Integrating Experiential Learning into College of Agriculture Capstone Courses: Implications and Applications for Practitioners

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Abstract

The findings of this study give a clear view of the importance of learning activities and experiential learning to college of agriculture capstone courses. Each component serves as an integral part of the entire process. The North American Association of Colleges and Teachers of Agriculture (NACTA) has published several articles detailing the importance of capstone courses within the discipline. Capstone courses are prevalent among all disciplines in colleges and universities across the nation. They provide an opportunity to incorporate previously learned, often disjointed, information into an interconnected contextual frame of reference from which to transition into a career or further study

Certain key elements hold true for all experientially based capstone courses. They are that capstone courses must contain the components indicated in the Model for the Integration of Experiential Learning into Capstone Courses (MIELCC) and the five R's of receive, relate, reflect, refine, and reconstruct be utilized to continually process and evaluate the learning which takes place. It is often these steps (the five R's) which are omitted from the learning process. Care must be exercised and precautions taken to ensure that capstone courses are truly the summative educational experience for our students.

Introduction

Experiential learning, as well as problem-solving and decision-making abilities, has continually been touted as an essential element in the education process. The 1991 Secretary's Commission on Achieving Necessary Skills (SCANS) Executive Summary Report includes the following statement: "We believe, after examining the findings... that the most effective way of learning skills is 'in context' and placing learning objectives within a real environment..." (p. xv).

In The National Council on Agricultural Education's 1996 Strategic Plan for Agricultural Education, Goal 7, which stated is "to elevate and extend our standards of excellence in classroom and laboratory instruction, supervised experiences and student organizations" (p. 9) is to be accomplished through experiential learning. It states, "Work-based learning through agricultural-related supervised experiences should provide practical, real-world experiences in agriculture, develop a positive work ethic, and meet realistic occupation expectations" (p. 9).

This experiential learning approach has provided the backbone of the FFA program since its inception. The FFA motto, "Learning to Do, Doing to Learn, Earning to Live, Living to Serve," embodies this experiential learning concept, as does the Supervised Agricultural Experience (SAE) program of the FFA. Hughes and Barrick (1993) stated that experiential learning through SAE and FFA has been a hallmark of agricultural education. The problem-solving approach used in agricultural education as the mainstay of the discipline is very similar to Kolb's work (Kolb, 1984), which was in turn based upon the earlier works of John Dewey (Dewey, 1936). This is supported by the report from the Grant Foundation (1988) stating: "experiential learning, i.e., learning by hands-on participation, by trying, making errors, and gradually narrowing the margin between failure and success, should be at the heart of our educational perspective" (p. 3).

In 1985, the Association of American Colleges (AAC) published its report entitled Integrity in the College Curriculum: A Report to the Academic Community. This report addressed concerns about the decay in the quality of the Nation's Colleges and Universities. The findings support a minimum required curriculum which should include the following items: inquiry, literacy, understanding numerical data, historical consciousness, science, values, art, international and multi cultural experiences, and, "study in depth". The "study in depth" area was explained as the following: a central core of theory and method, a range of topics, a sequence with advancing sophistication, and a means by which final mastery of a discipline's complexity can be shown and assessed (Wagenaar, 1993). This description forms the basis of and gives a general description of what constitutes a capstone course.

In a recent study of capstone courses by Crunkilton et al (1997), the authors offer the follow-

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ing definition of a capstone course: "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." In order for a course to be considered a capstone course certain outcomes must be achieved by the learners. These outcomes follow a familiar pattern. The basic theme among all experiential learning models is that learning through applicable experiences, with requisite reflection and synthesis, provides for the best education (Kolb, 1984; Joplin, 1981). It is this experiential learning model which provides the backbone for a capstone course. Crunkilton et al. (1997) go on to state that a capstone course should "...ease the transition of students between their academic experiences and entry into a career or further study." The course provides a culminating experience which needs to be carefully monitored so that students achieve their stated objectives (Knowles and Hoefler, 1995; Aupperle and Sarhan, 1995).

Six educational outcomes and five required learning activities were identified by Crunkilton et al. (1997). The expected educational outcomes of a capstone course include: problem solving; decision making; critical thinking; collaborative/professional relationships; oral communications; and written communications. Required learning activities may include: projects, case studies or written analyses, small group work, oral communication, intensive writing, and industry involvement. These outcomes and activities have been reiterated throughout the literature involving capstone courses (Zimmerman, 1991; Wagenaar, 1993; Aupperle and Sarhan, 1995; Crunkilton, et al., 1997; Zimmerman, 1997). Many similarities are evident between what Wagenaar (1993) and Crunkilton, et al. (1997) have described as essential components of capstone courses. Because of the nature of capstone courses and their roles within colleges and departments careful adherence to these principles must be maintained (AAC, 1985). While none of these authors referred to experiential learning by name, the theoretical framework is evident within the capstone requirements.

Conceptually, the main deficit encountered in the research on capstone courses is the direct inclusion of experiential learning activities into the curricula. While many activities mentioned could be considered experiential in nature, the experiential learning models mentioned earlier are never included nor are they treated as essential components in the make up of the capstone courses. It is the discovery of this deficiency which makes this study of unique importance to the discipline.

The purpose of this study was to review the related literature and theoretical frameworks relating to experiential learning and capstone courses. Further, this study sought to draw implication for the inclusion of experiential learning components and philosophy into capstone courses. Specific objectives were:

1. Identify the theoretical models of experiential learning.
2. Identify and define components of a capstone course.
3. Develop a model for incorporating experiential learning into capstone courses.

Methods

This study employed a historical research methodology. This method is a systematic collection and evaluation of data to describe, explain, and thereby understand actions/events that occurred in the past (Fraenkel and Wallen, 1993). The following sources were used to gather data for this study: ERIC Documentation Reproduction Service, NACTA Journal, Journal of Agricultural Education, and National Satellite Teleconference funded by the United States Department of Agriculture Cooperative States Research Service Higher Education Challenge Grants Program (Project number 208-11-10A-015-3337751). Studies appearing in these references were located through a library systems search completed at Iowa State University through August, 1997.

Results and Discussion

Objective 1: Identify the theoretical models of experiential learning.

Simply stated, experiential learning is learning through experience. This is the most common definition utilized in the literature (Charalambides, 1984; Garkovich, Bunch and Davis, 1992; Leske, 1994; Stone, 1994; Wulff-Risner and Stewart, 1997). While there are valid reasons for incorporating experiences into the curriculum and educational programs, to truly be labeled experiential careful adherence to the principles of experiential learning must be a prerequisite.

From the review of the literature, it is apparent that two very distinct views and definitions of experiential learning are present in today's society. One definition focuses on the inclusion of any experience or activity into the curriculum and the other definition includes a structured debriefing or reflective period within the experiential activities. Both camps espouse the virtues of providing experiences for the development of ideas and concepts in educational settings, but one group goes a step further in its definition of this concept by the inclusion of a structured reflective or debriefing period. This increased or expanded view of experiential learning takes place in a structured reflective period

(Joplin, 1981; Leske, 1994; Stone, 1994) and is essential if experiences are to be converted into higher order cognitive levels.

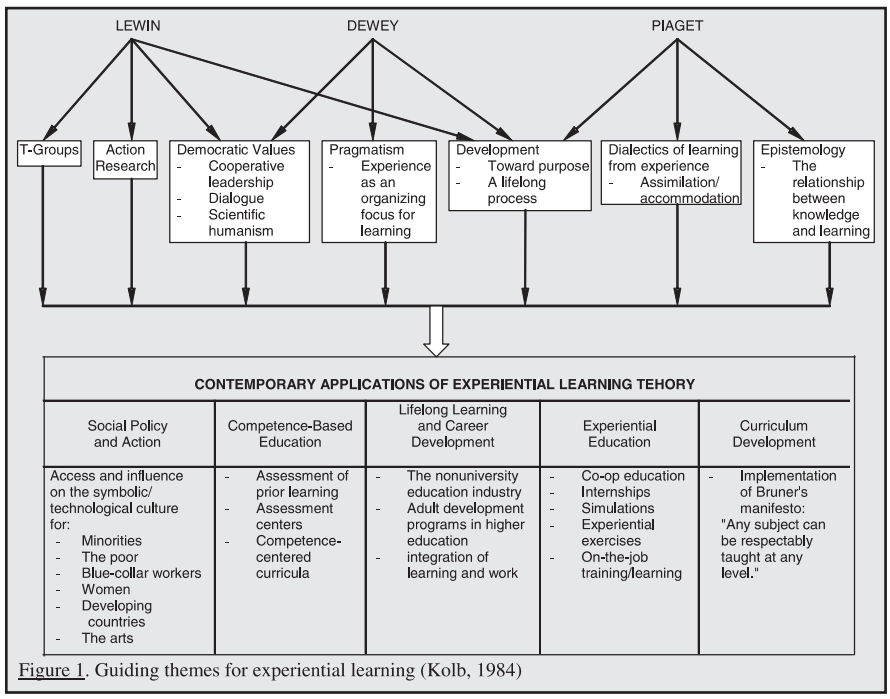

Figure 1. Guiding themes for experiential learning (Kolb, 1984)

David Kolb (1984), in his book Experiential Learning: Experience as the Source of Learning and Development, summarizes seven themes which provide the theoretical framework for experiential learning. Kolb draws upon the works of Kurt Lewin, (1951), John Dewey, (1936) and Jean Piaget, (1971) in forming guiding principles of experiential learning theory (Figure 1). Lewin's work with T-groups and the action research of John Dewey's work concerning the democratic values guiding experiential learning and his view of experiential learning as a life-long process work in concert with Piaget's contributions of the learning process as a dialectic between assimilating experience into concepts and accommodating concepts to experience. Dewey's unique work with pragmatism as well as Piaget's epistemology round out the themes for the principles of experiential theory.

Currently there are many models of experiential learning. Most of these models are very similar. However, they all can be directly related to the traditional theories of Lewin, Dewey, and Piaget.

The model proposed by David Kolb (1984) builds upon the works of Lewin, Dewey, and Piaget (Figure 2). This model depicts learning as a series of transitions among four adaptive modes: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The four quadrants of Kolb's model deal with the processes whereby knowledge is transformed through experience. Kolb explains that knowledge results from "the combination of grasping experience and transforming it" (p. 41). The knowledge, then, is transformed either through intention or extension and grasped either by comprehension or apprehension. In concrete experience, new content is introduced through new experiences.

In reflective observation, the content is presented through a variety of methodologies. The learner then contemplates and reflects upon them before moving to the abstract conceptualization mode. In this mode the learner creates concepts and forms them into generalizations. These concepts and generalizations are then used to make decisions, solve problems, and in applications in the active experimentation mode.

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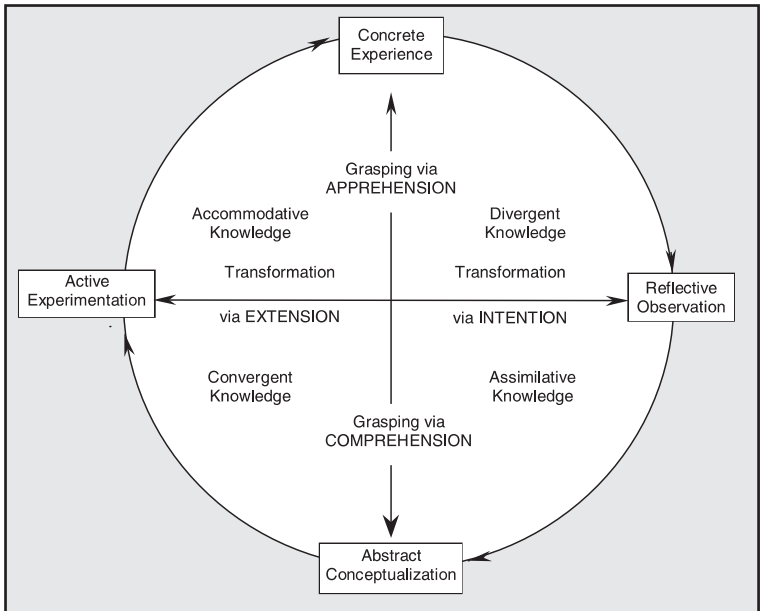

Figure 2. The Kolb model of experiential learning (Kolb, 1984)

noted the following: a central core of theory and method, a range of topics, a sequence with advancing sophistication, and a means by which final mastery of a discipline's complexity can be shown and assessed (Wagenaar, 1993). This description forms the basis of what is a capstone course.

In a recent study of capstone courses by Crunkilton, Cepica, and Fluker (1997), the authors offer the following definition of a capstone course: "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." Crunkilton et al. (1997) go on to state that a capstone course should "...ease the transition of students between their academic experiences and entry into a career or further study." The course provides a culminating experience which needs to be carefully monitored so that students achieve their stated objectives (Knowles and Hoefler, 1995; Aupperle and Sarhan, 1995).

Objective 2: Identify and define components of a capstone course

Six educational outcomes and five required learning activities were identified by Crunkilton et al. (1997). The expected educational outcomes of a capstone course include: problem solving; decision making; critical thinking; collaborative/professional relationships; oral communications; and written communications. Required learning activities include: projects, case studies or written analyses, small group work, oral communication, intensive writing, and industry involvement. These outcomes and activities have been reiterated throughout the literature involving capstone courses, its implication and applications for practitioners from several disciplines, but specifically agriculture (Zimmerman, 1991; Wagenaar, 1993; Aupperle and Sarhan, 1995; Crunkilton et al., 1997; Zimmerman, 1997).

Objective 3: Develop a model for incorporating experiential learning into capstone courses.

Based on the review of literature and researcher observations, a model for integrating experiential learning processes into capstone courses was developed (Andreasen, 1998). This model (MIELCC) (Figure 3) draws upon the research and observations of educators in diverse fields of expertise but is oriented toward capstone courses in Colleges of Agriculture. The benefits and applications of experiential learning and capstone courses, however, are universal. Crunkilton et al. (1997) stated that one of the principal values of a capstone course is to unify the fragmented disciplinary knowledge associated with the educative process. This model begins with this principle in mind. Crunkilton et al. further suggested five essential learning activities based upon their nation-wide analysis of capstone courses in colleges of agriculture. These activities include: problem solving, team work, decision-making, critical thinking, and oral and written communication.

The learning activities and instructional techniques included in the model's required capstone components are also the activities and techniques rated by students as being of exceptional quality and the most beneficial to them professionally (Andreasen, 1998). These learning activities and instructional techniques facilitate the experiential process within the capstone course.

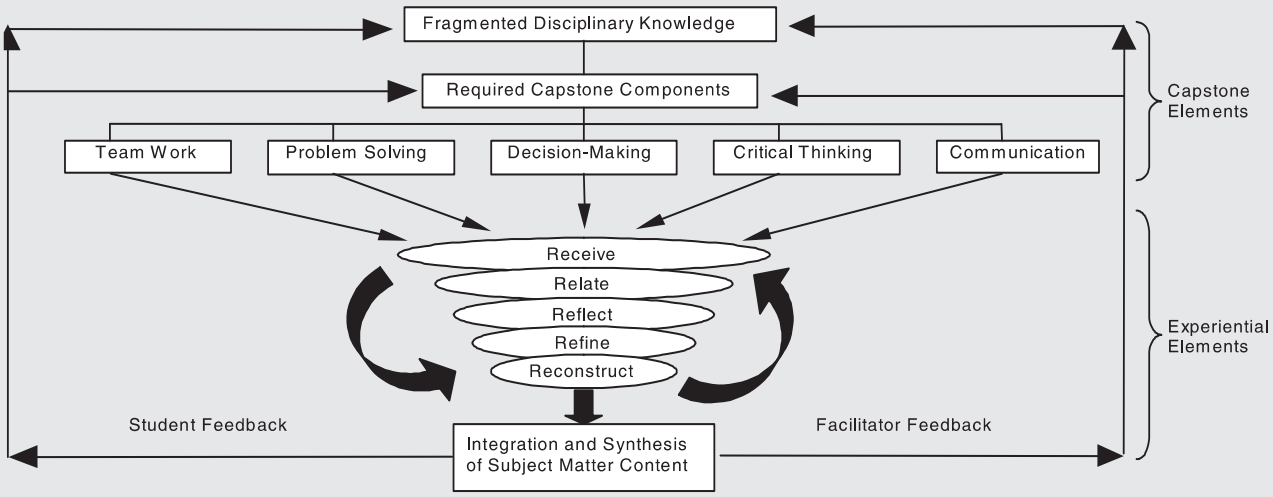

Figure 3. Model for the Integration of Experiential Learning into Capstone Courses (MIELCC)

The next section of the model is an interpretation of several experiential learning models (Kolb, 1984, Joplin, 1981, Pfeiffer and Jones, 1977) presented in the review of literature. The interpretation and its

incorporation into the capstone course concept are the synthesis of this study and review of literature. The five "R's" of the model (receive, relate, reflect, refine, and reconstruct) are a mnemonic device to represent the major areas of the experiential learning model. They are designed to spiral and funnel the required capstone components into a synthesis and lead to an integration of the subject matter content.

Receive: An activity or experience is received by the learner. This activity or experience may be contrived by the facilitator or may occur spontaneously during the capstone course or may have occurred during previous courses. This step corresponds with previously cited models, many of them using the term "concrete experience" (Lewin, 1951; Piaget, 1971; Kolb, 1984; and CSREES, 1992). Regardless of the origin of the experience, the learner must experience some stimulus or be placed in some learning environment.

Relate: Relating learned experiences to previously gained knowledge ties experiential learning into the capstone course philosophy. By associating the experience and processing its application or relationship to other knowledge bases, the learner begins to enter the spiral of the experiential cycle. Taking fragmented disciplinary knowledge and unifying it is the intent of this step. This step is referred to as "focus," "internalized reflection," "reflective observation," "share," or "processing" in other models.

Reflect: Laura Joplin stated, "True experiential education is characterized by systematic interventions of the learning facilitator with the learner along an experiential path" (Joplin, 1981, p. 156). It is the reflecting upon the experiences received and relating them to our previously gained knowledge or information that distinguishes experiential learning from merely learning experiences. Without structured and active reflection, the lessons available to the learner will not become as apparent and meaningful as otherwise possible.

Refine: Once knowledge has been related to and reflected on it must be refined. This refinement process causes further contemplation concerning the applicability of this knowledge and its association to and with other knowledge. Through refining the received knowledge and conceptualizing it with regards to other experiences, courses, or knowledge the learner begins to tie the experience or learning into their educational or experiential paradigm. This term may also be associated with "abstract conceptualization" and "generalize" from other experiential leaning models.

Reconstruct: As the vortex of the spiral is reached in the model, experiential learning is reconstructed by the learner or synthesized. The subject matter content and its integration into our knowledge base is then reconstructed by the learner. The Lewinian model calls this step "testing the implications of concepts in new situations" and the CSREES model refers to reconstruct as "apply what was learned to a similar or different situation or practice." Once synthesis and integration have resulted, the spiral of the five R's can be recycled or reused and additional knowledge processed, feedback provided and evaluations made that will improve knowledge acquisition, retention, and learning.

Summary

There is a very real need to relate the concepts of capstone courses and experiential learning. Without this relationship the possibility exists of lessening the educational advantage students have by participating in capstone courses. Without an understanding of the experiential learning process, the surface of knowledge and learning are only scratched. Utilization of this model in appropriate educational settings will show that when learning activities and instructional techniques based upon the principles of experiential learning and exposed to the structured, active learning steps of the MIELCC are applied in the capstone setting, the quality and benefits within these courses will be improved.

Utilization of the Model for Integration of Experiential Learning into Capstone Courses (MIELCC) provides an actualization of the relationship between and among these educational principles. The model provides one method of viewing these principles and incorporating them into a more holistic approach to education. Following the experiential learning process outlined in the five R's allows for improvements in education by improving the application and conceptualization of knowledge. As John Dewey (1936) said, "education, in order to accomplish its ends both for the individual learner and for society, must be based upon experience - which is always the actual life experience of some individual" (p. 113). The acquisition of knowledge, its retention, and measurable learning will all be greatly enhanced through careful and thoughtful utilization of true experiential learning concepts. The alternative to ignoring these concepts, principles, and this model is to underutilize the tools and opportunities available to educators; adherence to them is to improve education and learning for our students.

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