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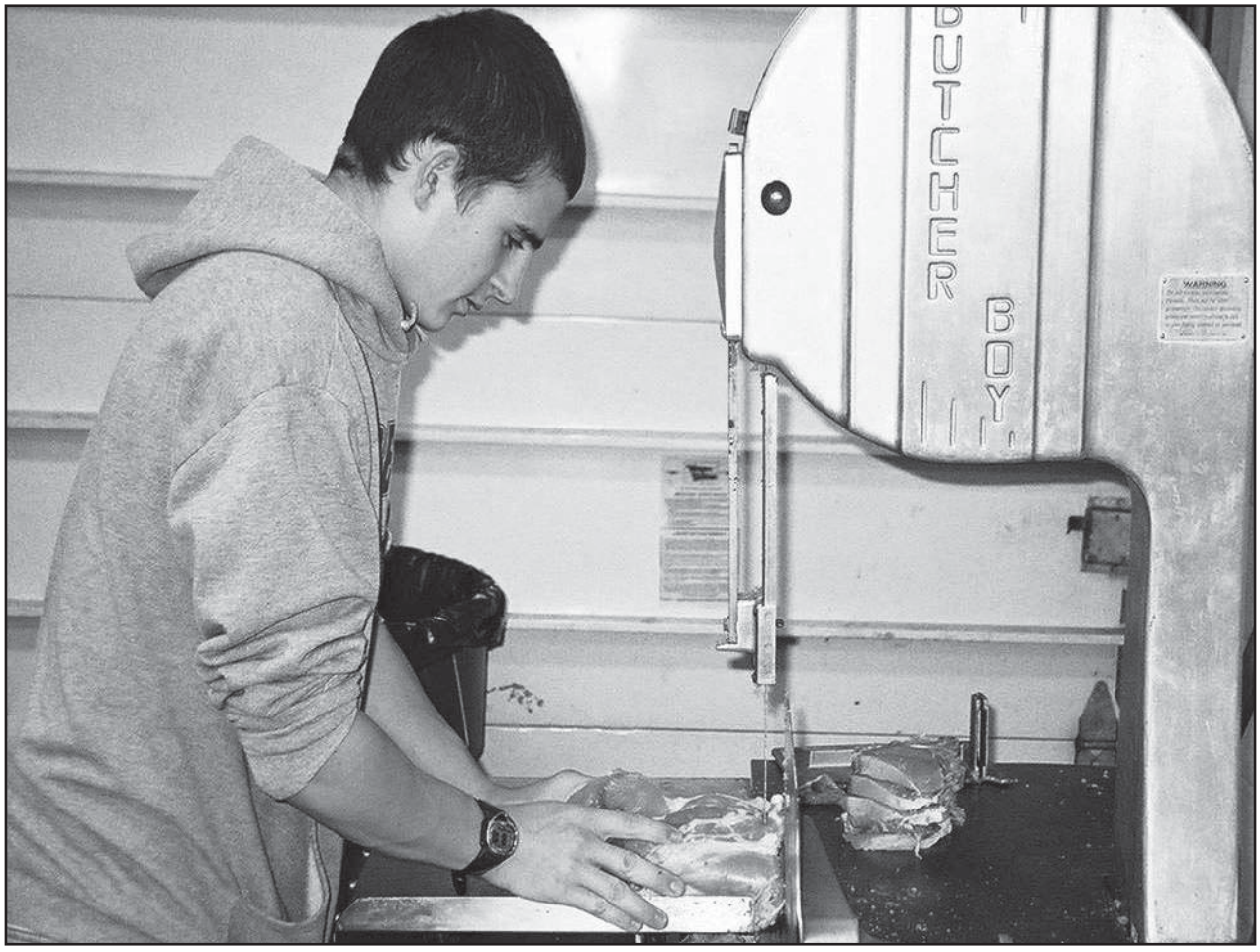

EXPERIENTIAL LEARNING: LEARNING FROM DIRECT EXPERIENCES

EDITORIAL

Defining Experiential Learning

Experiential learning – "An experience-based approach to learning in which students experience a direct encounter with the phenomenon under study, reflect on that experience, draw general conclusions, and test their newly acquired knowledge through subsequent performance" (Phipps, Osborne, Dyer, & Ball, 2008, p. 530). Agricultural education and supervised agricultural experience (SAE) programs have long been associated with the concept of experiential learning. As the authors in this issue are quick to point out, experiential learning is much more than SAEs. How can agricultural educators make certain that their entire program is an experiential learning situation?

Directly Encounter Phenomenon

Agricultural education programs are known for their "hands-on" approach to teaching. Teachers utilize laboratories to provide students with opportunities to experience and learn from situations first hand. These laboratories include agricultural mechanics shops, meat processing facilities, aquaculture labs, greenhouses, land laboratories, forests, and biotechnology laboratories to name a few. Agricultural education teachers routinely provide students with opportunities to learn needed skills and to practice these skills in simulated environments. In addition to the simulated environment of the school laboratories, students are encouraged to develop SAEs where they can use the skills in real world situations. Although the name has changed numerous times, SAEs were a part of agricultural education well before the Smith-Hughes Act (Boone, Doerfert, & Elliot, 1987). We must make certain that SAEs remain an integral part of agricultural education programs.

Reflect on Experience

In my opinion, agricultural education programs do a good job of providing opportunities for students to "encounter the phenomenon." Emphasis on the next three steps, however, starts to decline in many programs. This includes reflecting on the experiences. Lesson summaries are one part of reflecting on the experience. Analysis of SAE records is another good way to reflect on the experience. Just as the emphasis on SAEs have declined, so has the emphasis on record keeping declined.

Develop Conclusions/Test Knowledge

It's not enough to "reflect" on the phenomenon/experience. Students must develop the necessary reasoning skills to analyze the results of the situation and reach conclusions on the experience. In many situations the conclusions will require further "testing." The results of experiential learning experiences are problem solving and higher order thinking skills. In other words we are teaching agricultural education students the skills necessary to become lifelong learners.

Research on SAEs

In a final note, Workman (2010) found that over 90 percent of the agricultural education teachers in Kentucky, Maryland, Ohio, Pennsylvania, Virginia and West Virginia indicated they had an adequate understanding of SAE concepts. At first glance the results look great but let's look at it another way. Approximately one teacher in 10 felt they did not have an adequate understanding of SAE concepts. This is a disturbing fact that the profession needs to address.

I would like to thank Dr. Grady Roberts for serving as the Theme Editor and sharing his expertise and passion on experiential learning. I would also like to thank each of the authors that contributed an article to this issue. Without individuals willing to share their ideas, publishing *The Agricultural Education Magazine* would not be possible.

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A student directly experiencing food processing skills. Photo courtesy of Nathan Taylor, Coordinator, Agricultural Education, West Virginia Department of Education.

Back Cover:

Student supervised experience programs. Photos courtesy of Nathan Taylor, Coordinator, Agricultural Education, West Virginia Department of Education.

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Articles and photographs should be submitted to the editor or theme editors. Items to be considered for publication should be submitted at least 90 days prior to the date of the issue intended for the article or photograph. All submissions will be acknowledged by the Editor. No items are returned unless accompanied by a written request. Articles should be typed double-spaced, and include information about the author(s). One hard copy and one electronic copy of the article should be submitted. A recent, hardcopy photograph should accompany the article unless one is on file with the editor. Articles in the magazine may be reproduced without permission but should be acknowledged.

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What is Experiential Learning?

by T. Grady Roberts

The answer to this question would probably vary, based on whom you asked. My answer would be "ALL learning is experiential learning." This would also be how eminent experiential learning scholars like John Dewey (1938) and David Kolb (1984) would likely answer.

Experiential learning is the cyclical process by which learners transform their experiences into meaningful knowledge. Each experience builds on previous experiences and lays the groundwork for future experiences. Learning occurs as students reflect on their experiences, and build connections with previous knowledge.

As educators, our role is to create meaningful learning experiences. Edgar Dale (1946) gave us a useful tool to discuss learning experiences. Often referred to as Dale's Cone of Experience, this model presents learning experiences on a continuum from very concrete, hands-on experiences to very abstract experiences, like reading a book. As educators, we make conscious decisions about the types of experiences we create for our students.

Experiential Learning and Agricultural Education

Agricultural educators have long espoused a commitment to experiential learning. I would argue that this is correct, but far too many people incorrectly think only of Supervised Agricultural Experience (SAE). Experiential learning goes far beyond SAE. Agricultural educators routinely create meaningful learning experiences in classrooms, in laboratories, through FFA activities, and through SAE.

This issue of *The Agricultural Education Magazine*, begins with a reprint of an article from 1991 that challenged us to rethink experiential learning. Next, agricultural educators from around the country share some of their innovative approaches to creating learning experiences in a variety of contexts (classroom, laboratories, community, FFA, and SAE). This issue closes with articles that outlines some of the challenges to SAE and then outlines current efforts to revitalize SAE. I hope that these articles will give you some things to think about and a few ideas of activities worth implementing in your program.

T. Grady Roberts, the January-February Theme Editor, is an Associate Professor in the Department of Agricultural Education and Communication, University of Florida.

Upcoming Themes for *The Agricultural Education Magazine*

May-June: Instructional Practices for 21st Century Agricultural Education Teachers

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July-August: Maintaining an Adequate Supply of Agricultural Education Teachers

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Reshaping SAE To Provide Experiential Learning in the 1990's

(Originally Published in The Agricultural Education Magazine, May 1990, Volume 62)

by Jimmy G. Cheek and Larry R. Arrington

The past decade has been a time of reform and rethinking. The Communist world began massive restructuring, the Berlin Wall came tumbling down, and people throughout the world became concerned about issues that heretofore had not been of concern – destruction of the ozone layer, the "Greenhouse" effect, and bio-technology. A crusade to improve education gained momentum during the decade, gaining national attention with the publication of a report called *A Nation at Risk* (National Commission on Excellence in Education, 1983). The report was critical of American education and made numerous recommendations to improve the educational system and process. By the end of the decade the much revered SAT was undergoing revision. In the future the SAT will include an essay, different types of questions, and about 20% of the math questions would not be in the traditional multiple choice format (Toch, 1989).

Likewise, the 1980's was a period of study, refinement, and change in agricultural education. In 1985, the National Academy of Sciences initiated a study of agricultural education in secondary schools which culminated with the publication of *Understanding Agriculture: New Directions for Education* (National Research Council, 1988). Partially as a result of this study, many states renovated or are in the process of renovating the agricultural curriculum in public schools. Leaders within the profession called for further reform, and names of the Future Farmers of America (FFA) and supervised occupational experience (SOE) program were changed.

When reform is undertaken, the fundamental "truths" within a discipline emerge and usually become central in the restructuring effect. This was certainly the case with respect to SOE. Some of these fundamental "truths" that emerged from the National Council study were that all students should participate in worthwhile SOEs while enrolled in agricultural education. Additionally, a broader range of SOEs should be encouraged, and emphasis should be placed on experience and entrepreneurship, not only on the occupation. The importance of experiential learning was emphasized not only in SOE but in the total curriculum.

> Supervised experience programs have been an effective method of providing experiential learning experiences to agricultural education students.

Experiential Learning is More Than SAE

Experiential learning is interwoven into the very fabric of agricultural education. The basic problem solving teaching model used in agricultural education includes preparation, presentation, application and evaluation. According to this instructional model, once a subject has been taught, the material learned should be applied. Application may occur in the classroom, agricultural mechanics laboratory, greenhouse, or with a homework assignment. Following a unit on marketing, teachers might have their students apply what was learned by selecting a commodity of interest and develop a marketing strategy or role play the process of selling agricultural products.

One of the major methods used to provide experiential learning is SAE. The name change from SOE to SAE was significant, and provided the basis for further defining what supervised experience should be and could be. SAE not only involves occupational experiences but also includes non-occupational agricultural awareness and exploratory experiences. SAE is defined as all of the agricultural, both occupational and non-occupational, activities of educational value conducted by students outside of the class setting where students apply the knowledge, skills, and attitudes that have been learned in the instructional program and where supervision is provided by parents, em-

ployers, teachers, and others. SAE is the principle way students "learn by doing" in agricultural education. This article deals with some of the ways SAE can be expanded to provide additional experiential learning activities for students.

Why Experiential Learning

The value of experiential learning in agricultural education has long been recognized as an important part of the educational process. The reason for this is that through practice and experience students apply what they have learned in real situations, thus the material becomes understandable and usable. Moreover, in the process of gaining experience new problems and situations arise causing learners to seek additional information and new ways of applying what they have learned.

Experience provides relevance to the educational process. Dewey (1916) stated: "An ounce of experience is better than a ton of theory simply because it is only in experience that any theory has a vital and verifiable significance" (p. 109). Dale (1946) used the "Cone of experience" to explain the inter-relationships of various learning experiences to their abstractness or directness. He classified the "doing" experiences as direct experiences, contrived experiences, and dramatic participation and indicated that these experiences were the "bed-rock" of all education.

When using experiential learning, students must practice in real situations, model appropriate behaviors and procedures, and receive appropriate feedback and reinforcement. Also, there should be a lapse of time between practices so that students are put in a situation where they must think as they apply their knowledge to various situations.

Is SAE An Effective Learning Tool?

If experiential education is an effective way of teaching, is there any empirical evidence that SAE influences student achievement in vocational agriculture? Yes, there is solid evidence that SAE influences student achievement.

SOE's importance to secondary vocational agricultural programs was evident in a study completed by Neavill (1973), who found that tenth grade students who had agricultural mechanics, livestock, crop, or soil science projects achieved a higher level of mastery on criterion-referenced tests. Similar studies by McGhee and Cheek (1988) and Cheek and McGhee (1985) found that ninth and tenth grade students with a supervised occupational experience project had significantly higher mean achievement test scores than students who indicated that they did not.

Morton (1978) compared supervised occupational experience scope and achievement using a multiple-choice test designed to measure technical knowledge of agriculture. He found that even when the effects of scholastic aptitude, opportunity, year in school, and instructor project visits were statistically controlled, supervised occupational experience scope was positively related to learning.

Two similar studies conducted in Florida produced results consistent with Morton (1978). Arrington and Cheek (1988) found that for ninth graders, as participation in SOE increased, achievement test scores increased. Noxel and Cheek (1988) had identical results with eleventh and twelfth grade ornamental horticulture students.

The effectiveness of SAE activities for middle school and junior high school students has not been investigated. However, it seems logical that SAE would also be effective at increasing learning at these grades as well.

Innovative Ideas for Using SAE for Experiential Learning

The National Research Council (1988) recognized the importance of supervised occupational experience programs and identified several common characteristics of high-quality SOEs. These SOEs were characterized by involved teachers, planned experiences, adequate resources, and student placement in agribusiness and on commercial farms. Furthermore, it was recommended that a broader range of SOEs be encouraged.

Traditionally, vocational agriculture students have been encouraged to participate in experience programs related to production agriculture or agribusiness. There is a need to think beyond theses traditional experiential learning activities. Of particular importance is the need to provide experiences in areas related to biotechnology, food science, marketing, communications, the environment, and exploratory programs.

BIOTECHNOLOGY

Providing experiential learning related to biotechnology will require different and creative thinking. There are examples of programs that have done an outstanding job in this area. One example is a program that is able to place students in a local university agricultural experiment situation to work on biotechnological experiments. Many private companies and private laboratories use biotechnology and could provide an opportunity for students to receive experience. For example, a student could work in a tree nursery where the breeding of new varieties is occurring. In some

communities, non-agricultural laboratories may have to be used to provide experience related to biotechnology. Local Cooperative Extension agents may be a good resource for identifying possible sites.

FOOD SCIENCE

A common site for food science experience in Florida has been citrus processing plants. Many of these experiences have been related to the handling of citrus rather than the food science behind the industry. Efforts should focus on actively seeking experiences with the testing, processing, storage, and quality control related to these products. Product research and new product development are also areas for potential experiences.

Another acceptable activity may be to have students work with government agencies involved in testing and regulating food products.

MARKETING

Many students have received experience at state or local farmers' markets. However, have students received experiences that demonstrate the international nature of agricultural marketing? One way to provide this experience would be to work with a local broker to develop an understanding of commodities trading. Many commodity organizations and state farm bureaus actively seek new international markets and could assist in understanding this process. Another area might involve having students observe and work with agribusiness marketing cooperatives.

COMMUNICATION

Communication has not traditionally been recognized as an area for SAE. Information careers are one of the fastest growing sectors of employment in the United States. Students interested in a career in agricultural education may need to spend time working with a local Cooperative Extension agent or assisting an elementary teacher prepare lessons and experiences related to agriculture. Students interested in working in broadcasting or written media could work at a local radio station or local newspaper. Another idea would be for students to serve as the agricultural editor of a school newspaper. Attending and participating in a local public speaking short course sponsored by a civic organization or a church would be another appropriate activity.

ENVIRONMENT

In many states, no issue is hotter than the environment and its relationship to agriculture. Water shortages, groundwater pollution, surface water pollution, and solid waste management are just a few examples. Experience programs related to the environment could be provided with governmental agencies, engineering firms, and local education personnel responsible for teaching the public about water conservation, recycling, and other environmental issues. For example, many local Extension agents are actively involved in recycling bio-degradable yard waste. Students could become involved in working with Extension professionals in the re-cycling effort.

EXPLORATORY PROGRAMS

Several states now have formal agricultural education programs at the middle school level. What are appropriate SAE activities for younger students? Students may be required to interview agricultural employees about their job or they may observe agricultural operations. Using directed laboratory experience, there are an unlimited number of possibilities. Students could work on the school land laboratory, greenhouse, agricultural mechanics lab, or other school facility before school, after school, during study period, or on the weekend. Students could also conduct science fair projects at home as part of their SAE activities. Small production projects may also be appropriate.

Conclusion

The supervised occupational experience program has certainly been an effective method of providing experiential learning experiences to vocational agriculture students. The agricultural educational profession must decide how broad supervised agricultural experience will be and how much is enough. New areas and areas for further development include biotechnology, food science, marketing, communication, environment, and exploratory programs. It may be that all experiences cannot be provided in an agricultural setting.

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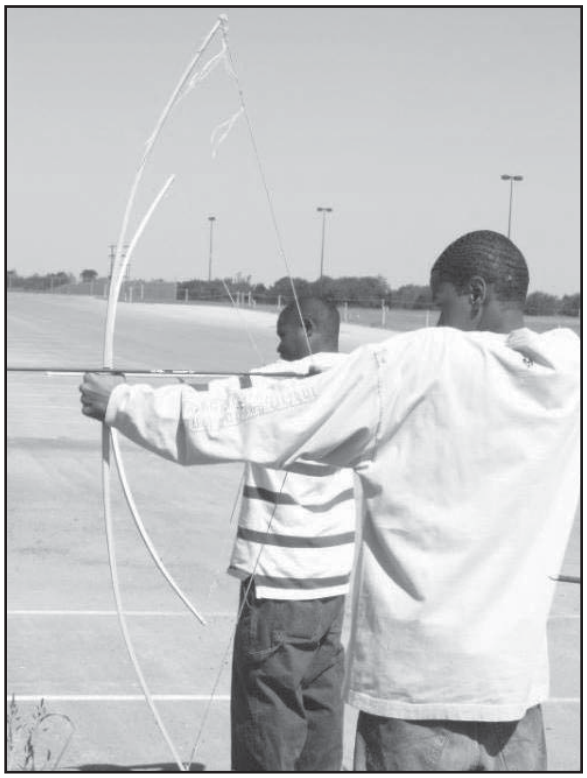
Elgin High School, Elgin, Texas uses a longbow making lesson as one example of how experiential learning can be directly applied to hands-on activities. *See the complete article on page 20.*



Should This Rightfully Be Called Education? – The Application of Kolb's Experiential Learning Model in Agricultural Education

by Marshall A. Baker and J. Shane Robinson

In the back corner of the shop, Jared is working intently on his nail box. Jared begins to put the pieces together as Mr. Morrison walks up beside him and asks, "Have you thought about using the clamps to hold the pieces together?" Jared stops, sets down the pieces, and responds, "No. I've been trying to figure out how to make sure that my box is perfectly square." Mr. Morrison steps closer, grabs the pencil from his pocket, and draws a triangle on a piece of scrap wood. "Do you remember learning about the 3 – 4 – 5 triangle in math?" Mr. Morrison asked. Jared's eyes lit up. "Use that ruler to check for the 3 – 4 – 5 measurement to make sure the base is square." Jared makes three different marks and notes the length between each, and then calls out to Mr. Morrison, "like this?" Mr. Morrison nods his head and moves on to another student.

A few hundred miles away, in a different state, a young girl named Sarah frantically awaits the arrival of her agriculture teacher, Mrs. Jones. This morning she made her way nervously to the farrowing barn to check on the sow that should be delivering any day. To her surprise, all of the signs described by her teacher were present – it was time to deliver. Mrs. Jones pulls up in the four-door white "ag truck" and rushes into the barn where she hugs Sarah quickly and asks, "Do you remember the four important things we discussed about delivering piglets?" Sarah quickly replies, "I think so. First, we should be here to help the sow if needed. Second, when a piglet is birthed, remove mucus from the airway. Third, wipe them dry, and fourth place them under the heat lamp." Mrs. Jones says, "Great Sarah. What was important in regard to building the piglets immunity?" Sarah added, "Oh yeah, and make sure they nurse to get colostrum." As the last piglet is born, Mrs. Jones asks Sarah, "How was delivering your first liter?"

> Experiential learning leads to a deeper understanding of subject matter, the capacity for critical thinking and application of knowledge, and the ability to engage in life-long learning.

Three counties over, and a few months later, it is show day. Cody is about to enter the show ring. This is the tenth livestock show as an exhibitor, and he is confident that his steer, "Shooter," has a chance to win the show. The past two years he found himself just outside of a sale hole, but this year is different. Cody asks his dad, "Can you put some more grass hay in his bucket? He looks a little sunk in." "You bet" his dad responds. The entire family is working hard. Cody's sister, McKenzie, is working on the tail head, his mother is polishing the show halter, and his father is doing some final trimming on the legs. The breeder who raised this specific calf walks up and quietly whispers to Cody, "Your calf looks sunk in. I can fix that real quick out at the trailer." Cody looks at the breeder, looks back at his calf, and remembers the discussion his agriculture teacher had with him and his classmates last week on ethics. He smiles and says, "No thanks, I think he is ready to go." Cody walked into the ring proud that he made the right decision.

Jared, Sarah, and Cody are students who are involved in secondary agricultural education programs. They have been given the opportunity to pursue relevant experiences that they are personally interested in as a part of their high school curriculum. These types of experiences are not foreign to those in agricultural education as they occur in agricultural education programs nation wide every day. Though these direct experiences are interesting, they bring up an important pedagogical question – "Should these experiences rightfully be called education?"

The answer to this question is – "It depends." Although agricultural education is unique in that it provides a myriad of direct experiences in which students can participate, but that alone does not constitute learning. Eyler (2009) stated that experiential education not only develops social skills, work ethic, and practical expertise, but also leads to more powerful academic learning. She noted that experiential learning leads to a deeper understanding of subject matter, the capacity for critical thinking and application of knowledge, and the ability to engage in life-long learning. However, Kolb (personal communication, September 7, 2010) noted that educators must remember the second very important word in experiential learning – learning. John Dewey (1938) asserted that, "Everything depends on the quality of the experience which is had" (p. 27). He explained further, "Unless experience is so conceived that the result is a plan for deciding upon subject-matter, upon methods of instruction and discipline, and upon material equipment and social organization of the school, it is wholly in the air" (p. 28).

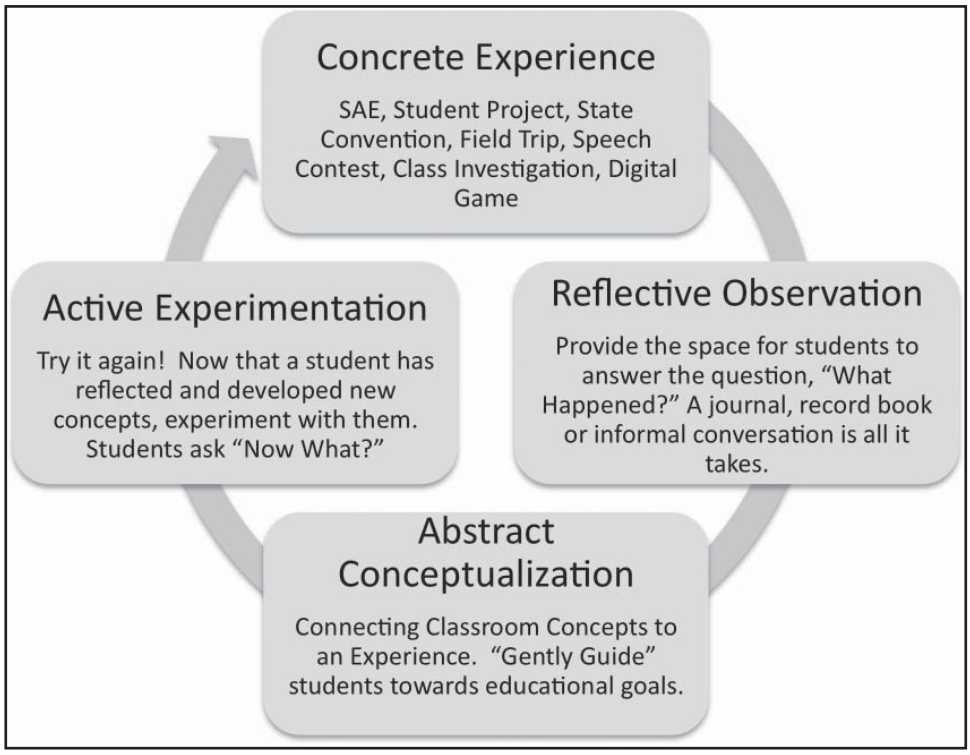


Figure 1. Modified Kolb's (1984) Experiential Learning Model.

Kolb's Experiential Learning Model

All of us, as agricultural educators, have mastered the planning of experiences logistically, but are we in the habit of planning the educational processes to accompany those experiences specifically or pedagogically. David A. Kolb, (1984) provided a great frame to answer this question through the experiential learning cycle (see Figure 1). This cycle, which is commonly discussed in agricultural education, provides a practical process by which agricultural educators can draw in-depth learning from the every day experiences in which students are exposed. Experiential learning does not have to be expensive, time-intensive, or vastly different from what we do every day. Typically, all it requires is an opportunity to reflect and think, the gentle guiding of abstract concepts related to the experience, and the opportunity for students to experiment with the newfound knowledge or skill. Let's return to Jared, Sarah, and Cody. As Sarah steps back in relief and views the new litter of piglets she just delivered, Mrs. Jones immediately asks the question, "How was delivering your first litter?" This is a prime example of following an experience with purposeful reflection. Jared's instructor, Mr. Morrison, quickly connected the mathematical concepts being covered in geometry with the building of the nail box and was able to gently guide the student to that connection – a prime example of abstract conceptualization. Finally, in the context of the show ring, Cody was called to actively experiment with concepts he had been taught in class, and was able to transfer the learning process into this different context by making the right decision.

This process is depicted as a cycle that includes some type of direct experience, the opportunity to reflect on the experience, the drawing of abstract concepts that are deduced from the experience, and a chance for active experimentation. There is no start or end to the cycle. As such, students can enter the cycle at any stage. Each learner and teacher has a preference in terms of where they like to begin this cycle. Learning occurs as a result of individuals grasping and transforming their experiences. This model, though simple in design, provides a framework to process experiences that leads to deep, meaningful and enduring learning.

Kolb's Suggestions for Agricultural Education

When presented with a basic overview of agricultural education, Kolb (personal communication, September 7, 2010) shared that, "You [teachers] have such an advantage in agricultural education because it is so easily experiential." He continued by outlining four suggestions, specific to

agricultural education, to help educators make the most of this advantage.

First, teachers must be present and involved in the experience. Kolb shared that too many times the experience occurs in the absence of the instructor who is guiding the educational goals in the classroom. It is essential that the teacher gently guides the student and helps him or her focus on important elements as the experience moves through the cycle. As students work on their Supervised Agricultural Experiences (SAE), agriscience projects, speeches, community service projects or show animals, it is essential that the instructor has a connection to the experience so that it is integrated into the experiential learning model and thus, the educational goals of the class.

Second, learning must begin with the student's interest. Kolb asserted that the value of a well-crafted experience is that it connects with the learner in a way that is congruent with how that person "sees" the world. Kolb gave the example of visiting a museum, and shared that the first stage of the experience should be for the teacher to allow students to explore the museum to find things that are interesting to them. That example can be extrapolated to agricultural education easily. As students choose projects, participate in field trips, serve the community, and identify activities in which to participate, there should be adequate room for the development of student interest.

Third, teachers should wear different hats throughout the experiential process. Kolb explained that as students move from a concrete experience into reflection, teachers serve as a facilitator drawing out the students' ideas and interests. From reflection to abstraction, the teacher assumes the role of a subject expert, making the connection between what students have experienced and the concepts being taught. As a student moves from abstraction to action, the teacher becomes the evaluator or standard setter, and provides immediate feedback to the student.

Finally, teaching content is not the only goal. Kolb shared that educators have two important responsibilities: 1) to teach content, and 2) to teach students how to learn. Following the passage of No Child Left Behind, the educational focus has been on delivering content, but just as important is the development of metacognitive skills that produce society-ready, successful and, contributing citizens. Kolb shared that, in his opinion, the SAE project is more about a student identifying an area of interest, taking the initiative to pursue that interest, solving real-world problems, experiencing success and challenges, and managing their time and resources. The type of SAE is not as important as the opportunity for the student to build critical skills. Kolb shared that the SAE programs provides a personal connection with each student that can be tied to classroom instruction when related.

A better understanding of what experiential education is helps us answer the question, "Should experiential learning rightfully be called education?" The next time you take a group of students to the National FFA Convention, a local speech contest, or a district livestock show, ask yourself the question, "Should this rightfully be called education?" Then, remember the four stages of Kolb's (1984) experiential learning model so that you can answer that question with a resounding, "Yes!"

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Agricultural Facilities: Experiential Learning under a Different Roof

by Catherine W. Shoulders, Chris Wilder, and Brian E. Myers

The Benefits of Experiential Learning in Agricultural Education

Students enrolled in today's agriculture classes walk into the classroom with increasingly diverse agricultural backgrounds. Some students are raised in hog barns, sitting on combines, or walking chicken barns, and rival their teachers' knowledge about production agriculture. However, more and more students are removed from farm life, and enter the classroom with experiences only on the fork-end of agriculture. This variety in student background and experiences causes knowledge gaps that agricultural educators must address in the planning of lessons. Teaching through experiential learning activities can provide the personal, hands-on agricultural experiences that address the needs of students regardless of their base agriculture knowledge; novice agriculture students can gain concrete experiences to which they can apply classroom concepts, while those with more experience can develop a deeper understanding for the processes and reasons behind those processes in agriculture.

Agricultural facilities, including mechanics laboratories, greenhouses, livestock facilities, land laboratories, and aquaculture laboratories, among others, are considered an integral component of agricultural education. These facilities allow teachers to provide students practical applications of theories taught in the classroom (McCormick, 1994; Phipps, Osborne, Dyer, & Ball, 2008). While these facilities are often utilized for improving student motor skills, they can be a site of many more goals, as is noted in Figure 1.

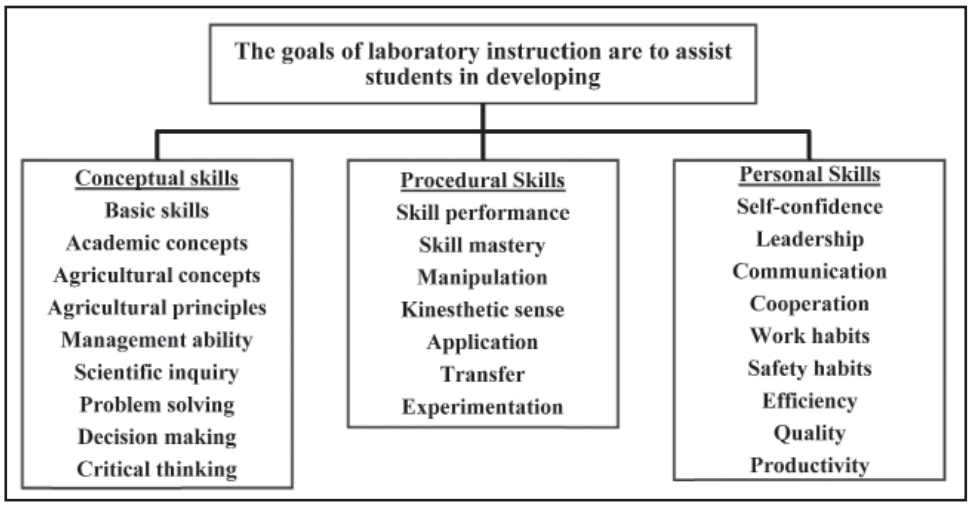

Figure 1. Goals of laboratory instruction (Phipps, Osborne, Dyer, & Ball, 2008).

The goals in this table are not exclusive, and teachers can plan for students to reach several goals in different areas during each experiential activity in an agricultural facility. Enabling students to meet these goals, however, requires careful teacher planning and facilitation.

Considerations When Planning

Student Involvement - When planning for the above goals, teachers must carefully consider the level of student involvement possible in the agricultural facility. Seasoned teachers understand how goals for student learning may go unattained if the students are not on task. Activities in agricultural facilities require careful planning to ensure all students are engaged in the experience.

Cooperative Learning - In many facilities, students must work together, similar to many work environments, which can make teachers uneasy – a student rarely gets into trouble on his or her own. When true collective learning occurs during an experience, students actually feel socially responsible for their actions, and mediate their own and the actions of others to support the group, leading to fewer students off-task.

Cognitive Engagement - While these students are participating, the level of cognitive engagement should be enhanced to meet goals related to higher conceptual skills. Cognitive engagement refers to the level of mental effort, active attention, and interaction with the material students are willing to exert (Fredricks, Blumenfeld, & Paris, 2004). For example, when a teacher directs a student to water the greenhouse, the cognitive engagement of the student is minimal. If the same student is directed to determine a watering schedule for the different types of plants that would save water, the same procedural skills are accomplished while enhancing student cognitive engagement. Lessons and activities in agricultural facilities that require higher order thinking skills also typically allow students to experiment.

Student Inquiry - While, again, more planning is required to facilitate inquiry-driven activities in agricultural facilities, the goals met by students are more numerous and valuable. As students follow a line of inquiry or experimentation, the knowledge they develop in an agricultural facility should relate directly to concepts learned in the classroom. After all, the purpose of the facility is to provide students with a place to apply classroom concepts.

Budgeting - Each of these considerations requires careful planning. However, just as is the case with commercial agricultural facilities, those for educational purposes must run on funds and according to a calendar. Teachers must budget for and plan activities for appropriate times during the year. Budgeting helps ensure that both financial obligations and learning objectives are met in the agricultural facilities.

Experiential Learning Scenarios for Agricultural Facilities

In the midst of a teacher's hectic schedule, planning enriched experiences for students can seem daunting, and can lead to lesson plans that follow a more traditional, motor skills focused experience, as shown below. Each of the following alternate experiential-based activities, while fully adaptable to different situations and students, is provided to help teachers begin the planning process of moving lessons toward a more enriched agricultural experience for students.

The Greenhouse:

Traditional Lesson: A common lesson would have the students use the greenhouse to grow a flower crop. Students are typically given a set of instructions to carry out focusing on the motor skills required to produce a plant. Many quality control measures, such as fertilizer type and amount, watering schedule, and light manipulation, are decided upon by the teacher before the lesson.

Students at Williston High School compare B-9 to Bonzi and Cycocel both as drench and spray in the greenhouse. Experiential learning is enriched by giving students more control of the decisions made during the production of poinsettias.

Enriched Experience: In addition to planting the crop in the greenhouse, students can investigate and make decisions on some of the quality control measures traditionally determined by the teacher. For example, at Williston High School in Williston, FL, students investigate which plant growth regulator (PGR) is most effective by conducting an experiment using two different types of PGR. This allows the student to develop hypotheses, design their own experiments in order to answer their questions, collect and analyze data, and evaluate results. Students are responsible for collecting the growth data from weekly measurements and presenting their findings in the form of graphs and charts.

The Land Laboratory:

Traditional Lesson: In north central Florida, one of the lessons the Animal Science classes undertake each fall is the production of forages for school beef cattle herds. Typically, this involves students following the directions of the instructor. Activities might include disking, tilling, and spreading the seeds. Using the land laboratory for strictly application-based activities enhances student motor skills, but lacks the development of higher order thinking skills.

Enriched Experience: To enhance this lesson and activities, the pasture at Williston High School is divided and temporarily cross fenced into 4 separate fields. One field remains the same native grasses for year round pastures while students plant the remaining three fields with different winter forages. One field is planted in rye, one in wheat and one in oats. When the forage is mature enough, the cattle are rotated through the fields. Throughout cattle rotations, the students collect data on animal weights and forage quality. Students then make recommendations on efficient forages for cattle grazing based on their findings. Just as in the traditional lesson, students are able to develop the motor skills required to plant forage crops. In addition, the enriched experience allows students to gain conceptual skills dealing with

scientific inquiry, agricultural concepts, and decision making.

The Garden:

Traditional lesson: The garden lends itself to many useful, hands on applications related to the various plant science skills taught in agriculture classes. However, many times plant science is only accompanied by basic application, with objectives being to "go out and plant a garden". While this activity reinforces psychomotor skills required in gardening, the concepts of plant science, soils and nutrient information can be grasped through activities that enhance student experiences.

Enriched Experience: In an enriched garden experience, teachers can lead the class to investigate various types of plants, mulches and water delivery systems used to produce vegetable crops. Every spring, Williston High School's freshman classes conduct such an experiment. The class is placed into cooperative groups of three to four students. Each group is charged with planning, planting, and caring for a row of vegetables using both traditional planting methods and bedded rows using plastic mulch. They also use a comparison log to gather data on the overhead sprinkler delivery system versus the drip emitter system found under the plastic mulch. Through this experience, students not only plant a garden as required by the traditional lesson, but also make decisions that affect quality and monetary efficiency based on the experiments they conduct.

Overcoming Barriers

The activities and facilities listed here are not all-encompassing of the facilities and experiences potentially available to agriculture teachers and students. They are provided as examples to help teachers turn traditional lessons into facility-based experiential learning situations for students to better meet each of the goals of agricultural laboratories.

Enhancing facility activities to increase experiential learning does not come without its challenges. Increased time requirements, both to plan and to carry out activities, limit the number of experiences teachers can provide for their students. Funding and available supplies can restrict the scope of student experiences. Safety concerns can limit the freedom teachers allow their students to try out their own ideas. However, many of the barriers to experiential learning in agricultural facilities can be overcome by working with community members, who can gather supplies, garner funding and support for the program, and help supervise students during large projects related to specific industries.

Agriculture teachers are fortunate to have access to a wide array of agricultural facilities. These facilities provide students a place to apply classroom concepts and help agricultural education keep its reputation as a model in hands-on learning. Enhancing facility activities to include more than psychomotor skill development can increase student learning in numerous other areas, including conceptual, procedural, and personal skills. Ensuring that agricultural facilities truly are educational laboratories – facilities that aid in student achievement – is critical. It is equally important that the positive impact these facilities have on students is documented and shared with school decision makers. The use of experiential learning methods is one major tool teachers can utilize to ensure and document this impact. Through teacher planning and creativity, student learning in agricultural facilities can truly become experiential.

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Service Learning: Doing to Learn…Living to Serve

by Ashley R. Dull

Experiential learning is a somewhat broad term that can include many different methods of teaching. Learning from experience simply makes the most sense and produces great results. Since the time we are born we learn through our environment, other people's reactions, the use of our senses, etc. Hence it would make sense for teachers to teach through the path of least resistance using our mind's instinctual way of learning to instill knowledge and life skills in their students. Learning through experience can take many forms and there is not one pre-determined "effective" way to accomplish this. Service learning is one form of experiential learning that is often forgotten. Service learning projects are used for "expanding the learning environment from the classroom to the community" (Barkley, 1999, p. 46). This article will describe the benefits and things to consider when implementing service learning in an agricultural education setting.

What is Service Learning?

Service learning is different from just service. Service learning is more structured than just going to volunteer somewhere. While volunteering and service learning hopefully both will benefit people and/or the community service learning requires additional components. Service learning is meant to promote student development and learning while making a difference in the community or meeting other people's needs. This form of experiential education requires planning. There must be specific goals set and time for preflection as well as reflection after the activity or throughout the project.

Benefits of Service Learning

Using service learning in the classroom has numerous benefits. Student interest and motivation are typically high because students can chose a project based on their interests. Service learning projects benefit the student and the community. The students gain insight into their community, feel as if they are doing something meaningful, improve interpersonal skills, and apply critical thinking skills to new situations (Barkley, 1999). It allows students to experience "real life" and see how their knowledge can be applied to real world applications with their own eyes. Valuable benefits of service learning include:

- Individual student needs and learning styles can be accommodated.
- Learning can take place in a positive environment outside of the usual classroom setting.
- Can be used to motivate and challenge students in unique ways.
- Can also go beyond the required classroom material to teach critical thinking, problem solving, teamwork, time management, social skills, tolerance, empathy, generosity, teamwork, and responsibility.
- Fosters development intellectually, morally, emotionally and may open the door to career paths or life goals.
- Provides opportunities for students to explore their community and the world around them.
- Provides hands on learning opportunities and exposes students to different viewpoints.

> Service learning allows students to apply their knowledge to real world applications.

Planning and Implementing Service Learning

When preparing and implementing service learning projects in your classroom there are some important considerations to make. With all the different learning styles how does an educator formulate lessons to meet the needs of all students? In addition to various learning styles educators have to take into consideration the various abilities of students. Other factors such as student motivation, behavior, and interests all affect how a lesson should be formulated. Lessons must be formulated to support students while at the same time challenging them. Assessments are another component that must be taken into consideration when formulating a lesson. Service learning projects can be tailored to meet individual student needs and can be assessed on various levels. Students can work as teams, pairs, or as individuals. So the

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THEME ARTICLE

Not All Learning Experiences Are Created Equal

by Christopher T. Stripling

We have all probably seen the hit game show, Are You Smarter than a 5th Grader. The creators of the show expect contestants to incorrectly answer questions based on elementary school material, thus avoiding having to payout a one million dollar purse. Only two contestants, Kathy Cox, the Georgia State School Superintendent and George Smoot, a Nobel Prize winner in physics, have answered all of the questions correctly and won the million dollar prize. With that in mind, why is a game show that is based on elementary school material so difficult to win?

Ironically, in 1938 in a book titled *Experience and Education*, John Dewey, who is considered by many to be the father of experiential learning, asked a similar question– what has become of the knowledge that was supposed to be gained during our years of schooling. Likewise, I too sometimes wonder what has become of the knowledge I supposedly amassed throughout my various levels of education. For example, as an undergraduate engineering major, I remember sitting in a small cold room learning how to solve differential equations. If I were asked to solve a differential equation today, I would be hard pressed to do so. On the other hand, if I were asked to identify various plants from the Georgia FFA nursery landscape list (which I learned in high school), I am confident I would be able to correctly identify the plants. Why is this? What is different about these experiences that allow me to recall the nursery landscape material, but not the necessary information needed to solve a differential equation?

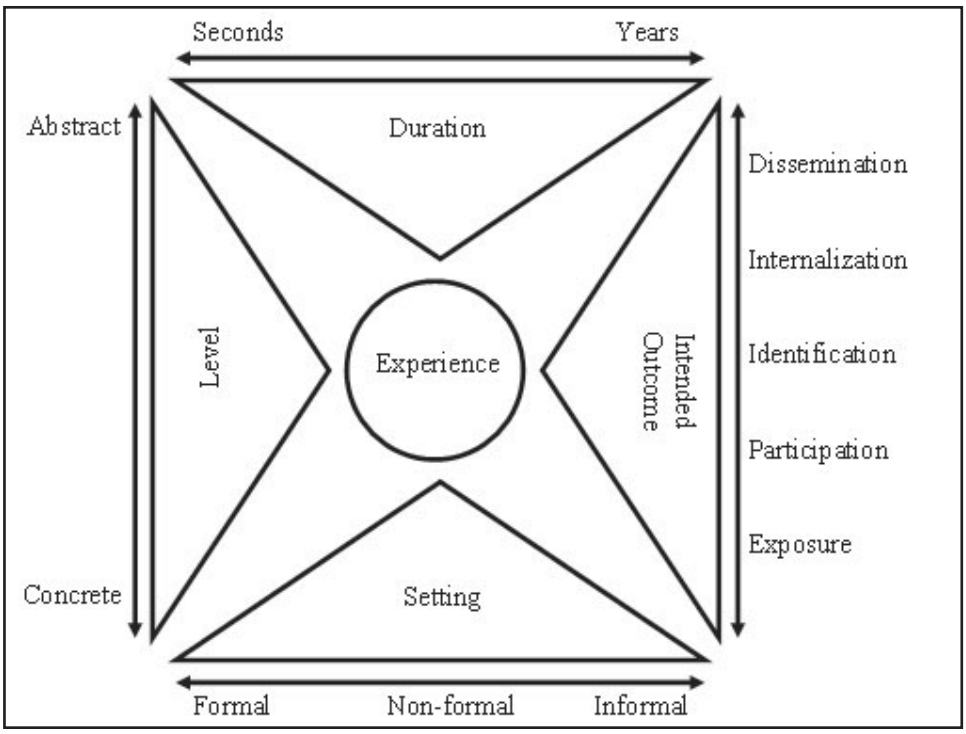

Figure 1. Model of Experiential Learning Context (Roberts, 2006, p. 26)

Dewey theorized that much of the subject matter we supposedly learned was taught or experienced in isolation, as discontinuous parts void of future use. Dewey described this knowledge as being contained in a "water-tight compartment" (1938, p. 48) that can only be retrieved when the exact conditions in which it was learned are reproduced. Fortunately, as a high school student I had an agriculture teacher who taught nursery landscape within the context of the nursery landscape industry and with a focus on future use. To that end, when surveying the various experiential learning opportunities within the context of agriculture, numerous possibilities exist. However, as is evident in my learning experiences described above, not all learning experiences are created equal.

So, how do we as agricultural educators construct meaningful experiential learning opportunities within the context of agriculture? Roberts (2006) recommended that practitioners utilize the Model of Experiential Learning Contexts (see Figure 1) when planning experiential learning activities to aid in defining the context in which experiential learning occurs. Furthermore, the Model of Experiential Learning Contexts illustrates that "the context in which experiential learning occurs can be defined by four dimensions: the level, the duration, the intended outcome, and the setting" (Roberts, 2006, p. 26). By taking into consideration the dimensions of experiential learning, agricultural educators can create meaningful learning experiences.

Level

The level of the educational experience occurs on a continuum from abstract to concrete (Roberts, 2006). Although learning experiences occur on a continuum, agricultural educators should seek to provide learning experiences that are more concrete in nature in view of the fact that experi-

ence provides the basis for observation, reflection, and generalization, which are foundational elements of the experiential learning cycle (Kolb, 1984).

With that in mind, agricultural educators often take great pride in the fact that they provide concrete, hands-on learning experiences. For example, as a high school agriscience teacher, my students had the opportunity to genetically modify E.coli while learning about genetically modified organisms. That experience provided a concrete connection between prior and current knowledge and was used as a building block for future iterations of the learning cycle.

Duration

The duration of a learning experience can occur in a matter of seconds or take several years to complete (Joplin, 1981; Roberts, 2006). For instance, I quickly discovered that my students could learn in a matter of minutes how to properly fill the wells of an electrophoresis gel. During those few minutes, the students experienced several iterations of the experiential learning cycle. Specifically, the student tried to fill a well, reflected on their success or failure, developed generalizations for improvement, and then experimented with filling the well again. An example on the opposite end of the continuum is the agricultural education program at Irwin County High School (ICHS) in Ocilla, Georgia. Agricultural education students at ICHS learn about agribusiness, agritourism, and value added agriculture through a series of courses, in which they develop and market value added agricultural products and oversee the agritourism portion of their school research farm. Accordingly, with subject matter of this nature the time required for the learner to complete the experiential learning cycle is considerably longer.

Intended Outcomes

Intended outcomes of experiential learning are arranged on a continuum from exposure to dissemination (Steinaker & Bell, 1979; Roberts, 2006). As one progresses higher on the intended outcomes continuum more is required of the learner. Arguably the higher levels of the intended outcomes continuum create a more meaningful learning experience, because the experience places a more demanding cognitive load upon the learner and provides multiple learning contexts. For instance, in the electrophoresis example provided earlier the students not only had to learn how to properly fill the wells, but were also required to teach advanced placement biology classes how to properly fill and run an electrophoresis gel. By requiring learners to disseminate their new knowledge, the learning experience required more of the learners and provided an additional context. In addition, the higher intended outcome supplied continuity in the learning process. Dewey (1938) purported continuity to be an essential part of the educational process.

Setting

Educational settings vary from formal to non-formal to informal (Etling, 1993; Roberts, 2006). In agricultural education, formal learning settings are structured learning environments such as a traditional classroom or an outdoor laboratory (Roberts, 2006). Non-formal educational settings are less structured than formal settings and usually occur "outside of traditional schooling" (Etling, 1993, p. 73). According to Roberts, Supervised Agricultural Experience programs, internships, and service learning projects are examples of non-formal educational activities that can be utilized by the agricultural educator. Also along the continuum are informal educational settings. Informal settings are not organized or planned and occur in everyday experiences (Etling, 1993; Roberts, 2006). For example, a student may overhear a conversation between two livestock producers and unintentionally learn about protein levels of different feeds while purchasing dog food at a local feed store. According to Etling (1993), this type of learning is incidental learning. Utilizing various educational settings will allow the learner to gain a variety of educational experiences and contexts for future use.

In conclusion, the possibilities for utilizing experiential learning in secondary agricultural education are numerous. However, secondary agricultural educators should keep in mind that not all learning experiences are created equal, and that the context in which learning occurs is a key component of experiential learning. Experiential learning can be enhanced by examining Roberts' (2006) dimensions of experiential learning: level, duration, intended outcomes, and setting. Planning learning experiences with conscious consideration of the aforementioned dimensions can aid secondary agricultural educators in creating meaningful learning experiences, which help the learner create transferable knowledge that can be used in the classroom and in life.

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Service Learning: Doing to Learn…Living to Serve

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first thing to consider is if you want to do a group project or do you want students to work individually or in small groups? If you want students to work in small groups do you want assigned groups or will you let students choose their groups? You can assign groups based on interests or even academic skill level. Assigning groups gives you an opportunity to evenly distribute English language learners, students struggling academically, etc., throughout the groups. If you assign students into groups would it be appropriate or beneficial to assign specific roles? Another important consideration is your objectives. What do you want your students to get from this activity? Create obtainable objectives and make sure criteria are clear to all the students. Will you require assignments to be completed based on their service learning experiences or do you just want them to participate? Specifying your requirements and goals for your students can not be stressed enough. If they do not completely understand what you are asking of them then they have little chance for success.

Evaluating Service Learning

Next you must consider what evaluation methods you will use. Multiple choice exams are likely not appropriate, especially if students are working individually or in small groups on separate projects. Reflection journals are a good way for students to gather their thoughts and reflect on their experience as well as for you to see what they have learned. Perhaps you may just want them to keep logs of their hours or progress. Class discussions are also a great way for students to share experiences with you and each other and may be used as a way to evaluate student progress.

Examples

Some service learning projects that have been done by agricultural classes or small groups include fixing local parks, helping local farmers, raising money for a specific community need, planting gardens (city beautification), and educating community members on agriculturally related issues or promoting agriculture literacy in grades lower than their grade (middle schoolers teaching elementary schoolers, etc.). Individuals can volunteer at local farms, nursing homes, non-profit organizations, food banks, etc. The possibilities for service learning projects are endless and can be easily tailored to student interests. As you can see there are so many ways to implement service learning in agricultural education and there are numerous valuable benefits for the students involved as well as for the community.

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Experiential Learning: Right on Target!

by Christopher M. Estepp and Michael Norton

Experiential learning has been the backbone of agricultural education since the initiation of the Smith-Hughes Act in 1917 (Graham & Birkenholz, 1999). Barrick et al. (1992) stated "agricultural education encompasses taking learning to the 'doing' or application stage of learning" (p. iii). The nature of agricultural instruction lends well to the integration of applied learning activities. Traditionally, secondary agricultural education teachers have incorporated a plethora of hands-on learning activities in their instruction. Although many secondary agricultural educators implement experiential learning activities, the question still stands; how can agricultural education instructors maximize the learning of their students through hands-on learning activities?

Stripling and Roberts (2010) proposed a practitioner-centered process of experiential learning, which can aid agricultural educators in their instructional planning. Their model combines theory and practice and provides a practical framework teachers can follow to guide students through the experiential learning process using applied learning activities. The process consists of sub-experiences which when combined together form the entire experiential learning process for a given learning activity.

The following is a summary of the process described by Stripling and Roberts (2010):

1. Assess students' prior knowledge and experiences: This gives the teacher a starting point to understand how much a student knows about a given subject.
2. Create a common introductory experience: A common introductory experience provides a link between students' prior knowledge and the new educational experience. This step should generate student interest.
3. Communicate the importance of the new educational experience: Emphasize why the new knowledge to be learned is important and give suggestions for future use in a real world setting.

> Implementation of experiential learning activities can increase student engagement and learning.

4. Use of a contextual learning experience: Teacher should use the appropriate method(s) to teach the new information relating it to prior knowledge, experiences and the planned use of the information.
5. Provide reflection experience: A period of reflection should be provided for students to think critically about the new experience and its connection to current knowledge and future and past experiences.
6. Provide a generalizing experience: Generalization of the new experience by students will allow them to think about the future use of the information and transfer it across contexts.
7. Provide a culminating application experience: Allow the students to use or test the new knowledge gained in a real world context.

Implementation of this model should allow students to create transferable knowledge which will then become prior knowledge for new learning activities. Building upon prior knowledge in different contexts helps students create a deeper understanding of the material being learned.

Stripling and Roberts' (2010) model can be implemented using a variety of hands-on learning activities. A specific example of how to fit the model into a lesson is shown through a traditional longbow making activity employed in the Wildlife and Recreation Management class at Elgin High School (EHS) in Elgin, Texas. Wildlife and Recreation Management has been traditionally taught as a text heavy course; however the agriscience instructor at EHS was searching for more hands-on activities. Inspiration for the longbow making lesson originally came through discussions between the agriscience teacher and two other teachers who mentioned bow making. After researching the topic, the agriscience teacher discovered the bow making lesson fit perfectly with the required essential knowledge and skills for the class, and in addition the lesson provided cross-curricular learning experiences about Texas history.

The following description shows how each step of the lesson fits into the experiential learning pro-

cess. The first step in Stripling and Roberts' process was assessment of students' prior knowledge and experiences. This was accomplished through a period of lecture/discussion about the history of longbows and inquiring about the students' prior archery experiences. This led to the second step of the process which was to create a common introductory experience. The agriscience teacher connected the longbow discussion to the Comanche Indians (previously discussed in students' history classes) and the Comanches' use of longbows. This connection generated interest among the students because it was a direct application of the knowledge acquired in history. The third step in the process was to communicate the importance of the new educational experience. This was accomplished in the longbow making example by informing the students that in addition to constructing the bow they would also learn safety, proper tool use, and craftsmanship skills. The students' interest level greatly increased as they progressed through the experiential learning process. The fourth step in the model is the actual use of the contextual learning experience. In the longbow making example this process takes approximately two weeks. After the materials are gathered the wood is cut into the basic longbow shape. Students then take their bow forms and rasp them into the final shape. Throughout this process the students also tiller their bows, which is the process of checking for adequate and uniform bend in the wood. At some point in the second week students prepare the strings for the longbows and the final assembly is completed. During the longbow making process students are given opportunities to reflect on the experience and how it connects to their prior experiences. Part of this reflection process includes critical thinking and problem solving as students encounter problems such as bows breaking during the tillering process. Development of critical thinking and problem solving skills during student reflection allows students to generalize about their experience and think about future use of the information as well as how to transfer the new knowledge across contexts. The culminating experience for the longbow making activity is a shooting competition. This experience gives the students a sense of gratification because they are able to see the fruit of their experience, thus bringing the knowledge full circle.

John Dewey (1938) who is traditionally noted as the father of experiential learning asserted that all learning is derived from experiences; however some experiences are more educational than others. As agricultural educators, we need to ensure that we are not providing experiences for the sake of experience; classroom learning experiences should maximize student learning throughout the process. Stripling and Roberts' (2010) model provides a guide teachers can follow to make the most out of experiential learning activities. The longbow making activity at Elgin High School provides one example how the model of the experiential learning process can be directly applied to hands-on activities. Through careful consideration and planning, secondary agricultural instructors can use this model to create or modify hands-on learning activities. Implementation of such activities in the classroom can be powerful tools to increase student engagement and learning.

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Putting it all Together! Capstone Experiences & Projects

by Don W. Edgar, Leslie D. Edgar, and Jeff D. Miller

Agricultural educators have been characterized as those who teach practical skills and, more importantly, as teachers who make learning "real." They collectively have a knack for aligning pieces of knowledge—they seem to understand better than most how to help students "experience" learning. Even the most excellent teachers in agricultural education, struggle with balancing theory and higher order thinking skills with practical hands-on learning. They understand the importance of teaching at all levels of cognition using many different methods, but sometimes a good mixture of teaching methods, theory and practical application is not enough. The balance of methods and levels of cognition teachers strive for is critical, and it's even more difficult to achieve because it's never the same for each student or each class.

John Dewey (1938) postulated that experience is the better teacher and successful students are a product of those experiences. It has also been observed that collateral learning occurring in classrooms—that is, the unintended learning students experience through experiential activities—may be as important as the intended point of the primary lesson. These two key pedagogical concepts, along with the need for classroom and laboratory activities that "put it all together," have led to the development of the capstone project idea prevalent in many classrooms.

Capstone Experiences

Capstone courses are defined throughout instructional methods literature, but arguably one of the best definitions of a capstone course is one proposed by Durel (1993)

> . . . a crowning course or experience coming at the end of a sequence of courses with the specific objective of integrating a body of relatively fragmented knowledge into a unified whole. (p. 223)

Capstone experiences in agricultural education coursework allow students to connect previous disjointed information gathered through a variety of methods and tactics employed over time in a classroom into a unified understanding of "the big picture." The balance teachers strive for is never the same for each student or each class. As our students have changed, so must our tactics towards aiming at the intended outcome of the teaching that occurs in our classrooms.

At the post-secondary level, The University of Arkansas Agricultural and Extension Education Department has developed several capstone experiences rooted in the theory of experiential learning with exciting results. They serve as models for others seeking to build experiences that help students "put it all together." Common characteristics that seem to have contributed to the success of these educational efforts include the following:

1. They lend themselves to the tactic of team teaching.
2. They lend themselves to the concept of service learning.
3. They encourage students to experience what Andreason (2004) calls the 5 R's: Receive, Relate, Reflect, Refine, and Reconstruct.

Regardless of the teaching level, secondary or post-secondary, these characteristics should be present in good capstone projects and courses. Also, as a measure of quality of learning, good capstone experiences should help students not only receive the assignment but also relate the assignment to the "fragmented" knowledge they have previously gained. When the project is complete, students should have the opportunity to reflect on what was learned and how they learned it, then refine that knowledge using higher-order thinking skills, and finally reconstruct the way they view the knowledge and skill sets they have acquired.

The University of Arkansas agricultural communications faculty has developed a capstone course model encompassing real-world experiences and allowing students to apply the skills and knowledge gained through their previous agricultural communications classes. Faculty identified

> Experiential education engages and impacts learners in a profound way.

a problem among their students - their ability to pull together previous skills and knowledge and apply them in real world settings was suspect. They knew the students had obtained skills but wondered if they could demonstrate them in terms of what employers wanted. The product was a magazine constructed, designed and printed resulting in greater understanding and use of previously learned competencies and skills. As one student commented, "This class allowed me to use all the skills I have accumulated while in school, writing, communication and graphic design, and apply all those skills to one important project."

With those resonating thoughts towards the end goal of education, shouldn't teachers redefine how we instruct students in today's educational system with more focus on accountability? Many states require different types of end of course testing. Therefore, the question should be posed, how should we prepare students best for those types of examinations?

Today's Agricultural Science Classrooms

Experiential learning allows students to experience and apply knowledge and skills either previously learned or through present process. Many students in agricultural education programs enroll because they enjoy learning through practical applications. These students enjoy using their senses (manipulative skills) because it is easier for them to remember and relate concepts. The capstone experience engages foundation knowledge taught in classes ending in a project that joins information previously learned. This is not a new concept for agricultural education especially in agricultural mechanization or horticulture but it may be a process that should be scrutinized in other areas of study in agricultural education.

In agricultural mechanization education students are instructed in many different areas. An example used by many agricultural education teachers is depicted in welding. The students are taught basic knowledge of the welder, welding processes through identification of parts, electrode selection, welding positions, and safety. After instruction in these areas, students are allowed to practice welding through actual experiences. Should these experiences be the final "teacher?" Can students actively use those skills in the production of implements, machinery accessories, and farm building? Most teachers might answer a definitive "No!" How can this be done? As we have seen, a capstone experience is a great answer used in many agricultural science programs.

In today's accountability measures utilized in public schools, activities such as these (capstone experiences) must be instituted in all areas of our teaching to promote learning and maximize growth. Our programs impact students each and every day, let's showcase what is done so well in agricultural sciences through experiential learning activities. These projects make not always work perfect but as one student commented "I would love to take this class again. Looking back, and seeing the finished product of my work makes me see a ton of things I could have done differently." Experiential education engages and impacts learners in a profound way. These projects can be large scale or as small as a seed plot in the closet. Engage learners through capstone experiences and experiential activities; they will come back wanting more to learn.

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Learning by Doing through SAE: It isn't as Easy as it Sounds!

by Michael S. Retallick

Agriculture teachers believe SAE is the one piece of the agricultural education model that differentiates agricultural education from other career and technical education and academic programs (Retallick, 2010). Conceptually, SAE epitomizes experiential learning. SAE, a form of individualized, planned instruction (Barrick, et al., 1992), is used to apply the principles and concepts learned in the classroom to real-world situations (Newcomb, McCracken, Warmbrod, & Whittington, 2004). Experiential learning, in theory, occurs when a person reflects on an activity expanding their existing knowledge or understanding and uses that newly created knowledge or understanding in future experiences.

> The fundamental concepts of experiential learning are experience, reflection, and transfer.

A study, which sought to explore why agriculture teachers in Iowa do or do not use SAE instruction as part of their local agricultural program, was recently completed. The project evolved as a result of two earlier projects. The first project studied the economic impact of SAE in Iowa over an 11-year period and concluded that SAE programs had a substantial economic impact on local communities (Retallick & Martin, 2005). One of the economic indicators was return on investment. From 1991-2001, the average dollar returned through SAE per dollar invested in the local agriculture program was $1.66. A few years later, a second study focusing on the 15-year enrollment trends related to the three components of agricultural education (i.e., classroom instruction, SAE, and FFA) was conducted (Retallick & Martin, 2008). From 1991 to 2005, enrollment grew at an annualized growth rate of 4.06% while the actual percentage of students participating in SAE declined. In the early 1990's, over 85% of students enrolled in agricultural education reported having an SAE. By 2005, the SAE participation was approximately 55%.

These findings were perplexing and lead to more inquiry. Although agriculture teachers profess that (a) there are three components to the agricultural education model; (b) SAE is an experiential learning component of the agricultural education program; and (c) experiential learning is a hallmark of the profession, we find fewer and fewer students participating in SAE. Why are agricultural teachers either incorporating or not incorporating SAE into their programs? How do teachers implement SAE into their programs? What factors limit SAE participation and are there ways to improve SAE? These questions lead to a research study using focus groups and telephone interviews of Iowa agriculture teachers (Retallick, 2010). The themes that emerged for each question were reported in a published research paper (Retallick, 2010) and are summarized below by question.

Why incorporate SAE?

- SAE teaches life skills (recordkeeping, record analysis, financial management, and money management) and enhances decision-making and employment skill
- SAE is part of the FFA award system. SAE portfolios are needed for FFA degree advancement and proficiency awards
- SAE is part of the comprehensive agricultural education model. Without it, agricultural education is just another program in the school system.

How do teachers implement SAE?

- SAE as a requirement. Some teacher required all students to have an SAE and other teachers required record books of only their FFA members. A few teachers made SAE optional and some didn't require SAE at all.
- Incorporating SAE. Some teachers introduced SAE in their freshmen-level course and then regularly updated record books. Other teachers more intermittently updated record books, often at the end of a grading period. Some teachers used SAE recordkeeping as out of class homework.
- Influenced by grading. Sometimes SAE was used as part of the grade and was evaluated on

the extent to which the record book is up-to-date and its neatness. Some teachers used SAE as a midterm or final exam for a course. Yet, others used SAE as extra credit as a means to help students improve their grades.

What factors limit SAE participation?

- Changing demographics and societal attitudes. Teachers are faced with a more diverse student body (gender, ethnicity, socio-economic status, and academic ability to name a few). Importance of student work has changed from career exploration to necessity as a means to cover expenses like cell phone bills, automobile payments, gasoline, etc. Parental protectionism is also an issue because students haven't had to face adversity or been allowed to struggle with issues outside their control or manage stress and conflict.

- Mechanics and structure of schools. Agriculture teachers have designed their curriculum allowing for easy entry and exit resulting in fewer program completers and less continuity throughout the entire student's high school experience, which influences SAE participation. The school day structure also impacts the continuity of SAE. Courses can be semester, quarter, trimester or year-long and the school day can range from various modified block schedules to traditional seven-, eight-, or nine-period days influencing how often agriculture teachers have contact with all students.

- Resource availability. For teachers, travel funds, extended (summer) contracts, and discontinuation of SAE visit periods limited the incorporation of SAE as does federal and state mandates (e.g., required improvement on reading or math scores). Teaching upper-level high school agriculture courses for college credit also limits SAE participation. Also according to agriculture teachers, students no longer have the physical and financial resources of previous generations of students, which means students and teachers need to be more creative and, because of increased enrollments and a more diverse student body, there is less time for individualized SAE instruction.

- Agricultural education system. The FFA award system and the approved SAEs for awards don't fit all of today's students. Also, SAE lacks an articulated purpose and list of expected outcomes resulting in huge variability of SAE instruction from program to program.

- Image. Although FFA and agricultural classes are more glamorous, SAE is the engine that makes agricultural education work. Teachers are viewed as agriculture teachers and sometimes FFA teachers, but never SAE teachers. Students and stakeholders know very little about SAE and often hold to the traditional agricultural education stereotypes of both production agriculture and vocational agriculture.

What can be done to improve SAE instruction?

- Redefine SAE for a broader student body and educate stakeholders to ensure clearer, more consistent messages and expectations.

- Develop a structure that works in a variety of school settings with a more diverse and non-traditional study body.

- SAE can't be "one size fits all," but the structure and purpose must be consistent throughout the state and nation.

- Increased focus on career exploration and linkages among life experiences (including SAE), coursework, and what students really need to know.

- Communicate the value of this unique experiential learning program. SAE adds to the rigor and relevance of the student academic experience and is a program that parents and students should seek rather than resist.

Not all of these finding are new, nor do they emerge as a surprise. Other researchers in agricultural education have discovered similar findings. What might be revealing about the findings of this study is the fact that class enrollment continues to increase, the student body continues to become more diverse and the ability of teachers to offer individualized instruction in the form of SAE has become a major challenge (Retallick, 2010). It is also becoming more evident that many agriculture teachers understand conceptually the value of SAE, but find it difficult to implement in practice. Teachers struggle to consistently incorporate SAE into their programs and have little understanding of the extent to which SAE should be incorporated into a comprehensive agricultural education program.

These findings also suggest that the focus of SAE is centered on the experience through record keeping, etc., and not as much on the learning (Retallick, 2010). If we still believe that SAE is a vital component of agricultural education, the profession must better outline its purpose and

communicate how to successfully implement SAE given the issues teachers face. Agriculture teachers should be encouraged to develop and share creative and innovative approaches that can be used in diverse settings. Such approaches could include innovative entrepreneurial activities, exploratory programs, student-owned or -managed cooperatives, and short-term, group-based projects. But, it is imperative that any changes to SAE mesh with the other two components of the agricultural education model.

And most importantly, if SAE is the experiential learning piece that extends the classroom by linking it to real-world settings, we must incorporate the experiential learning principles that are espoused throughout the profession. A lot has been written about experiential learning in agricultural education and conceptually many in the profession understand the experiential learning process, but a more concentrated effort is needed to incorporate these principles and make the SAE experience more educational. As Boone (2010) stated in his editorial of the SAE themed issue of *The Agricultural Education Magazine*, SAE has evolved since its inception, but there is still a need for teachers to expand the use of experiential learning component of SAE.

The fundamental concepts of experiential learning are experience, reflection (looking back and evaluating) and transfer (using this new knowledge in the future). Agricultural educators understand the experience part and do it very well given the context in which we teach. However, the reflection and transfer are more difficult to accomplish without some effort. In formal, school-based agricultural education, we have the vehicles – one being SAE – to model the experiential learning process. We just need an improved structure and process that fits the agriculture teachers' and students' needs.

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Upcoming Themes for *The Agricultural Education Magazine*

July/August	**Maintaining an Adequate Supply of Agricultural Education Teachers** Ellen Thompson, ethompson.naae@uky.edu
September/October	**Keeping Up-to-Date: Professional Development Opportunities for Agr Educ Teachers** Nancy Trivette, nancy.trivette@ag.state.nj.us
November/December	**Balancing Career and Family: Preventing Burnout** Jamie M. Cano, cano.1@osu.edu

Experience Programs in Agriscience Education: From Projects to SAEPs and Beyond

by R. Kirby Barrick and Christopher M. Estepp

Introduction

Prior to the adoption of the National Vocational Education Act (Smith-Hughes) in 1917, students (boys) studying agriculture (farming) in schools were involved in hands-on learning. Rufus Stimson had formulated a new way of teaching agriculture, using what he termed the home project method (Moore, 1988) in his school in Massachusetts. The subsequent Smith-Hughes Act specifically called for directed or supervised practice for students enrolled in the newly-established vocational agriculture programs in the public high schools. Students were to be provided the opportunity for such experiences either on the home farm or by the school (Roberts & Harlin, 2007).

Over the years, the concept has developed and the term to describe it has evolved. Students conducted supervised experiences (SOE) as part of their supervised occupational experience program (SOEP); eventually "occupational" was replaced by "agricultural." SAE and SAEP continue to be the common terms (Camp, Clarke & Fallon, 2000). The Vocational Education Amendments of 1963 and 1968 broadened instruction in agriculture but the concept of hands-on experiences continued.

Camp et al. (2000) reported the results of a Delphi panel study about supervised agricultural experience. While several recommendations were posited, no official action has been taken to adopt them.

The most recent national publication regarding SAE is *Experiencing Agriculture: A Handbook on Supervised Agricultural Experience* (Barrick et al., 1992). Definitions, models and descriptions of various types of SAEs were distributed along with lesson plans for teachers to use in the classroom.

The National Research Council study (NRC, 1988) promoted the new dual concept of instruction in agriculture and instruction about agriculture. But with that differentiation in instructional programs, there was no indication that SOEs [sic] should differ among students. Perhaps agriculture teachers have experienced difficulty in identifying suitable opportunities for students studying about agriculture as well as those students studying in agriculture.

Renewed Effort

In March 2010, the National Council for Agricultural Education "created an Experiential Learning Planning Committee as part of the National Council for Agricultural Education . . . [to include a] report on the literature on experiential learning, [and] identify objectives" (unpublished minutes, March 2010). That was translated to the following objectives.

1. To bring all organizations together to create a definition of experiential learning.
2. To identify the educational merits of experiential learning.
3. To add SAE to the college-ready/career-ready conversations.
4. To identify strategies that will help get SAE implemented by teachers.
5. To answer the question, "What does the construct of experiential leaning contribute to learning?"
6. To identify resources that exist to make SAE happen.

The renewed effort to address experiential learning in agriscience leads to two primary questions: (a) Are long-established assumptions about agricultural experience programs still valid? (b) What should be the new, innovative experience programs in agriscience education?

Principles and Assumptions About SAE

A comprehensive review of the literature has been conducted on two topics: experiential learning, and supervised agricultural experiences. From that review a listing of the philosophical and theoretical principles that are frequently used in the study of SAE has been established. The literature also reveals a set of commonly held assumptions about SAE. A report of the research that affirms (or contradicts) those assumptions has been developed.

Theory, Philosophy, Definitions and Assumptions

Various philosophical and theoretical concepts have been reported to be the foundation of SAE. In addition, the concept of experiential learning as developed from Dewey (1938) and expanded by Joplin (1981) and Kolb (1984) provide the background for a definition that pertains to SAE. Likewise, a definition of SAE and models of experiential learning and

SAE have been used for decades. The assumptions that support practice in supervised experience programs, based on the work of Jenkins (2008), include the following. SAE should:

1. be viewed as a program, not a project
2. be planned, with learning objectives and agreements among parties involved
3. require records/portfolio of experiences that are kept by student and teacher and are part instruction and evaluation
4. show evidence of growth in size and scope
5. include evidence of skill/competency/knowledge/expertise development
6. be related to state-approved agricultural content standards
7. be a part of the curriculum, extending beyond classroom and laboratory instruction
8. be required of all students
9. include programs that differ between students studying in agriculture and those studying about agriculture
10. be taught by an instructor who is prepared for and supportive of experience programs
11. be approved by school administration
12. be supported by program advisory committee
13. be supervised year-round
14. ensure that parents are informed and supportive of student involvement
15. require that students invest time, energy and/or money
16. provide for student recognition.

Future Plans

In addition to a report to The Council, the new thinking regarding SAE will be part of the National Agricultural Education Summit in March 2011. In the interim, feedback from teachers, supervisors and teacher educators is welcome. Are the assumptions valid, and how does modern-day experiential learning in agriscience education address those assumptions? Contact the committee chair (kbarrick@ufl.edu) with your comments, suggestions and experiences.

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