An Analysis of Experiental Learning and Instructional Techniques in AgEdS450 at Iowa State University[1]

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Abstract

This study determined the perceptions of AgEdS450 course graduates regarding the experiential learning experiences from the capstone course and their perceptions with respect to class learning activities and instructional techniques.

Experiential learning and farm enterprise learning activities were beneficial to the course graduates. The ability to work in teams to solve problems and make group decisions was rated highly. Specific farm enterprise experiential learning experiences in crops, livestock, and building repair and maintenance were also highly beneficial.

Using a real farm as a laboratory and allowing students to participate in the management of that farm were highly rated as instructional techniques. Respondents also felt that interacting with fellow students through the class committee structure was a valuable experience to them.

Implications from this study can be applied to experiential learning courses in other colleges of agriculture. Clearly defined instructional techniques and class learning activities will greatly enhance the experiential learning in a capstone course.

Introduction

Experiential learning has been around for a long time. Aristotle postulated the idea that knowledge comes from experience. John Dewey (1938) helped define the role of experience in learning. More recently, experiential learning has been adopted by a number of educational reformers (Kraft, 1995; Lewin, 1951; and Piaget, 1971). Additionally, the National Council for Agricultural Education's mission statement, as stated in Reinventing Agriculture Education for the Year 2020, states that educational processes should include experiential learning.

University capstone undergraduate courses frequently involve experiential learning. According to Crunkilton et al. (1997), capstone courses should include a planned learning experience requiring students to synthesize previously learned subject matter content and to integrate new information into their knowledge base for solving simulated or real world problems. The capstone course, combined with experiential learning, provides a culminating experience that needs to be carefully monitored so students achieve their stated objectives (Knowles and Hoefler, 1995; Aupperle and Sharhan, 1995).

Learning activities and/or instructional techniques are often an integral part of experiential learning in a capstone course. Activities and techniques frequently included are projects and case studies, issue analysis, small group work, oral and written communication, and industry involvement (Crunkilton et al. 1997). Projects, case studies, and issue analysis are designed so that students gather and interpret data relative to a specific problem.

Small group work (committees) is an instructional technique that facilitates the process of problem-solving. Oral communication activities are intended to be informative and stimulating to the class and complement written communication. Finally, industry involvement integrates students and industry representatives in a planned learning environment to achieve an educational outcome.

AgEdS450 serves as the Iowa State University Agricultural Education and Studies Department's capstone course with a strong emphasis on experiential learning. It is required for all Agricultural Studies majors and is offered as an elective for Agricultural Education majors and other majors within the College of Agriculture. The ISU Ag450 farm is used as the experiential learning laboratory for the course. Established in 1943 the farm provides an opportunity for students to manage and operate a typical Midwestern commercial farm. The farm laboratory was organized to give students who planned to farm training before graduation in regional practices, the scientific principles of farming, and decision-making. The farm's mission and objectives have

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been identified and include "...the management process including the making of all of the production and financial management decisions... Students gain experience in planning, purchasing, selling, and investing in farming enterprises on a self-sustaining basis." (Trede, 1997).

Course objectives for AgEdS450 include the opportunity to participate in the actual management of a typical Iowa farm, the opportunity for students to experience the challenges and satisfactions of the management process, the opportunity to participate in an effective committee structure, and to actively participate in the decision-making process (Trede, 1997).

The Ag450 farm consists of approximately 850 acres of owned, rented, and custom farmed land. The major crops grown are corn and soybeans. Some speciality crops are included in the crop rotation. The farm has a full-line of owned and leased row crop and livestock equipment and grain storage. The major and only livestock enterprise is a swine farrow-to-finish operation. A 200-sow herd is maintained. Swine facilities include total confinement farrowing, nursing, and growing-finishing buildings. Breeding and gestation facilities are open front buildings with outside concrete lots.

The purpose of this study was to determine the perceptions of AgEdS450 course graduates regarding experiential learning as it related to their first professional position and to determine the perceptions of course graduates with respect to class learning activities and instructional techniques related to the overall quality of the course.

Methods

The study was a descriptive survey design. This type of research is grounded in the need to describe and interpret what is. Descriptive research can provide a plethora of information from a wide variety of individuals. The data can be utilized to produce information about various aspects of education (Borg and Gall, 1980) which, in turn, leads to the improvement of education and educational delivery systems.

The population for this study consisted of 335 AgEdS450 course graduates enrolled between the 1991 fall semester and the 1996 summer semester. This time frame was selected because no known research had been gathered on these course graduates. Independent random samples were generated following the model set up by Krejcie and Morgan (1970). A total random sample of 214 course graduates was utilized, with 150 Agricultural Studies majors, 38 Agricultural Education majors, and 26 other majors.

Instrument items for a questionnaire were selected from related studies (Soomro, 1991; Stevenson, 1985; and Hamilton, 1979), input from faculty and staff familiar with AgEdS450, and the researcher's graduate committee. The survey instrument was pilot tested on the 1997 fall AgEdS 450 class to ensure face validity and test the reliability of the instrument. The survey instrument contained four parts. Part I identified the perceived benefits of the course to the first agricultural position of the course graduates. Part II compared the experiential learning activities in the course with other completed courses. Part III related the perceived quality of the learning activities and instructional techniques used in AgEdS450. Demographic data were gathered in Part IV. A 5-point Likert-type scale was used to measure the perceived benefits of the course and also the perceived quality of the learning activities.

The Dillman Total Design Method (Dillman, 1978) was followed for data collection procedures. A total of 134 usable instruments were returned for a response rate of 62.6%. A random survey of non-respondents indicated no significant difference between early respondents and non-respondents, early respondents and late respondents, and late respondents and non-respondents. Therefore, the result of this study may be generalized to the population from which the sample was drawn.

Results and Discussion

Demographic Information

Demographic information from the course graduates indicated that the majority were male (85%), had a farm background (94.1%), and enrolled in AgEdS450 one time. Five undergraduate curricula were represented in the sample. Agricultural Studies with 90 respondents (71.4%) had the largest response rate followed by Agricultural Education (16.7%), Agricultural Business (9.5%), and Animal Science and Agronomy (2%).

Working in a farming operation management position (family or non-family) was the first professional position of 41% of the sample. Industry jobs related to agricultural sales and/or service accounted for an additional 26%. Agribusiness management and teaching accounted for 15%. Other positions (18%) included researchers, loan officers, military service, entrepreneurs, graduate school, and non-agricultural business.

Students may enroll in AgEdS450 during the spring, summer, or fall semesters and may enroll more than once in different semesters provided space is available. There was a fairly equal distribution by term and year of graduation with the exception of 1992 and 1997. These years accounted for less than 5% of the responses. Responses were received from 67 course graduates from the spring of 1992 through the fall of 1994 and 68 graduates from the spring of 1995 through the summer of 1997.

Experiential Learning Activities

Perceived benefits related to experiential learning in

Table 1. Means and standard deviations of perceived benefits of experiential learning activities in AgEdS450 in preparation for course graduate's first professional position.[z]

Experiential Learning	Mean	Std. Dev.
Work as a team to solve problems	4.81	.39
Group decision-making skills	4.47	.58
Opportunity to exchange ideas	4.25	.54
Responsible for own learning	4.17	.65
Class committees	4.13	.73
Development of human relation skills	4.09	.62
Develop alternatives to solve problems	4.02	.69
Delegate responsibility	3.69	.92
Composite mean	4.16	.41

[z]scale: 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree

preparation for the course graduate's first professional position are shown in Table 1. Course graduates responded to eight different statements related to experiential learning including team building, human relations skills, and decision-making. Mean scores ranged from 3.69 to 4.81 with a grand mean of 4.16. The team building experiential learning items generally rated the highest and included such items as "working as a team to solve problems," and "group decision-making skills." Clustered together were the "opportunity to exchange ideas," "being responsible for own learning," "class committees," and "developing human relation skills."

Farm Enterprise Experiential Learning Activities

Perceived benefits of specific farm enterprise experiential learning activities related to the enterprises found on the Ag450 farm are listed in Table 2. Enterprise management activities included experiential learning related to the care, marketing, and breeding of livestock; the management, marketing, and conservation of crops; the repair, maintenance, operation of facilities and equipment; and the financial management of records, budgets, plans, employees, and land. Fifteen different activities were identified and course graduates used a 5-point Likert scale to rate their perceived benefits. Composite means were calculated for each major enterprise area. The highest rated was livestock followed by facility/equipment and crops. The lowest was financial management. All of the composite means exceeded 3.80 indicating that course graduates generally agreed that the experiences in AgEdS450 were beneficial in preparation for their first professional position.

Several specific experiences rated higher than 4.0. The highest rated individual activity was keeping and analyzing farm records followed by building repair and maintenance. Other activities rating as highly beneficial were related to crop and livestock production technologies. Livestock care and crop management were nearly equally rated. Other specific experiences rating above 4.0 included livestock marketing, livestock breeding, crop marketing, building planning, design, and construction, budgeting and planning, and financial management. None of the specific enterprise management activities rated below 3.49.

Class Learning Activities

Course graduates were asked to rate the quality of the class learning activities used in AgEdS450 (Table 3). Class learning activities were defined as course components using the hands-on approaches. Course graduates responded to seven different activities ranging from participating in the management of the farm, working on the farm, contacting and interacting with vendors, ISU faculty and staff, and working together to solve problems. A 5-point Likert scale was used. Quality was measured in terms of the experience being excellent, above average, average, below

Table 2. Means and standard deviations of perceived benefits of specific enterprise experiential learning activities in AgEdS450 in preparation for course graduate's first professional position.[z]

Farm Experiential Learning Activities	Mean	Std. Dev.
Livestock Management		
Livestock care	4.18	.57
Livestock marketing	4.09	.65
Livestock breeding	4.07	.67
Composite mean	4.11	.52
Crops Management		
Crop production management	4.17	.61
Crop marketing	4.04	.70
Soil and water conservation management	3.94	.59
Composite mean	3.95	.61
Facility/Equipment Management		
Building repair and maintenance	4.50	.50
Building planning, design, and construction	4.04	.69
Equipment repair, maintenance, and operation	3.93	.83
Equipment selection	3.81	.85
Composite mean	3.98	.57
Financial Management		
Keeping and analyzing records	4.53	.70
Budgeting and planning	4.01	.76
Financial management	4.01	.80
Employee management	3.50	.99
Leasing/purchasing land	3.49	.84
Composite mean	3.83	.64

[z]scale: 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree

average, or poor.

Participating in the management of the farm and working with farm staff were the highest rated learning activities by the course graduates. Closely grouped together were "electing class officers" and "having a work experience on the farm." Other items rating above 3.5 were "analyzing a strategic issue" and "contacting and interacting with vendors." The grand mean for all learning activities was 3.82.

Class Instructional Techniques

Course graduates were also asked to rate the quality of the instructional techniques using a 5-point Likert-type scale (Table 3). Instructional techniques comprised of pedagogical methods utilized in the presentation of course materials to achieve course objectives.

The highest rated instructional technique was "using a real farm as a laboratory" followed by "interacting with fellow students." Closely rated were "utilizing classroom and laboratory activities" and "using committees in decision-making." The lowest rated item was "utilizing computer technology to collect data." The composite mean for all instructional techniques was 3.85 indicating that the instructional techniques were "above average."

Summary

The expected outcomes of AgEds450, as a capstone course, are based, in part, on the types of experiential learning activities and instructional techniques utilized in the course. Experiential learning provides a vehicle for summarizing the activities characterized in the course. The

Table 3. Means and standard deviations for the quality of AgEdS450 learning activities and instructional techniques graduate's first professional position.[z]

	Mean	Std. Dev.
Learning Activities		
Participating in the management of the farm	4.10	.77
Working with farm staff to solve problems	4.07	.78
Electing class officers	3.89	.89
Having a work experience on the farm	3.89	.97
Analyzing a strategic issue	3.72	.77
Contacting and interacting with vendors	3.68	.89
Using ISU faculty and staff as speakers	3.42	.84
Composite mean	3.82	.84
Instructional Techniques		
Using a real farm as a laboratory	4.40	.74
Interacting with fellow students	4.25	.69
Utilizing classroom and laboratory activities	4.13	.79
Using committees in decision-making	4.10	.78
Preparing and presenting oral reports	3.77	.82
Having outside speakers present information	3.62	.94
Developing written reports	3.41	.85
Utilizing computer technology to collect data	3.14	1.04
Composite mean	3.85	.83

[z]scale: 1=poor, 2=below average, 3=average, 4=above average. 5=excellent

experiential learning process provides for integration, synthesis, and evaluation of the activities desired and is deemed essential to the success of the course.

Conclusions and Recommendations

These findings suggest several conclusions and recommendations.

1. Course graduates indicated that the experiential learning activities and enterprise management activities were beneficial to them in their first professional position. This conclusion is supported by Soomro (1991) who found that the content procedures in AgEdS450 were useful, appropriate, and beneficial to respondents. Team work and group decision-making skills were the most beneficial and should be continually emphasized throughout the course.

2. Crop and livestock management, financial management, and building and facility care rated high as specific experiential learning activities. The course curriculum should be evaluated periodically to incorporate this into all phases of the capstone experience.

3. The highest rated instructional technique was the use of a "real farm" laboratory. A "real farm" rather than a "case study computerized farm" allowed students to visualize the actual application of their decisions, analyze them, and evaluate them in a practical context.

4. AgEdS450 places a strong emphasis on the application of subject matter previously learned in other courses. This is consistent with the Crunkilton criteria for capstone courses and AgEdS450 should strive to build on that concept and revise course objectives to reflect the changing nature of material learned by students in other College of Agriculture classes.

5. The integration of student-directed learning along with the student-teacher interaction is critical to the success of this course. The course should be evaluated on a routine basis to provide feedback to course planners to ensure that course objectives are being met.

6. Instructional techniques in AgEdS450 rely heavily on student-to-student interaction through class committees, work activities, and class leadership. The course graduates felt that the quality of the course was enhanced through this interaction and that valuable lessons were learned in sharing ideas with fellow class participants.

7. A wide variety of instructional techniques related to oral and written presentation are used throughout the course. These instructional techniques were rated "average" to "above average" in terms of quality, therefore, supporting the Crunkilton criteria of a capstone course.

8. The use of the computer to collect and make decisions was rated lower than many other instructional techniques. Therefore, additional emphasis should be given to more effective ways of using this technology.

Implications

Implications from this study can be applied to other experiential learning courses in colleges of agriculture. The findings clearly indicate the importance of experiential learning, particularly as it relates to capstone courses. Experiential learning can serve as an integral part of the educational process in capstone courses. Clearly defined instructional techniques and learning activities greatly enhance the experiential learning process in these courses.

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