONAL STRATEGY: Lab Practicum

Calibrating a grain drill and corn planter was the content of the laboratory practicum. Mike Moore, the Agricultural Engineer;s Lab Instructor at the start, interjected a real life situation:

"We're playing a game here because this field wasn't plowed last week. We were supposed to plant this week, but if you walk out there you'll sink knee deep in mud. This is something that farmers, I would have to look at it as the farmers might see it. Why should I go in the field and sweat and work it (soil) up and increase my soil compaction and run the risk of plugging the planter and lower the germination rate and all those sort of things. So it doesn't make sense to try and go out even though it is getting later and later in the year and that also has an affect on when you plant."

Mike then asked for volunteers to plow and plant the field on Saturday of that week. He receives a mixed reaction: three minority participants and two non-minority participants volunteer. The following interactive process takes place at the pavillion of the farm learning center.

Interactive Process	Description and Interpretation
Interaction 1	Experiential Education 1
Lab Instructor: "Let's count off by x's and y's. I want the x's working on the grain drill and the y's working on the corn planter... Okay now a couple of things before we get started... who was it that worked with certified seeds (names participant). Alright we've got two different kinds of seeds here this is wheat and its certified, Michigan Certified seed. Can	The participants proceeded to count off and assemble in an x or y group. The researcher was assigned to work with participants who calibrated the grain drill and most of this Field Report centered on their interaction. The lab instructor relied on a participant's work experience with seed certification to

Interactive Process	Description and Interpretation
you tell us what certified seed is and why you want certified seed."	create interest and motivation for the practicum.
11CSS1: "Okay. . . certified seed is in plant and foundation seeds like the pure stuff coming from the university and you go out and inspect the foundation seeds in the field. Like this was (points to a bag of certified seeds) inspected in July and its wheat. You go out in the field and you look for weeds, diseases and other crops ...You record your balance sheet and you turn in the sheets and then they (lab technician) send a sample to the lab and you analyze it for weeds and impurities like other crops and half seeds. . . What it is is a pure variety, it is like that variety should be the only variety in that sack. . . Certified seed is pure seed and therefore it's more expensive and a higher quality...usually (it's) a better yield than your regular commercial seed."	
Lab Instructor: (to the whole group). "So generally it is high quality seed and its been inspected to improve your yields and most importantly you usually get higher germination and germination is a very important factor when you plant . . . We want to run them through the corn planter and we want to calibrate the corn planter and then when we get the chance sometime, hopefully, at the end of this week, we'll plant half of this field out here that we worked up in wheat and half of it in beans.	The lab instructor paraphrases the participant's explanation of the seed certification process and underscores some important principles. The lab instructor also interrelates calibration to planting with a tractor. This was perhaps a new concept for nonfarm students. It also illustrates the lab instructor's attempt at providing the participants with a succession of related steps in the crop production system.

Interactive Process	Description and Interpretation
Interaction 2	Interdisciplinary Thinking 1
12RD3: "Yeah, but still what's the equation?"	There seems to have been little apprehension for participants in different agriculture majors to work together in a problem-solving situation.
21AGNP2: "That's what I was trying to get from him." (Lab instructor).	
11CSS1: "Is this it right here?" (Looking at the Extension Bulletin on Calibration).	The communication about working the formula spreads through the group.
12RD3: "I feel short."	
11FSM2: "Why?"	
12RD3: "I can't get over there (to see the seed-hoppers on the grain drill).	
11CSS1: "Wait it comes out to something else (the results from the equation), but whatever it comes out to you have to divide by two because you're only planting half of the field.	
12RD3: "Okay, let me write this down; ooh, it's going to get dirty (notebook pad).	
12AE3: "So you times this (variable in the equation).	
11CSS1: "You times this out and it comes up with some number and then you divide by two."	
12RD3: "Oh so, it's this times this divided by two equals that squared feet and then how did you get that?"	

Interactive Process	Description and Interpretation
11CSS1: "To get from squared feet to the amount of acres you divide by 43560 (feet per acre) because that's the square feet in an acre."	
12RD3: "Okay stop (this) equals what the number of square feet in acres is right?"	One participant gains understanding with assistance from another participant from a different major.
11CSS1: "Right, in your area" (the given area).	
12RD3: "I just want to be sure that I know what I'm doing."	
Interaction 3	Experiential Education 2
Researcher: "You need to know how big the wheel is right. . . so the radius would be half of the length of the wheel."	The researcher observed some participants that were at the periphery of the interaction adjacent to the grain drill.
12HORT3: "What's r?"	
Researcher: "R is the radius, the diameter is 37.5 inches so you divide the diameter by the radius.	The researcher entered into the problem-solving process with one of the participants.
12HORT3: "Then you times it by H?"	The participant may not have been an aggressive learner, but seemed to demonstrate interest in understanding the hands-on activity.
Researcher: "That would be 3.14 inches...r is the radius, but see the revolution (of the wheel) would be the diameter, okay the length of half of that would be from the middle (of the wheel) to the end. That would be half of the diameter (of the wheel) that's the radius.	

Interactive Process	Description and Interpretation
12HORT3: "Oh, you divide by this." 12RD3: "And then you divide this by what?" 11CSS1: "43560 inches because that's the number of square feet in an acre."	The participant became more involved with others in solving the calibration equation. This confirmed that active involvement leads to greater understanding in the problem-solving process.
Interaction 4	Experiential Education 3
12RD3: "Can I talk and you just tell me what I got wrong... Okay, we multiply that out and then we divide it by two because we are only using half of the field...okay, I got that. We come up with that answer, but then we want to convert it into acres so we divide it by this (43560 square feet) which converts acres into feet." 11CSS1: "And that's the number of acres to be planted ...on the corn its going to be the same thing because you're planting the corn in the other half." 12RD3: "Okay, so we have an equation for the revolution of the wheel."	The participant demonstrated hands-on skills can be learned through repetition. This seemed to indicate the participants criteria for knowing or being proficient in a skill was to complete the steps involved with minimal supervision.
Interaction 5	Interdisciplinary Thinking 2
11FSM2: "There's got to be something else to this. We're not doing this right, because each time that wheel goes around, its not going to plant just one seed and they're (other participants) not thinking about that."	This interaction is an example of problem-solving in an interdisciplinary group. Participants were simultaneously concerned about the various components in the calibration equation. How many seeds drop per revolution? How much area

Interactive Process	Description and Interpretation
Researcher: "It's covering the whole area." 12AE3: "Yes, it's covering the whole area, but how many seeds are falling in it? (in the ground every revolution).	is covered? How much area is planted? How do you figure the circumference of the wheel?"
11FSM2: "How much area is covered? How much area is planted?" 21FSM1: "Hold it, let's divide a 114." 21AGNP2: "You've got to figure the circumferences of the wheel." Lab Assistant: "Okay, see what you can do."	They appear to experience frustration which can be a negative side-effect both in the problem-solving process and in working with inter-disciplinary groups.
21AGNP2: "Wait, what is the circumference of the wheel... which is..." 11CSS1: "You guys, Bill, (Lab Assistant), one revolution is 114.45." Lab Assistant: "Does everybody have that answer?" (Several participants reply No.)	The equation seems elementary, but perhaps the participants were not used to immediately applying abstract principles to concrete situations.
Interaction 6	Experiential Education 4
Lab Instructor: "Okay, don't get frustrated. What do you need? Alright, where are these adjustments you are talking about?" Researcher: "You can see those hoppers, we first dumped them."	The lab instructor returns to check the participants' progress. They had experienced trial and error and frustration.

Interactive Process	Description and Interpretation
Lab Instructor: "Well, that is where the seeds drop down, where do you adjust it?"	Yet, it seems the participants while frustrated, were enjoying the problem-solving approach o learning.
11CSS1: "The dial thing you use in there."	They seemed persistent and determined to comprehend and interrelate the calibrations steps and calculations.
Lab Instructor: "The dial thing you use in where? In here, where's the dial thing?" (Laughter erupts).	
12RD3: "There's some way you have to adjust it."	
11CSS1: "How come you've got some plates in here?" (examining the grain drill).	
Researcher: "So that you can adjust the spacing in which the seeds fall out."	
Lab Instructor: "I've got her stumped now, she worked for certified seeds, she knows everything."	
11CSS1: (Smiling) "I don't either."	
Lab Instructor: "Well, I'll give you a hint. This is a grain drill. What you're thinking about is a corn planter with plates in it. These have holes that they (seeds) drop through, and if you have someone spin that wheel down at that end, you can see how the seeds go through an auger."	The participants cluster around the grain drill. As one of them spins the wheel they observe how the seed is conveyed through the auger.
12RD3: "Can I just ask one more question. The speed of the tractor doesn't have anything to do with the amount of little seed that drops out	

Interactive Process	Description and Interpretation
of it (grain drill) does it?"	
Lab Instructor: "Yes, it does and it doesn't. Okay, it does because the faster you go the faster the seed is going to drop."	
12RDS: "See, I knew it."	What the participant suspects is confirmed by the lab instructor.
Lab Instructor: "But the reason why it makes a difference is because the faster you go the more inefficient it gets, because if you go slow you're still going to drop seeds at the same rate, but you're not going to drop them as fast; (do) you see!"	
12RD3: "But if you speed up you still drop the same amount of seed, but it's just at a different rate?"	The participant continues to press for comprehension. The rate of seed dropped into a furrow in relation to the speed in which the grain drill is pulled by the tractor is a big concern.
Lab Instructor: "It'll just take you less time to do it, but they (Extension Service) have recommended speeds to do it at like from 2½ miles per hour to 5½ miles per hour ... They give you that big range because of terrain.	
If it is really bumpy ground you have to go slower. But if its really smooth ground then you can go faster. You see this seeder is driven by these wheels (points to wheels). Now, there are some corn planters that are driven off the PTO (Power Transmission Operation for power driven tractor attachments). That's when ground speed makes the difference.	The lab instructor attempts to give the participants clarification by introducing new factors. Factors not considered before by the participants were ground speed in relation to terrain and tractor technology. As these two factors are introduced into the problem-solving process the participant seems to gain comprehension.

Interactive Process	Description and Interpretation
12RD3: "Oh, but this is just driven strictly by this."	
Lab Instructor: "By the wheels."	
12RD3: "Okay."	Moreover, all the participants were exposed to the decision-making factors of seed application rates.

Integrative	Summary

During the interactive process in which the task was to calibrate a grain drill attitude about experiential education were most widely expressed. There was some attention directed towards attitudes about interdisciplinary thinking, especially working in interdisciplinary groups to problem solve. There seemed to be no significant expressions related to attitudes about career opportunity.

The instructional strategies used by the lab instructor, Mike Moore, seemed to be effective. The use of a participants' experience (11CSS1) with certified seeds appeared to have created interest in the calibration practicum. Calibration and planting with a tractor were presented as interrelated steps in the crop production system. This served to reinforce procedures for farm participants and clarify procedure for non-farm participants. Thus, the lab instructor attempted to meet the needs of both groups.

Through informal conversation, the researcher discovered the lab instructor was sensitive to creating and maintaining equity in his instruction at KBS. He was taking a course on equity in the classroom at the main campus during the same term of the KBS pilot program. The lab instructor wrote a term paper for the course based on his instructional efforts at KBS. Thus, the instructional strategies employed in the agricultural engineering labs may have been influenced by the course on equity in the classroom.

This brings into question the effectiveness of the KBS program versus the interactive effects of the course in classroom equity when assessing change in participants' attitudes.

Integrative	Summary

One of the attitudes expressed indirectly by the lab instructor during the hands-on grain drill calibration, was that learning would be made more meaningful if participants engaged in self-inquiry or problem-solving. In an informal conversation the lab instructor explained he was ambivalent. He wanted the participants to be decision-makers or problem-solvers, but he was not satisfied with his preparation in terms of knowing the subject matter.

There was substantial expression and activity during this lab/practicum directed towards the attitude of working in interdisciplinary groups. Interaction 2 showed that participants were able to work with each other regardless of agriculture major, especially 11CSS1 and 12RD3. Interaction 5 showed the possibility that an interdisciplinary group may look at a problem comprehensively. The component questions asked by different agriculture majors were all related to the general question: How much seed is needed by the grain drill to cover the given acres of a field?

Interaction 6 showed that students experienced frustration during the lab/practicum. This was related to the participants' attitudes that experiential education provides trial and error in developing a career choice, versus experience in a career choice. A case in point may be participant 12AE3. Would the frustration that developed in the lab serve to have 12AE3 reassess agricultural engineering as a career choice? Conversely, would the frustration give 12AE3 greater resolve to achieve more competency and experience in the agricultural engineering career. This has implications for follow-up studies of the KBS participants.

This lab/practicum may have given 22AGPK3, 12RD3, 12AGCO3, 21AGNP2 and 11ANS2 a significant real-life experience in terms of planting delays due to adverse weather. The researcher left Saturday morning with the above participants from the MSU main campus. We were to meet the lab instructor and plant wheat and beans at the KBS farm learning center. In East Lansing the day was sunny and bright. The closer we got to the KBS site the more overcast it became. Upon arrival at KBS we were met with a steady downpour. The fields, as a result,were too wet to plant and if we were farmers, the delay would have cost us profit. This was discussed with the lab instructor. Planting became impractical the next week as the coming of winter and program scheduling constraints made it impractical.

Field Observation Report 4

PLACE: KBS Bird Sanctuary Classroom
DATE: October 19, 1984
RESOURCE PERSON(S): Dr. Dave Johnson and two teacher assistants.
INSTRUCTIONAL STRATEGY: Lecture/Small Group Discussion

Resource Ecology was the content of this Lecture/Small Group Session. Dr. Dave Johnson introduces himself:

"I have two degrees in Zoology. . . my emphasis is in Fisheries and Wildlife. I have taught student teachers in the area of environmental education as well as teaching resource ecology. Today. . . we're going to follow the theme of contrasting natural systems with human systems. Typically (they are) agricultural systems (but) urban industrial systems (will be included) and so on. Is everybody clear, does everybody have the theme?"

Johnson continues with his opening remarks and eventually asks the two teacher assistants to introduce themselves to the participants. These three resource persons have interesting career backgrounds which address interrelations between natural and managed resource systems.

Interactive Process	Description and Interpretation
Interaction 1	Interdisciplinary Thinking 1
Dr. Johnson: In my regular course what we do is develop the whole conceptual scheme of ecology as well as talk about fundamental environmental problems. Today... the theme is going to be what is it like conceptually in nature as versus in human, urban agricultural systems. Is everybody clear, has everybody got the theme? my own special interest is in the area of solid waste. We're not going to get into solid waste today."	

Interactive Process	Description and Interpretation
12RD3: "Why not?"	
Johnson: "Well, undoubtedly we will, go run into the trash can (laughter) you'll be into that. You could get into it if you wanted to. I have two of my cohorts here today. John why don't you and Eshwan come up and introduce yourselves."	Johnson has a good sense of humor which helps create an informal learning environment.
John: "I've been interested in natural resource issues in the Midwest...then I went to Africa for 2½ years and I got really interested in what was going on there. So I'm sort of bringing them together at Michigan State studying for my Ph.D. now."	
Dr.Johnson: "Well, what kind of work?"	
John: "I'm really interested in forestry and especially forest ecology, tropical forest ecology and the problems of conservation and management of tropical forests. African rainforests (are) much more diverse (than U.S.forests). So instead of 20 kinds of trees...you have over 200 species. One of the questions I worked on in my thesis was, what impact does the animal have on trees, specifically seed dispersal? What happens if you start overhunting or removing the animals? What may potentially happen to your population dynamics and the population of trees? It's made me really sensitive to the interconnection of things."	John gives the participants an opportunity to see global interrelationships in agricultural and natural resource systems. The participants seemed interested and receptive to the information. All eyes were forward. There were no sleepy faces. As the researcher, I was also extremely interested. Thus, questions near the end of his introduction addressed problem-solving issues in resource ecology.

Interactive Process	Description and Interpretation
Eshwan: "My name is Eshwan for those who have problems pronouncing that name, just call me Esh. (Participants laugh). I'm from Sri Lanka. It's a small island south of India. It's an independent country, its not part of India.	Before listening to Eshwan participants may have not considered that some developing countries have the capacity to offer advance degrees.
I did my basic degree and my Masters both in Zoology back at home. I worked on my Masters on the Asian Elephant with a Smithsonian team which was working there. Then I continued my work on the Asian elephant in my Ph.D. work. That's what I'm trying to do now; write up my data for the Ph.D. There is an area back at home being developed for massive agricultural settlement and there are the elephant populations which are getting displaced from...their natural range area. The Department of Wildlife Conservation, back at home, came up with some areas for protecting these elephants and I did preliminary evaluation on these protection areas. ...and that is the data I am submitting for my Ph.D. at Michigan State."	Eshwan further enhances global interrelationships. He outlines some measures taken in Sri Lanka to maintain the ecological balance between managed and natural resource systems.
Interaction 2	Experiential Education 1
Dr.Johnson: "One of the first things I want to do is I want to show you this film. I will readily admit I have a bias. I don't come to this bias without experience. I personally operated a small farm that we lived on. So I don't come to farms without a background by any means. However, based on	Experiential and divergent experiences brings Dr.Johnson to a hypothesis testing

Interactive Process	Description and Interpretation
my teaching experience and readings and so on over the years since I've been at MSU, my personal opinion is that in the long haul the current system (agriculture) is not going to stay this way too much longer. I want to explore over the course of the day why that's true. I want to get you thinking about this line of reasoning by showing you this movie. It's called "Farming with Nature."	situation, a real life situation. He wants to share this situation with the participants, but he doesn't want to lecture them. This is going to be an exploratory process.
Here's what I want you to get out of this. When you're done (looking at the film) I'm going to split you up into two groups. I want those who are from an urban environment...those who have not been on a farm (prior to KBS), have not worked on a farm, (and) not lived on a farm. I want you to take an anti-position to this film. And those of you who are from the farm I want you to take a pro-position to this film."	Dr. Johnson's directions for the learning activity were for each group to make succinct statements given their assigned pro or con position. Eight of the sixteen participants had no prior farm experience.
AGNP2: "Do you want us to be pro for what the film is saying or pro for the film itself."	This was a good question. The participant wants to know whether to be objective or to do what is expected.
Dr. Johnson: "Pro for what the film is saying not pro because we've got a film (laughter from participants). Is everybody clear on what I want you to get out of this. Be ready to move when you're done (watching the film).	
12AGCO3: "Do you want the people who are not from the farm to be against or (con) you can have either or?	It seems to the researcher 12AGCO3 doesn't want to be caught on the wrong end. This may be a case of interactive

Interactive Process	Description and Interpretation
Dr. Johnson: "No I want the people who are not from the farm to be against what this film is recommending. 22AGPK3: "But we might enjoy (agree with) what they're recommending."	effect caused by an obviously manipulated learning situation. The two participants 21AGNP2 and 12AGCO3 were pre-testing the situation. That is, past experiences about expected normative behavior were coming into play.
Dr. Johnson: "Tough! We've got to have something here that is contrasting in terms of views to try to get down to the nitty gritty. So we're just saying okay, we're going to put you in that particular arena. We're going to put the other people in the other arena. There is nothing sinister about this jesture, its just technique to accomplish the goals we want to accomplish (to become clearer on why the present system of agriculture is not sustainable).	Johnson is directing the participants by setting a procedure toward a framework for experiencing different viewpoints or attitudes. The film is setting the stage for this process to occur in theory.
22AGPK3: "Okay!"	
Dr. Johnson: "Is everybody clear?"	
Interaction 3	Interdisciplinary Thinking 2
11ANRE1: "With fewer numbers of farmers being in agriculture and our land being swallowed up for urban uses, we need to protect the land that we have. And even though we need production... maybe that's what we're thinking about too much today. Our country is not a starving nation. We have plenty of food. We need to look more at conserving the land for future generations. Mr.Purrow (the antagonist) was trying to create the wildlife and work	After 20 minutes of discussion a selected representative from each group gave a pro and/or con summary of their group's position. The two teaching assistants (Hart and Eshwan) were resource persons for the groups.

Interactive Process	Description and Interpretation
the whole circle so that he's putting money into something today that may not pay off in his life-time, but it can pay off in the future. We realize that an investment in the land is important if agriculture in America is going to continue. We're going to have to save our land and that includes saving the entire eco-system and our wildlife. What Mr. Purrow showed is that we can prevent erosion of the land. We can bring nutrients back to the land and we can conserve our water and make better use of it. At the same time, Mr. Purrow showed that while he was making an investment in improving the soil and the eco-system, he was turning a profit."	This view underscores the attitude that profit doesn't have to be at the expense of conservation and recycling the food chain.
12AGCO3: "This is a biased film because it only introduces Mr. Purrow's ideas (related to) such as his education. He had initial capital and good land. His family worked this land (for) three generations. So three generations of family had knowledge about the land. What he (Purrow) considers as a failure could be someone else's glory as far as the tenants of the past. He tried to convert others to his process while degrading others who didn't or couldn't afford the use of technology. He didn't share his knowledge. He advertised his feed, his talents and did not promote it in other countries and other states. Because of this he represented the typical selfish American attitude. That's it!"	It seemed to the researcher that the nonfarm students were forced to take a negative position which was superficial. Given the film's contention, it may have been difficult to find a vehicle for dissention from the film alone. It seemed the attitude was expressed that farming directed towards maintaining an ecological balance is more costly than conventional farming.

Interactive Process	Description and Interpretation
Interaction 4	
Dr. Johnson: "Does anyone want to respond to these two presentations?"	
12RD3: "He's only promoting it to the educated. He's not like promoting it to Joe Farmer in Michigan who's sitting there struggling trying to get herbicides and all these other things. He's only promoting it to say like college students who can use him as a resource and what we're trying to say is that's fine. He was educated and he sort of downgraded the tenants before (him) because of their failure. Like we said the film was biased because he said it failed (the land). He didn't get one ear of corn, but that doesn't mean he didn't get a whole field of wheat. Do you see what I'm saying? See like what he considered a failure might have been millions of dollars to somebody else."	This nonfarm participant's position seemed to be that Purrow was an elitist. He was not promoting his conservation farming to the average farmer. It seemed to the researcher the film did not express this view. Again, the nonfarm participants had little to base a dissenting viewpoint on. The film presented only a pro viewpoint and the nonfarm participants had no real life experience to draw on.
11RD2: "They put him on a counsel they elected him to the board."	The participants were showing emotional behavior. They had rigid positions that were strongly defended.
12RD3: "They elect anybody to a board!"	
12RD2: "It wasn't just the educated, it was the farmers through the board of agriculture."	
Dr.Johnson: "Let's...you don't have to raise your hand to respond, but let's make sure we don't interrupt people."	Dr. Johnson wants the participants to listen to each other's position.

Interactive Process	Description and Interpretation
12AGNP3: "I was going to say, I think what (12RD3) was saying about downgraded land... he (Purrow) doesn't know the circumstances of the tenants who had the land before or why it failed. It might have been they didn't have the money to maintain it. They may have had families to feed where they needed their crops then and couldn't afford to wait like he could until the land was ready to give back (the nutrient recycling)."	This was brought out in the film. There was overcultivation with plows and chemical fertilizers which caused erosion and lower fertility. Again, the attitude that short-term economic needs have greater priority than maintaining an ecological balance is underscored.

Integrative Summary

The researcher feels Dr. Johnson anticipated the film would raise emotions and conflicting attitudes. One reason for the amiable introductions (which were mostly inaudible on the audio cassette for the session) by participants was to keep the group in some semblance of order in response to the manipulated conflict that ensued. The film set the stage for participants to show emotion in a constructive learning structure. The introduction by the resource people (Dr. Johnson and the teaching assistants Hart and Eshwan), was also effective in establishing interest in resource ecology. That afternoon Dr. Johnson organized the participants into teams at the KBS Bird Sanctuary to inventory evidence of wildlife habitation within the KBS Bird Sanctuary ecology. This served to bridge the gap between theory and practice.

This session was one of the few times in the program interval the researcher can recall that farm and nonfarm participants formally received a chance to share their feelings or attitudes about agriculture and natural resources. It was observed that both of these groups remained in intense discussions even after the arrival of that day's lunch to the KBS Bird Sanctuary. During these discussions, the farm participants were hard pressed to believe that food exports were spoiled when they arrived in Third World countries. The nonfarm participants were hard pressed to believe that farm debt was a causal factor in the poor conservation and environmental practices by farmers. The latter was perplexing since the nonfarm participants were

Integrative	Summary

forced to take this view during the discussion on "Farming with Nature."

In an informal conversation with 11ANRE1, the presentor of the Pro-Purrow position, it was expressed that the session could have been more productive. If Dr. Johnson had mixed groups of farm and nonfarm participants more sharing of ideas and less hostility would have resulted. The researcher supported that view, but still felt, as did other participants, that it was one of the most effective classroom sessions in the program. Substantial participant sensitivity toward interrelationships within and between agriculture and natural resources was observed. Attitudes in terms of interdisciplinary thinking seemed to be greatly imparted in this session dominating those of experiential education. Overall, there seemed to be moderate impact toward attitudes about a career in farming, career opportunity.

Field Observation Report 5

PLACE: Cabin C Classroom near Gull Lake
DATE: November 14, 1984
RESOURCE PERSON: Dr. Delbert Mokma
INSTRUCTIONAL STRATEGY: Lecture/Small Group Discussion

Dr. Mokma started off his three hour presentation on land use classes and characteristics by providing background information about his career development in crops and soil science. This included international agricultural assignments in Somalia, Kenya, Israel, Jamaica and Honduras.

He talked in a deep monotone voice and his non-verbal communications were characterized by the frequent motion of his hands to emphasize important points. The other forms of communication he used during his presentation were the occasional use of the blackboard, a slide presentation on Land Use and Soils and a land use manual containing soil maps in Michigan.

Mokma was very relaxed with the participants. He urged them to ask questions. He stated, "the only questions you don't ask are dumb."

One of the highlights of the afternoon in Cabin C centered on a discussion about the glaciation period in Michigan.

Interactive Process	Description and Interpretation
Interaction 1	Interdisciplinary Thinking 1
12RD3: "Did the glaciers keep moving or did they just like hit certain parts of Michigan and then they stopped and stood still and they melted? You said when they went through. . ."	This interaction illustrates history can be used as a tool to introduce interrelations in agriculture and natural resources.
Dr.Mokma: "At maximum glaciation the whole state was covered. It did not go through as a single sheet. The lower peninsula had three major ice or lopes of ice because there were old	The discussion on glaciation interrelated the disciplines of geography, geology, soils, climate, hydrology and chemistry. The state of Michigan was the point of departure.

Interactive Process	Description and Interpretation
drainage ways before the glacier started to go through. So this was a low area, so the ice just moved through this low area, but it just didn't move this way (gestures with hands), it also moved this way (draws diagram on the blackboard). This is the Erie lobe, this is the Saginaw lobe, this is the Huron/Erie (lobe) and this is the Michigan lobe. So we end up with these areas where ice was coming from both directions being very high."	
12RD3: "That's very interesting."	The interest in glaciation is expressed.
Dr. Mokma: "That's where a lot of material was brought and deposited so our highest elevations are in these areas here (points to diagram previously drawn on the blackboard).	
Interaction 2	Career Opportunity 1
12RD3: "Do you know a class I can take to learn more about this?"	In this segment of the interaction interest in geology courses was expressed. Exposure to a new career path has taken place.
12AGB13: "Yeah! I want to know too!"	
12AGCO3" "Me too!"	
Dr. Mokma: "You're going to have to start off with Geology 201 and then you have to go to 400 and something. That's glacial geology."	
12RD3: "I think it's 3. Well when I took it was 315, but anyhow it was under (with) Dr. Larsen."	

Interactive Process	Description and Interpretation
Dr.Mokma: "Okay, Dr.Larsen is the one who teaches it. It's glacial geology."	
Interaction 3	Interdisciplinary Thinking 2
Researcher: "Do you think another glaciation will come down?"	
Dr.Mokma: "Sure, it could. All we'd have to have is ... it doesn't take a very large difference in temperature to have it come. See people (scientists) are debating on what this increase in carbon dioxide in the atmosphere is going to do. Is that going to cool or heat up the earth? If it does cool (the earth) as some people predict, we very well could be starting another glacial period. We're not going to see it in Michigan. Don't worry about it. I doubt if your grandkids are going to see it in Michigan."	The relationship between pollutants such as carbon dioxide and increased temperature is underscored. The accompanying attitude by the scientific community is also expressed. Overall Dr.Mokma presents a long-term scenario for a possible real-life situation.
12AGBI3: "Why?"	
Dr. Mokma: "It just moves so slowly."	
12AGBI3: "Oh!"	
12AGCO3: "So you're saying we don't know if the glaciers will cool or heat."	12AGCO3 has an opportunity to receive clarification. This would be a much more limited possibility in a large formal lecture.
Dr.Mokma: "No it's carbon dioxide in the air, if that will cool or warm the earth."	
22AGPK3: "If it warms the earth will it last as long (spread) to Alaska?"	22AGPK3 was extending the implications of a sustained increase in temperatures on the earth.

Interactive Process	Description and Interpretation
Dr. Mokma: "Yes, then the glacier is going to start melting. What's going to happen is that there is a lot of water tied up in that ice. Not just Alaska, you've got Canada (and) you've got Greenland. The water levels in our oceans are going to rise. Now start looking at where some of our major cities are located in the U.S. And where are they relative to sea level. You start thinking about we could be underwater."	The attitude of seeing a system as process which produces an outcome seemed to have taken place.
22AGPK3: But that's years away (laughter from the group)".	Humor, enjoyment and a relaxed learning environment characterized much of this session.
Dr.Mokma: (Smiling) "Yes! That's years away."	
Interaction 4	Career Opportunity 2
12AGBI3: "Do you have a lot of female candidates?"	12AGBI3's question may have come from discussions in Dr.Gardner's leadership class. Dr.Gardner frequently remarked that the agriculture industry was dominated by white males with little participation from women and minorities. 12AGBI3 may have been testing the hypothesis about the attitude of white male dominance in asking, "Do you have a lot of female candidates?"
Dr.Mokma: "Right now we have just one that I'm advising as a Masters (candidate). She finished collecting her data on July 10th (1984) and she took her final exam (her defense) about the 20th of August. She wrote her entire thesis in that period of time. She wrote, could sit at the typewriter and compose sentences better than I can when I write it down (and) go back and rework the sentences. She was fantastic. "	
12AGB13: "What is she doing now?"	
Dr.Mokma: "She's now working on her Ph.D. at North Carolina. No sweat! She went down there	

Interactive Process	Description and Interpretation
to give a seminar. The Department Chairman was so impressed with her, he wrote a letter back to our department chairman. (He) said that she outperformed many of the professor candidates and she went just with a Masters. Hopefully it's a privilege for them (graduate students) to work with me, but it's a privilege to work with a very good student."	The female participants seemed awed. Their eyes were wide and all secondary conversation among them had stopped.
12RD3: "For your Ph.D. you go to school and take all of your classes and then you said that some people fail their exam. Don't you have to take some sort of exam before they (the department) ever lets you become a doctor?"	The interaction from this point between Dr.Mokma and 12RD3 turns into what is expected in graduate school study. The participants had the opportunity to decide at this stage of their career: Is graduate school a possibility?
Dr. Mokma: "Yes, you have prelims."	
12RD3: "But what kind of exam do they (the department) give you at the end, stuff over your classwork?"	
Dr.Mokma: "No! Your prelim is over course work, and your final exam is over your thesis/"	
12RD3: "How can you flunk an exam over something you wrote?"	
Dr.Mokma: "It's more than just writing. It's how well you did the research. How did you interpret it? (You) see that reflects on you as well."	
Researcher: "The final exam is the defense of your dissertation."	

Interactive Process	Description and Interpretation
Dr.Mokma: "You're defending not your writing, but what you did."	
12RD3: "Oh, you ask me how did I get something..."	
Dr.Mokma: "I could say well what about this."	
12RD3: "Ask me a typical question?"	12RD3 wanted a simulation of a real-life situation and was attempting to understand the graduate study process.
Dr.Mokma: "I had a student from geography that I don't think considered something from a soil standpoint and should have because he had my courses. I said, if you'd look at it from this standpoint, you'd come up with a different interpretation."	
12RD3: "Oh, this is an oral exam?"	12RD3 was like a detective linking parts to form a whole picture.
Dr. Mokma: "It's an oral exam."	

Integrative	Summary

The researcher observed that the themes presented by Dr.Mokma centered on the attitudes of interdisciplinary thinking and career opportunities. The discussion on glaciation interrelated geography, geology, soils, climate, hydrology and chemistry. The question and answers on graduate study in crops and soils, if it did not inspire the female participants, it informed them that women could excel at the graduate level in crops and soil science. Moreover, it provided the participants with insights about the demands and challenges of graduate education. Dr.Mokma's examples were all based on real life situations and provided the participants with a type of vicarious experiential education.

Integrative	Summary

This classroom session was successful because the content was interesting, Mokma was patient in asking questions that were wide ranging.

The participants usually nodded the most in class sessions immediately after lunch. There was no midday, no diverted conversations and a high frequency of participant to instructor interaction took place. Mokma enjoyed the small participant to instructor ratio, since he had more flexibility to explore different subjects. This represented more of a challenge than the set lecture routine on the campus. This was expressed to the researcher by Dr.Mokma while driving back to East Lansing shortly after the class session.

During the drive back Dr. Mokma also said he was surprised that almost half of the participants were minority and that in general minorities have a poor image of agriculture. He felt there were a lot of interesting career opportunities for minorities, that agriculture was far more than farming.

The classroom session was dominated by questions from minority students who happen to be predominantly female and from urban environments. This was a consistent pattern in much of the classroom sessions. It was probably due to their lack of familiarity with agriculture and natural resource terminology and concepts as well as their high level of curiosity and desire to learn.

Another aspect of this classroom session which emerged as a pattern was the career information presented. This took the form of resource people, including professors, describing their background during introductions and providing students with many vicarious real life situations during the span of their presentations. Moreover, there were opportunities for students to ask follow-up questions about careers after the classroom session. For example, in morning classroom sessions that ended at 12 noon, resource people were invited to dine with participants at the KBS Cafeteria where more discussion ensued. In the days and weeks that followed participants mentioned Dr. Mokma as one of the more popular resource people they had experienced.

Field Observation REport 6

PLACE: Kalamazoo Waste Water Treatment Plant
DATE: November 26, 1984
RESOURCE PERSON: Jess Whitney - Training Information and Safety Coordinator
INSTRUCTIONAL STRATEGY: Field Trip

Dr. Phil Ogline, KBS Lead Instructor, accompanied the participants to the Waste Water Treatment Plant. In preparation of a guided tour of the plant, the group was shown a movie on sludge conditioning in the Zephryl Wet Air Oxidation System and a slide/tape presentation which showed the principles of Waste Water Treatment. Both audio visual presentations were viewed in the training room at the plant. Question and answer periods followed each presentation in preparation of touring the plant. This field report centers on the interactions between the participants, lead instructor, researcher and the Training Information & Safety Coordinator during the question and answer periods.

Interactive Process	Description and Interpretation
Interaction 1	Content: Interdisciplinary Thinking 1
12RD3: "What is sludge?" Jess: "Sludge is a solid material that settles out of the water. All water is, is a vehicle to get the solids in."	At the start basic questions were asked by some participants and the lead instructor. This provided a framework for which the whole group could think about interrelations in agriculture and natural resources.
Dr. Ogline: "What do you do with that sludge then?"	The interrelations between process and product were clearly presented. The participants cognitive domains were being impacted: Sludge is produced from waste materials and has to be treated and this produces another product.
Jess: "...What we do is condition it...what we used to do was pump it to our anaerobic digester and then the bacteria would break it down and we'd form methane. We used to heat our digester with methane, but when this large pharmaceutical plant came on line it killed that right off so we had to go to a different system."	The participants had the opportunity to appreciate the concept of beneficial bacteria. They were extremely absorbed by the information they received. There were no idle conversations and no sleepy faces.

Interactive Process	Description and Interpretation
12RD3: "What does an anaerobic digester do?"	
Jess: "...It's like a big tank that's completely sealed from the atmosphere and you put sludge in with the bacteria that are already in the sludge... You seal it and heat it to about 98 degrees... You have material that you call acid forming. You pump your organics in and your sludge in and the acid forming bacteria will start to change that into acid and then other bacteria turn those acids into methane and water."	Jess's response to questions were quite detailed and graphic. Again the concept of beneficial bacteria was referred to in the waste water treatment process.
Interaction 2	Interdisciplinary Thinking 2
11CSS1: "When you went (attitude) to a new system who paid for it?" Jess: "You did, the users (did). A lot of money comes from EPA (Environmental Protection Agency). For instance we're in the midst of about an 8 million dollar expansion here and probably (85.0 percent) of it was paid by the EPA. In fact, some of our equipment here is so innovative and so new that we go almost (100.0 percent). Because it was the newest stuff on the market, they paid an even bigger share and that's kind of impressive... That'll probably be, when it goes on line, the largest municipal regeneration system."	The economics of waste water treatment was underscored. The participants were given the opportunity to appreciate economic considerations and the public's willingness to affect policies to treat water waste. The linkage between environmental actors such as the EPA in developing waste water treatment technology was highlighted.

Interactive Process	Description and Interpretation
12AGBI3 : "Why did you need a new system?"	The dynamics of the waste water treatment system in combining inputs to create desired effects was illustrated through the use of powdered carbon.
Jess: "Well, that's a good question... you have so many exotic chemicals and stuff that are in the water that our conventional system just can't take care of it. So what we'll do is add powdered activated carbon to the system and what we'll get is adsorption...hopefully some biological activity growing on the carbon...then what we'll do (is) pull a certain amount of the flow back into the regeneration system, burn the organics and pollutants out of it and then dump it right back into the system."	
12RD3: "I don't understand... you mentioned earlier that you use bacteria to get rid of the waste sludge in the water and also chemicals that come from the plant (treatment). How can bacteria eat away chemicals?"	The participant asked a high level question which attempts to evaluate and synthesize the information received.
Jess: "Okay, now listen. In waste water you have what you call settlement solids and then you have what you call dissolved solids. Okay, the settlement solids...we'll take this water that's going through the sewer at 2-3 feet per second and we'll slow it down and make it a foot per second... First we take the gritout of it. Grit is any inorganics like sand, gravel, stone, stuff like that, that doesn't breakdown by biological activity. Then we'll take it to another tank and	The concepts and processes in waste water treatment were now becoming more complicated as the participants probed for comprehension and insights. New terms created the need for more clarification. Jess continued to meticuously explain in a step-by-step fashion the concepts and processes of waste water treatment.

Interactive Process	Description and Interpretation

slow it down to maybe a fraction of a foot per second and a lot of the stuff that's carried in will settle out. You've got food particles, other types of waste, fecal material, that stuff will settle out if you slow it down enough. So we'll totally remove 50-60% of the waste...and that will be sludge. Now you still have those dissolved solids. You have your nutrients, your salts, sugars, anything like that...There are several ways you could get those solids back. You could evacuate the water but then that would take an awful lot of energy to do that or you could introduce bacteria ...which would use that sugar ...as a food source, create bio-mass and then they (bacteria) would grow large and settle out and then you remove that as sludge.

Interaction 3

12RD3: "Do you overpopulate the bacteria to get rid of the waste?"

Jess: "I suppose you could but then you could be creating another problem too. Say for instance, if you live around a lake that has a lot of septic tanks, (the septic tank acts like an anerobic digester), you still have your nutrients like your nitrogen. If you notice...some lakes they have a bad weed problem. That's because you're releasing the nitrogen that you created in your septic tank...into the lake

Interdisciplinary Thinking 3

This interaction addressed the problem of introducing a biological change in the environment to achieve a desired affect which results in an undesired effect. Participants were given the opportunity to appreciate the interrelationships between environmental impact and waste treatment.

Interactive Process	Description and Interpretation
and then nitrogen helps the weeds to grow. That's what we call Eutrophication. You start dumping all this stuff in there and it might form fertilizer in your lake. Then your weeds grow and die off and they create another food source in essence and then you have sludge again. They die and rot and then you create another problem. It's just a vicious circle unless you can either stop your nutrients going into the lake or harvest this material often enough so that it doesn't go right back and complete the cycle."	
12RD3: "What would happen if the plant let water in that was contaminated with a chemical that couldn't be broken down?"	It seems 12RD3 has created a hypothesis which was to be tested by Jess's response.
Jess: "You'd have a real problem. That's what happened in Battle Creek. They dumped cyanide and it wiped them right out."	Jess's response seems to illustrate to the participants how waste water treatment technology can rapidly become obsolete due to industrial innovations.
12RD3: "So what would you do, just shut down?"	
Jess: "You can't shut down. As soon as people start flushing their toilets you've got a problem (laughter). You have to treat it as best you can and write a lot of letters to the DNR (Department of Natural Resources) about why you're treatment is shot, but how long it takes to fix it is unknown."	The gap in production technology and waste water treatment technology can create a crisis situation. Appreciation of this insight may have provided participants with an implication for achieving a sustainable agriculture in the 21st century.

Interactive Process	Description and Interpretation
Interaction 4	Interdisciplinary Thinking 4
Dr.Ogline: (Lead Instructor) "We are visiting the paper mill this afternoon. Do these paper mills pretreat any of it (waste) before it gets here?"	
Jess: "Yes, a lot of it in fact. Because with industrial use if you get charged not only the amount of flow but the strength of the waste. So its very advantageous to pretreat and get as much waste out ahead of time because your cost will be lower."	Jess demonstrated to the participants how regulatory policy in waste water treatment increases the cost of industrial production.
11CSS1: "Who regulates, does the EPA regulate how much the industrial places put in and what they can't?"	
Jess: "Yeah, they probably got some guideline. We also have what we call industrial surveillance, we go out and try to monitor it. And if they have waste that is flowing (which is) detrimental to our system, we have to tell them they have to pretreat or we can't take it."	
Interaction 5	Career Opportunity 1
12AGB13: "What's your title?"	
Dr. Ogline: "What's your background and education?"	
Jess: "I have a two year degree from Kalamazoo Community College. Unfortunately its in machine tool technology. I came to work	The participants could have seen Jess as an articulated waste water treatment specialist. They were exposed to the demands of his job, and the

Interactive Process	Description and Interpretation
for the city in 1972 as a laborer running a jack hammer. I did everything from run an air hammer to plowing snow at night and when I came to the plant it was for two reasons. Economics... this was where the overtime was and because this was a place where a person could move up as fast as he wanted... I started as an apprentice operator and worked my way up and I've had this job for about 2½ years. I hold an ABC Certification from the State of Michigan."	background needed for the job. They saw him as a good natured and patient person which could have been an indicator of his success and satisfaction. He was attracted to the waste water treatment industry because of the availability of overtime hours and the unlimited opportunities for advancement. It seemed Jess was expressing the attitude that a good job means good pay.
Dr.Ogline: "But you had to take courses to qualify?"	
Jess: "I've taken courses at Valley (State), and plus here (Kalamazoo) and also (taken) courses given by the DNR (Dept. of Nat.Res.). I'm certified at an A,B, or C plant. This is an A plant, the highest classification."	
Dr.Ogline: "Now being certified does that require testing?"	Dr. Ogline interjects the demands of a career in waste water treatment.
Jess: "Oh yeah , in fact they give testing once a year and it starts at 9 a.m. until 5."	
12RD3: "How do you find out about internships?"	12RD3 wants to investigate a career path.
Jess: "You can check with human resources down at city hall. Any more questions?"	
12AGBI3 : "The plant classification, are they by size?"	12AGBI3: wants insights into the waste water treatment industry.

Interactive Process	Description and Interpretation
Jess: "Yes, a D plant would be a small plant like maybe Plainwell. . . I think Battle Creek is an A, I'm not sure. An A plant would be equivalent to what Kalamazoo got... Say for instance, here our plant is so big we have people that operate and people that do maintenance. We have 7 people that do the laboratory. In a D plant they do everything because you might have only two people working in it...	
Researcher: "So you're saying a D plant would be expected to have people with more broad-based knowledge and people at an A plant would be more specialized."	The researcher addresses attitudes about broad-based training versus specialized training.
Jess: "Yeah, see in a D plant you do everything from packing the pump to running your laboratory analysis. Here (an A plant) we have specified people who do that. Right now we have 22 operators and four superiors and thats just operations. We have probably 35 maintenance people and 8-10 lab people... When I came in there I took over the digester system and that's all I ran."	

Integrative	Summary

The field trip provided participants with many opportunities to express and listen to attitudes about interdisciplinary thinking. There was also one substantial interaction addressing attitudes about career opportunity.

Integrative	Summary

During this field trip the waste water treatment industry was thoroughly explored. Different methods of biological and chemical treatment were discussed. The following interrelationships were explored: Economic considerations and waste water treatment technology, government regulatory policy and the cost of production, industrial innovation and obsolete waste water treatment technology, waste water and ecological imbalance, beneficial bacteria and waste water treatment, and the introduction of desired effects which produce undesired environmental consequences.

The researcher observed that the total interactions seemed to be directed towards the outlook that systems were not merely interrelated parts that create a function. Rather, systems in terms of waste water treatment, were interrelated processes which produced an effect or outcome or product. The effect could be both positive or negative.

During this field trip the pattern of minority or large city participants dominating questions continued. The researcher developed a hypothesis as a result of this sustained pattern. Students who have less knowledge about agriculture and natural resources in the KBS program ask more questions. Put in another way, nonfarm participants will ask more questions than farm participants in the KBS program.

Related to these hypotheses is the level of questions the nonfarm participants asked. The researcher observed that over the program interval the above category of participants started with comprehension or foundation questions. From the midpoint to the end, the level of questions progressed to judgment, evaluation and synthesis. This was also the pattern during the waste water treatment field trip.

The tour of the Kalamazoo plant was well related to the discussion at the training classroom. The participants had the opportunity to observe the sludge conditioning unit, the water conveyance system, and received a presentation at the plant's toxicity laboratory.

When the participants were asked what was the most interesting aspect of the field trip, these were a sample of their responses.

12 AGBI3: "The field trip helped me better appreciate how the environment is affected by the water."

12RD3: "The question that he (Jess) answered for me. I learned a lot."

Integrative	Summary
11FSM2:	"I didn't like the smell. I thought I might be sick. It was awful to see the water that was still brown when it went into the river."
11ANRE1:	"Smelling, knowing how important it is to clean up the Kalamazoo River so the smell can get out."
21FSM1:	"When he (Jess) told us about the guy that fell in the sludge. I was surprised how dirty the water was when it went back into the river."
11CSS1:	"I thought that the whole field trip was interesting. Coming from a farm we drink well water and have septic tanks for disposal. We usually pump out our septic tank once every five years and spread it on our fields with a honeywagon for fertilizer. Everything in the tank is usually decayed to liquid form. It was interesting since I've never been exposed to municipal waste treatment. (It was interesting) to see how they break it down and decontaminate the waste so it can be put into the river. Overall it was a very informative and well presented tour."
11RD2:	"I thought the final product would be clear as opposed to a copper brown."
11ANS2:	"The whole water treatment system was very interesting."
11CSS1:	"To me the whole tour was very interesting. Especially interesting (was) the part where the water was flushed back to the river, and it was still brown in color."
21ANRE1:	"The whole process of very polluted water being treated and changed into supposedly clear water. The process of bacteria eating the waste to purify the water."
12HORT3:	"(The) process on how bacteria eats waste."

APPENDIX C

UNDERGRADUATE AGRICULTURE

AND

NATURAL RESOURCES

ATTITUDE QUESTIONNAIRE

UNDERGRADUATE AGRICULTURE AND NATURAL RESOURCES ATTITUDE QUESTIONNAIRE

Instructions

What are your feelings concerning the following statements? Your answer is correct if it expresses your true feeling. This is not a test of ability. It is concerned only with your expression of agreement or disagreement for each of the statements.

Read each statement carefully, and tell how you feel about the situation it describes. For each statement place an X under the column which represents your own feelings. For each statement blacken out the one symbol that best represents your agreement or disagreement for the item. The symbols have the following meanings:

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
SA	A	U	D	SD

Here are some examples similar to the ones found throughout the questionnaire:

1.	Agribusinesses often prefer their employees to have had applied agriculture and natural resources skills prior to employment.	■	A	U	D	SD
2.	Opportunities to work on a farm are important in establishing a good outlook about farming.	SA	A	■	D	SD
3.	More training in production agriculture should be required of environmentalists.	SA	A	U	■	SD

In the first example a person who blackens the symbol "SA" means that he or she <u>strongly agrees with the statement</u>. The marking of "U" in the second example means the person is <u>undecided</u> about his or her feelings. The person who marks "D" in the third example <u>disagrees</u> with the statement.

You are now ready to turn the page and begin. Be sure to blacken out one symbol for each item. Remember THIS IS NOT A TEST!

1.	The advantages of mechanized agriculture outweigh its effect of reducing small full time family farming.	SA	A	U	D	SD
2.	Obtaining more applied skills will make the agriculture and natural resources major a better problem-solver.	SA	A	U	D	SD
3.	Communication skills are not especially important unless you are working in Agricultural Extension.	SA	A	U	D	SD
4.	Farmers' dependency on machinery and fertilizer should be reduced by encouraging organic farming and small inexpensive machinery.	SA	A	U	D	SD
5.	Experience and classroom learning go hand and hand in developing competency.	SA	A	U	D	SD
6.	A practical understanding of farm production will enhance one's opportunity for a job off the farm.	SA	A	U	D	SD
7.	I will sacrifice my professional identity when called on to solve problems with professionals outside my field.	SA	A	U	D	SD
8.	I will gain relatively little insight about farmers' problems from a structured farm work program.	SA	A	U	D	SD
9.	I would choose an agriculture and natural resources occupation if the material rewards were low, but the prestige was high.	SA	A	U	D	SD
10.	Most farmers have broad educational experiences in many fields of agriculture and natural resources.	SA	A	U	D	SD
11.	Students who lack extensive work experiences in agriculture and natural resources can become as competent as those already having such experiences.	SA	A	U	D	SD
12.	A career in farming yields less satifaction than most other careers in agriculture and natural resources.	SA	A	U	D	SD
13.	Todays' agriculture and natural resource professional should emphasize broad based training over specialist training.	SA	A	U	D	SD
14.	Agriculture and natural resource students who perform "hands-on" activities are more career conscious than those who do not.	SA	A	U	D	SD
15.	Obtaining technical knowledge over understanding human relations in an organization is a good rule of thumb in developing careers in agriculture.	SA	A	U	D	SD
16.	A good wildlife and fisheries professor has all or most of his degrees in the field of fisheries and wild life.	SA	A	U	D	SD

17.	In real life work situation making money is less important than developing career contacts.	SA	A	U	D	SD
18.	All agriculture and natural resources should be required to have communication training.	SA	A	U	D	SD
19.	Administrators in your college should require all students to take applied agriculture and natural resources training.	SA	A	U	D	SD
20.	I would prefer to stay with a job that I know I can handle than to change to one where most things would be new to me.	SA	A	U	D	SD
21.	As a Senator, I would push for a government policy that encourages the expansion of foreign markets for U.S. farm products.	SA	A	U	D	SD
22.	An increased ability to clarify one's values is not necessarily related to obtaining real life work experience.	SA	A	U	D	SD
23.	I feel a career in agriculture and natural resources has as much prestige as a career in law.	SA	A	U	D	SD
24.	A renewable solar energy technology increases the possibility of reducing the energy costs of farm production.	SA	A	U	D	SD
25.	Applied skill training in a student's major field more than likely acquaints the student with influential people.	SA	A	U	D	SD
26.	Solving problems associated with agriculture and natural resources are not as important as solving health problems.	SA	A	U	D	SD
27.	A Rural Sociologist, Agronomist, Extension Agent and Resource Developer could almost never form an effective research team.	SA	A	U	D	SD
28.	I more or less view farming as hard work with little reward.	SA	A	U	D	SD
29.	I like a job where I know that I will be doing my work about the same way from one week to the next.	SA	A	U	D	SD
30.	Soil, climate, insects and the meat preferences of people are important of actors when designing a grazing system, for beef cattle.	SA	A	U	D	SD
31.	An increase in student competency will result when the agriculture and natural resources industry becomes an extension of the traditional classroom.	SA	A	U	D	SD

32.	The independence of farm life appeals to me.	SA	A	U	D	SD
33.	Disagreements between environmental action groups and herbicide corportations should be settled in a court of law rather than by forming a collaborative investigation.	SA	A	U	D	SD
34.	I will sacrifice my professional identity when called on to solve problems with professionals outside my field.	SA	A	U	D	SD
35.	Most farmers have broad educational experiences in many fields of agriculture and natural resources.	SA	A	U	D	SD

APPENDIX D

KBS PRE-TERM

QUESTIONNAIRE

KBS PRE-TERM QUESTIONNAIRE

A. PERSONAL/PROFESSIONAL

1. What is your major?

2. Do you have any questions? ____ (add extra pages if necessary).

3. Where is your home? ____

4. What experiences have you had in ANR?

   a. Work?

   b. Relatives or others?

5. What special experiences would you like to gain this term at KBS?

   a. Chores?

   b. Special activities or projects?

   c. Leadership?

      (1) Leadership skills?

      (2) Communication skills?

      (3) Career Exploration?

      (4) Education?

6. What special field trips would you like to take?

   a. Natural areas?

   b. Agribusiness or production?

   c. Career related?

7. What forms of recreation interest you?

   a. Camping?

   b. Hiking?

   c. Photography?

   d. Language Arts?

   e. Hobbies?

   f. Participating in sports

   g. Observing sports?

   h. Others?

8. What objections do you have to Saturday activities and field trips?

9. Are there any Saturdays when you are scheduled to be elsewhere?

10. Do you wish to work part-time while at KBS?

    a. Work-Study?

    b. Other?

B. <u>OPEN ENDED QUESTION</u>

1. Interdisciplinary Approach

    a. Tell me what you feel the concept system means?

    b. Problem. What is a relationship?

       What are interrelated components?

    c. What are some of the Agriculture systems you have observed?

    d. Prob. Can you describe the parts or components?

C. <u>EXPERI~~ME~~NTIAL EUDCATION</u>

    a. Tell me what do you feel the concept *experiential* education means?

    b. Problem: What is practical education? Applied skills? Real life work experiences?

    c. How will *experential* Education assist in developing a career?

    d. Problem: How will it help you to get along better with people and mastering technical requirements?

C. CLOSED ENDED QUESTIONS

1. What career exploration activities are the most popular to you.

    a. Field trips ________ b. Seminars ________ c. Counseling ________

2. What do you anticipate about the Farm Learning Center?

    a. Hardwork: Yes ______ No ________

    b. Distaste for work: Yes _______ No ________

    c. Gain in Appreciation for farming:

        (1) High ________ (2) Moderate _________ (3) Some ________

    d. Gain in Applied Ag Skills

        (1) High ______ (2) Moderate __________ (3) Some _________

3. What do you anticipate about overall career changes due to KBS Program?

    a. Help in establishing a career goal: Yes _______ No _______

    b. Help in pursuing a career goal: Yes _____ No ______

    c. Help in providing career opportunity:

        (1) High ________ (2) Moderate __________ (3) Some __________

4. What do you anticipate about working in the Kellogg Forest?

    a. Hardwork: Yes _______ No ______

    b. Distasteful work: Yes ______ No ________

    c. Gain an appreciation for forest managment.

        (1) High _______ (2) Moderate _________ (3) Some ________

    d. Gain in Appreication for Wildlife:

        (1) High ______ (2) Moderate __________ (3) Some ________

    e. Gain in Applied Natural resource skills.

        (1) High ______ (2) Moderate __________ (3) Some _________

    f. What do you anticipate about classroom learning:

        1. Innovations in Learning: _____ Yes _______No
        2. Learning New Definitions and concepts: _____ Yes _____ No
        3. Lecture: ______ Yes ______ NO
        4. Small group discussion: ______Yes _____No
        5. Team teaching: ______Yes ______No
        6. Lab Sessions Related to Lectures: _____Yes _____No

APPENDIX E

KBS POST-PROGRAM

INTERVIEW

KBS POST-PROGRAM INTERVIEW

Name________________________________ Date________________

East Lansing Address____Phone_______________

Major____

I am conducting this interview near the end of your enrollment in the KBS Rural Resources Education Pilot Program. I hope this will help us better understand what changes you've experienced about experiential education, career opportunities and interrelationships in agriculture and natural resource systems.

While this interview will be used in a written evaluation of the program your name and identitiy will be held in the strictest confidence. Are there any questions before we proceed? This interview is being tape recorded.

I.

These first series of questions concern specific events that occured during the program and your feeling about them.

1. To what extent were the career exploration activities what you expected them to be? ____

2. How were the career exploration activities different from what you expected?

3. During the program what career exploration activities were the most popular to you?

   A. Field Trips____ B. Seminar/Classroom Activities____ C. Counseling/ one-on-one

   Discussions with visiting resource people____

4. Why were ____the most popular to you?

____

____

____

____

____

____

5. To what extent were the Farm Learning Center Activities what you expected them to be?

____

____

____

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____

____

____

____

6. How were they different from what you expected?

____

____

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____

____

____

7. Were the tasks you performed at the Farm Learning/Dairy Center

   A. Hardwork: Yes___ No ____ B. Distasteful work: Yes___ No___

8. What aspects of the farm tasks were easy/hard work?

   ____

   ____

   ____

   ____

9. What aspects of the farm tasks were enjoyable/distasteful work?

   ____

   ____

   ____

   ____

10. As a result of your participation in the KBS program your appreciation for farming is now:

    A. High___ B. Moderate___ C. Slight___

11. To what extent have your career goals changed due to your participation in the KBS program:

    A. Did the program help you establish a career goal: Yes___ No___
    B. " " " " " pursue " " " Yes___ No___
    C. The KBS program provided you with : high___ Moderate___ Some___ career opportunity?

12. To what extent were the Kellogg Forest activities what you expected them to be?

    ____

    ____

    ____

    ____

    ____

13. To what extent were they different from what you expected?

    ____

    ____

    ____

    ____

14. To what extent were the Bird Sanctuary Activities what you expected them to be?

____

____

____

____

____

15. How were they different from what you expected?

____

____

____

____

____

16. Were the Kellogg Forest and Bird Sanctuary learning activities:
A. Hardwork: Yes___ No ___ B. Distasteful work: Yes___ No___

17. What aspects of the forestry activities were easy/hard work?

____

____

____

____

____

18. What aspects of the forestry activities were enjoyable/distasteful work?

____

____

____

____

____

19. What aspects of the wildlife activities were enjoyable/distasteful work?

____

____

____

____

20. As a result of your participation in the program your appreciation for forest management is now:

    High___ Moderate___ Slight___

21. As a result of your participation in the program your appreciation for wildlife is now:

    High___ Moderate___ Slight___

22. As a result of your participation in the program your appreciation for applied natural resource skills is now:

    High___ Moderate___ Slight____

23. To what extent were formal classroom learning activities what you expected them to be?

____
____
____
____
____
____

24. How were they different from what you expected?

____
____
____
____
____
____

25. In the formal classroom learning situation:

    A. were there innovations in learning? Yes___ No___
    B. do you feel you learned new definitions and concepts? Yes___ NO___
    C. did you enjoy the lectures? Yes___ No___
    D. did you enjoy the small group discussions? Yes___ No___
    E. did you enjoy the team teaching? Yes___ No___
    G. were lab sessions related to lectures? Yes___ No___

26. What did you/not enjoy about the lectures?

27. What did you/not enjoy about the small group discussions?

28. What did you/not enjoy about the team teaching?

29. What did you/not enjoy about the lab sessions?

II

These series of questions concern your feelings about issues and concepts related to agriculture and natural resources.

1. Tell me what you feel the concept system means?

Probe: What is a relationship?

Probe: What are interrelated components?

2. What are some of the agriculture and natural resource systems you have observed during your participation in the KBS program?

Probe: Can you describe the parts or components?

3. What feelings do you have about increasing crop production by utilizing large units of farm machinary but reducing the opportunities of small farmers to make a living?

Probe: Is increasing farm production more important than the social costs of reducing small full time farming? How are large farms different than small farms?

4. What feelings do you have about reducing the energy costs of farmers associated with the use of large farm machinery, chemical fertilizers, herbicides and pesticides?

Probe: What do you feel about reducing energy costs and the maintenance of environmental quality? ... energy costs and the reduction of soil erosion?

5. What so you feel about farmers utilizing renewable energy sources as a method of reducing our dependency on non-renewable energy sources such as oil and nuclear power?

Probe: What are some of the renewable energies you'd like to see developed? What strategies would you develop? Who would have to be involved?

6. What do you feel about professional in the agriculture and natural resource industries being encoraged to obtain broad based training over specialized training?

Probe: Your participation in the KBS program was broad based. How did it or didn't it benefit you?

7. What so you feel about professionald from various fields in agriculture and natural resources being asked to join together to solve interrelated problems?

Probe: How can you relate this question to working with students from various disciplines in the KBS program?

Probe: What steps would you take to develop harmony among professional from various fields in agriculture and natural resources?

8. What do you feel about a government policy that encourages the expansion of foriegn markets for U.S. farm products?

Probe: What are the benefits to U.S. Farmers? What are the costs to U.S. Farmers? What are the benefits to the importing country? What are the costs to the improting country?

9. Tell me what do you feel the concept experiential education means?

Probe: What is practical education, applied skills, real life work experience

10. How will experiential education assist you in developing a career?

How will it help you get along better with people? How will it help you master technical requirements? (probe)

11. To what extent did you feel the hands-on learning made you more conscious about the problems of the agriculture and natural resources industry?

Probe: How did it help you identitfy problems in agriculture and natural resources?
What specific instances stand out in your mind?

12. To what extent do you feel the hands-on learning activities made you more compeetnet as an agriculture and natural resources student?

Probe: How did it help you understand the various production and management activities?
What specific instances stand out in your mind?

13. To what extent do you feel the field trips to field operations at the KBS site and agribusinesses increased your competency in aagriculture and natural resources?
To what extent did they not?

Probe: What about the farm visitations, the apple orchard and layer operation?

14. To what extent did the hands -on activities provide you with insights about career opportunities in agriculture and natural resources industry? To what extent did they not?

Probe: Can you sight and explain some specific instances?

15. To what extent did the field trips provide you with insights about career opportunities in the Agriculture and Natural Resources industry? To what extent did they not?

Probe: Can you sight and epain some specific instances?

16. To what extent do you feel a career in your major area offers you high prestige and challenging work?

    Probe: Can you get satisfaction if you felt you were doing challenging work but your salary was only average?

17. Under what conditions do you feel farming could provide you with satisfaction?

    Probe: What conditions would be necessary for you to engage in farming e.g. independence, profit, type, leasure.

18. What is your feeling about what should be more important in developing a career in Agriculture and Natural Resources: technical knowledge or human relations knowledge?

    Probe: Is it possible to be technically competent but not sucessful in working with people to get a job done? Please explain.

19. To what extent do you feel all Agriculture and Natural Resources majors should have communications training?

    Probe: What are the advantages of having? What are the disadvantages of not having?

20. To what extent do you feel your future work in the Agriculture and Natural Resource industry should be a set routine or should consist of frequent changes?

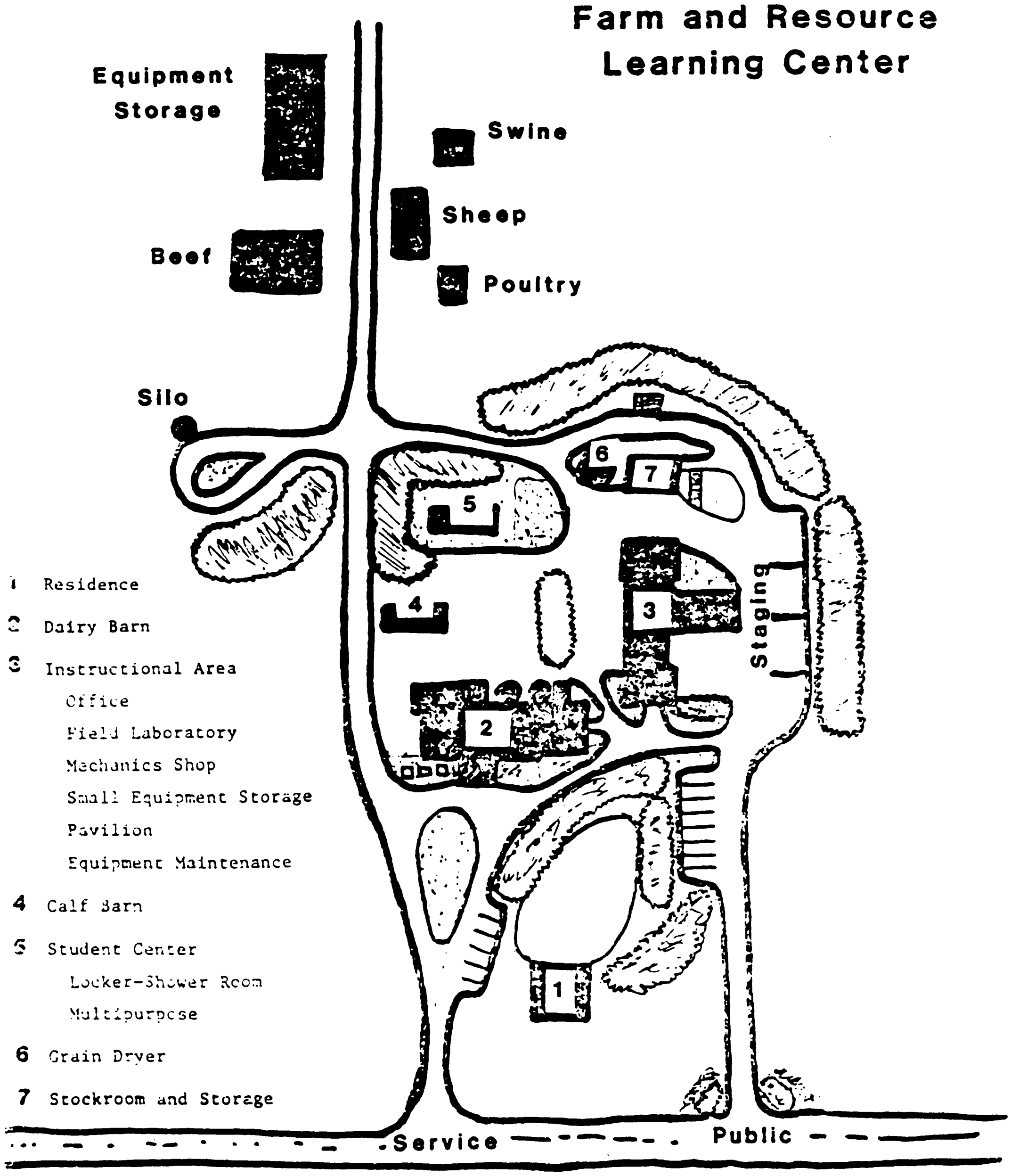
Probe: Do you prefer work that you know you can handle or where things are constantly changing?

APPENDIX F

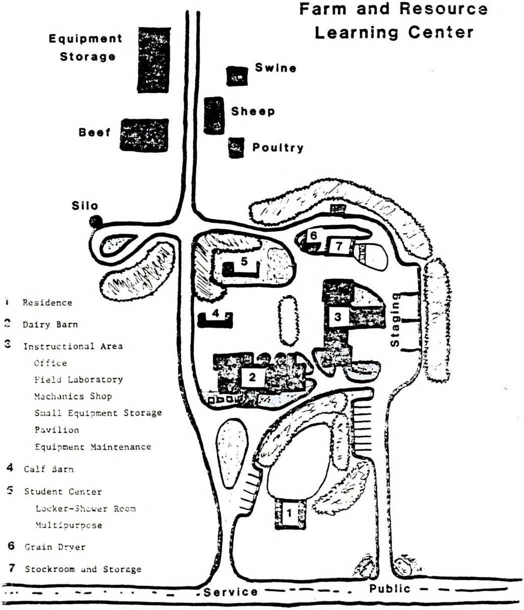
KBS FARM AND RESOURCE LEARNING CENTER AND SITE PLAN

Site Plan

Farm and Resource Learning Center



Site Plan


Farm and Resource
Learning Center
Equipment
Storage
Swine
Sheep
Beef
Poultry
Silo
Staging
Service
Public
1 Residence
2 Dairy Barn
3 Instructional Area
Office
Field Laboratory
Mechanics Shop
Small Equipment Storage
Pavilion
Equipment Maintenance
4 Calf Barn
5 Student Center
Locker-Shower Room
Multipurpose
6 Grain Dryer
7 Stockroom and Storage

APPENDIX G

NONFARM AND FARM RESPONSE TO THE KBS PROGRAM

FIRST KBS CLUB RECOGNITION BANQUET
NONFARM UNDERGRADUATE RESPONSE

by

Lisa JoJoana LaGarde

Good afternoon friends and distinguished guests. It is truly an honor to address you today. After contemplating the viewpoints of the participants with a nonfarm background noticeable changes have occurred concerning Agriculture and Natural Resources. I believe this is not only applicable to Nonfarm students but to students with farm backgrounds as well.

Students with farm backgrounds benefitted from KBS because they may have not fully comprehended how Natural Resources combines with Agriculture, while students from specialized farms came to this program with lack of knowledge about all aspects of Agriculture. However, the Nonfarm students came to KBS with insufficient knowledge about Agriculture and Natural Resources which resulted in lack of appreciation for ecology and an understanding of how intricate and interrelated these two can be.

To illustrate this complexity let's take milk production as an example. We all had the opportunity to milk cows and understand the procedures of milking which enabled us to gain insight to the farmers' perspectives. Through a field trip to Country Fresh the idea of interrelated enters the picture: The milk comes from the farm, its processed and tested, converted to consumable products, labels are supplied from paper mills, water management is important and the marketing of a good product is a necessity. Now if this isn't intricate, or interrelated, what is? Many things are taken for granted but through programs like KBS gaps can be closed by providing hands-on experience, lectures and field trips which will alleviate these barriers.

Because programs like KBS will bring together individuals from different backgrounds interaction will occur. And as stated in Megatrend the time has come for generalists to make up the flow in our future. I believe future leaders have been molded here at KBS because we have acquired a broader range of knowledge, which has expanded our ideas. This program has taught both Nonfarm and farm students the importance of affective communication for continuing progress and for posterity.

Personally, I feel Agriculture and Natural Resources related industries are excellent career choices because it incorporates all aspects and allows an individual to partake in the decisions affecting society.

Of course, none of this would be possible if it weren't for you who have taken the time to share the knowledge and expertise that will make the leaders of tomorrow. On behalf of all the students, thank you for contributing and believing in our program.

To Dr. Gardner, thank you for putting forth the time and effort to make our dreams today become reality in the future.

FIRST KBS CLUB RECOGNITION BANQUET
FARM UNDERGRADUATE RESPONSE

by

Jan Meyer

This program by design, was intended for urban and non-farm students, and students with expertise in one specialized area. It was intended that those rural students could aid in instructing those areas they have experience in. It was also intended that the rural students would do a lot of giving, and the urban students would do a lot of receiving.

So much for intentions.

Now don't get me wrong--all of these things did happen. But it was the unintended achievements that added to the success of this program.

Those of us in agriculture now make up less than 5% of the population, which has forced us to realize the importance of communication about agriculture to the other 97% of the p-pulation.

Dr. Gardner has been talking with us about effective communication--and an important link, which I think the farming sector may be guilty of forgetting, is <u>feedback</u>.

You've heard that you can lead a horse to water, but you can't make him drink--well you can force a man to hear you, but you can't make him think.

The agricultural sector tries to let their opinions and concerns be known--we want the understanding of those 97%, but we haven't always taken the time to understand the people we're trying to communicate with. Remember, information flows in one direction and may never see results, but communication is two-way and continuous.

This is where one of the most important unintended achievements of this program disclosed itself. Rural students learned the vital importance of being able to establish a common frame of reference, and a willingness to understand different cultures, before we can come together to share and interpret concerns about agriculture and natural resources.

Farm students also had the opportunity to learn more skills and knowledge on a more broad based view of agriculture and natural resources.

Many of our farmers today are specialized toward one particular field, say beef or cropping. But to make it in the year 2000, an understanding of all phases of agriculture and natural resources is an important factor for success.

This program effectively addressed this need by expanding our knowledge bases--and our horizons. And for giving us this opportunity, we'd like to thank the staff, MSU faculty, and all supporters who dispersed to us more than information--you dispersed communication.

God, in all his wisdom, realized that Adam could not be a good steward in the garden of Eden alone.

Just like Adam, the American farmer can no longer farm independently--he needs the marketing, accounting, consulting, and financing abilities of individuals in our ever growing agribusiness fields--and the understanding and support of the 97% of the population. And once again, understanding begins with communication.

Adam and Eve ran into some real problems when they ate of the forbidden fruit. So great was this seemingly simple sin that their children, and their children's children, and every generation since has had to pay the price.

The farm learning program has made our challenge clear--we know there are many forbidden fruits that lie in our industry today--many which are disguised more temptingly than the apple--others that at this time are not even distinguishable... but with what we will take with us from this experience, we will strive to avoid those moves that would cause our children to suffer the consequences.

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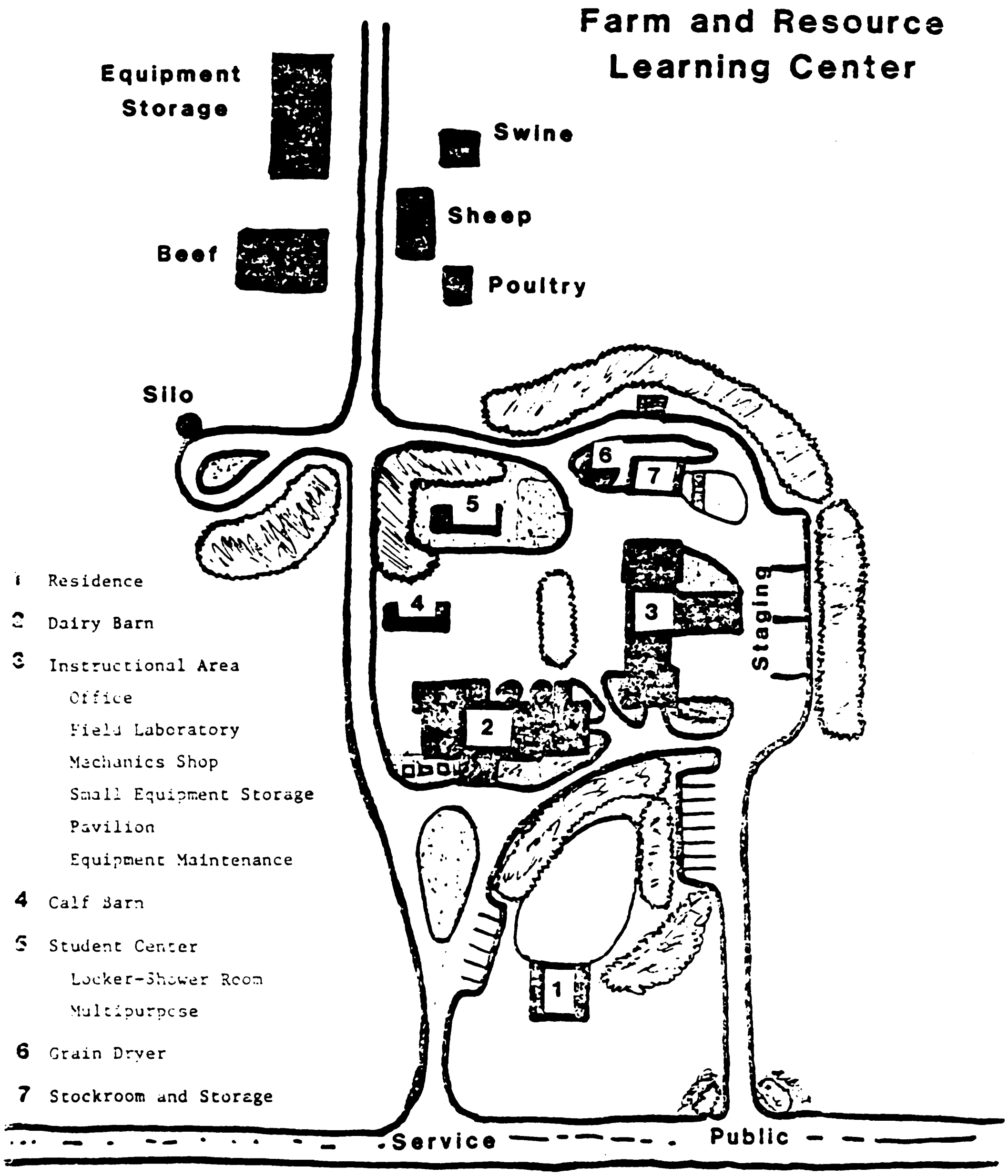
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Equipment Storage
Swine
Sheep
Beef
Poultry
Silo
Staging
Service
Public
1 Residence
2 Dairy Barn
3 Instructional Area
Office
Field Laboratory
Mechanics Shop
Small Equipment Storage
Pavilion
Equipment Maintenance
4 Calf Barn
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Locker-Shower Room
Multipurpose
6 Grain Dryer
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