The Utilization of Livestock Laboratories in Arizona Secondary Agricultural Education Programs to Promote Student Learning

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A Thesis Submitted to the Faculty of the
DEPARTMENT OF AGRICULTURAL EDUCATION

In Partial Fulfillment of the Requirements
For the Degree of

MASTER OF SCIENCE
WITH A MAJOR IN AGRICULTURAL EDUCATION
In the Graduate College
THE UNIVERSITY OF ARIZONA
2012

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SIGNED: Brandon Paul Watkins
DEDICATIONS AND ACKNOWLEDGEMENTS

*Just keep swimming – Finding Nemo*

Thank you to all of the Arizona secondary agricultural educators that participated in this study. With your input, the Department of Agricultural Education at the University of Arizona can use the data collected to allow for the possibility of this study.

Thank you so much to Department of Agricultural Education for providing funding in the forms of stipends and grants and for the academic resources to conduct this study. Additionally, a great thanks is given to the department for funding me within this journey.

Thank you to the Office of Academic Programs in the College of Agriculture and Life Sciences for providing me with a CALS Grad College Fellowship and the Pistor-Stanley Scholarship. Without these multiple sources of funding, this thesis would be hard to accomplish.

Thank you Dr. Knight, Kristen Vann, Michelle Hintz, and Mr. Molina for withstanding me for so long and helping to keep me positive throughout the process. Thank you to Dr. Torres, Dr. Foor, Dr. Poe, and Dr. Franklin for believing in me throughout the process. Without the CONSTANT assistance and words of encouragement I don’t think I would have finished. Sure I bet you are glad to see me leave, but I’ve learned more than I could ever possibly imagine. I am excited to take what I have learned at the university and become make my future of an agricultural educator, a reality.

To my awesome friends in the graduate program, I will miss you so dearly. There have been some great laughs and cries (Mostly me) about this pain-staking process. Special thanks to my close friends; Amanda, Marisa, Debora, Kristen, Kaitlin and my fellow Gumba till the bitter end Cassie.

Amanda: I still remember the time we spent being TA’s for Dr. Foor. The stories we told will live and die in the Family and Consumer Sciences building.
Marisa: I will always remember all the awesome times we had in shop and trying to clean up and fix Cassie’s “Shop issues.”

Debora: Man oh might, I never thought I would find someone that could hold a piece of wood in shop and make it inappropriate. I found someone and it’s your alter ego, Dee Dee!

Kristen: From the get go you were an awesome friend. You always had a crazy story like almost getting arrested, to situations at your previous work.

Kaitlin: You are such a positive person and I am glad we became friends from the get go. AGTM 100 was a blast because I had friends like you to keep me laughing.

Cassie: Girl, all I have to tell you is good job. We have made it thought the rough of the storm and now we are home free. You have been an asset to me completing this thesis and this program. Without my fellow Gumba, this storm would have been overwhelming and my hypothetical floaties would have taken me out.

I want to especially thank my family and friends. Without your love and support this thesis and Master’s degree would have been overwhelming and impossible.

To the love of my life, I’m sure you deserve this more than I do. I know things got hard, but you were one of the motivations for finishing and I am overwhelmed with excitement to be marrying my best friend. I am just glad that now it is all over we get to start our lives together. I just remember the late nights of chapter Two and the chaos of my office. I love you my Boo Bear.

To my mom and dad, you guys believed in me and supported me though the whole process and now I can finally say I’m done with this part of my educational life.
To my siblings: Kristina, Drew, Grant you guys have had a part to play with me completing this thesis. If it was listening to me complain about the process or just being supportive. I love you guys.

Special dedication to both my grandpa’s, while you guys blessed the world with your presents here, you two always were a huge motivation to my success, educationally. You guys have been missed, but I know you too gentleman have guided me though this whole process and how up when you needed the most.

This thesis has been nothing besides a miracle to complete and there is no way it would have been completed without the help of god.
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Abstract

The purpose of this study was to determine the utilization of livestock laboratories in Arizona secondary agricultural education programs to promote student learning and the teachers perceived abilities to utilize Kolb’s experiential learning cycle to deliver a concrete experience, reflective observation experience, abstract conceptualization experience, and active experimentation experience within the school’s livestock laboratory. This study describes how livestock laboratories are utilized in secondary Arizona agricultural programs to promote student learning. The design used for this study was descriptive in nature, gathered data from a group of individuals, and sought to determine mean means and frequencies of those teachers that utilize their school’s livestock laboratory. The study conducted was a census and the entire population received a questionnaire. The agriculture teachers had the option to respond that their school did not have a livestock laboratory to ensure all agriculture teachers had the option to respond. A mailed questionnaire to the 93 Arizona secondary agricultural educators and resulted in a final response rate of 82% (n = 76). The educators found a school’s livestock laboratory was used to moderately promote student learning within Kolb’s for learning constructs.
CHAPTER 1: INTRODUCTION

Background and Settings

Aristotle, a Greek critic, philosopher, physicist, and zoologist explained, for the things we have to learn before we can do them, we learn by doing them. The concept from Aristotle has been molded over thousands of years into a tangible learning model known as experiential learning (Tirmizi, 2000). Kolb wrote “learning is the major process of human adaption. This concept of learning is considerably broader than that commonly associated with the school and classroom. It occurs in all human settings, from schools to the workplace, from the research laboratory to the management board room, in personal relationships and the aisles of the local grocery store” (1984, p. 32). When exploring experiential learning four significant individuals were recognized for the assembly of this concept: John Dewey, Jean Piaget, Kurt Lewin, and David Kolb (Tirmizi, 2000). Experiential learning is the most commonly used learning style within laboratories, where students learn by doing through hands-on experiences (Tirmizi, 2000).

Laboratories such as greenhouses, agricultural mechanics laboratories, and livestock laboratories have been critical in guiding experiential learning in secondary Agricultural Education programs (Cheek & Arrington, 1990). Arizona agricultural livestock laboratories are a very important part of Agricultural Education because these laboratories allow students to have a hands-on learning experience. Fred Amator (1971), a graduate student from the University of Arizona wrote, “School land-livestock laboratories have been used many years for the purpose of providing vocational agriculture students with a variety of agricultural experiences while retaining the concept of ‘learning by doing’” (p. 74). Due to the outdated and limited literature on livestock laboratories in general, a study must be conducted to have a better understanding of
how livestock laboratories are being utilized to promote student learning within secondary Arizona agricultural programs.

Laboratories

A laboratory is defined as “an area equipped for students’ experimentation, research, or study” (Talbert, Vaughn, & Croom, 2005, p. 516). Laboratories are the perfect place for students to be in a controlled environment, which is supervised, to complete experiments and projects (Talbert et al., 2005). These laboratories provide a foundational basis of knowledge through the use of experiential learning (Phipps, Osborne, Dyer, & Ball, 2008). Laboratories can have different uses in many fields such as biology, natural resources, chemistry, agriculture, and other related sciences (Warner, Arnold, Jones, & Myers, 2006). Laboratories are a necessity and have been recognized as one of the more valuable learning tools. Oomes and Jurshack (1978) wrote, “The use of laboratory facilities to enhance the ability of learners in developing the needed skills has long been applauded…” (p. 31).

Experiential Learning

Students have numerous amounts of hands-on experience through activities within livestock laboratories, greenhouses, agricultural mechanics laboratories, or any school facility where experiments are completed (Cheek & Arrington, 1990). Experiential learning encourages students to be actively engaged in their learning, and to apply acquired knowledge from the classroom to build a comprehensive understanding of physical science. Experiential learning allows individuals to actively problem solve and rely on their own decision making, thus learning individual accountability as well (Warner et al., 2006). There are many opportunities for experiential learning within the school and home environment, depending on the resources of the community and/or individual interest.
Laboratory/Classroom Instruction

Laboratory instruction is “organized instruction occurring in laboratories that, compared with classroom instruction, provides for greater freedom of movement for students, focuses on psychomotor skills development, uses special tools and equipment, and uses student self-directed learning; educational emphasis is placed on the application of hands-on learning through the conducting of experiments and the simulation of real world experiences” (Talbert et al., 2005, p. 516). Laboratory instruction involves teaching within a laboratory and learning activities through hands-on learning (Talbert et al., 2005). Franklin (2008) wrote, “Students use of the specialized facility reinforces essential concepts taught in the classroom, making greater strides toward student achievement” (p. 44). Laboratories give students the environment to practice skill sets and to develop and learn concepts kinesthetically (Phipps et al., 2008). Laboratory instruction needs to be effective within the teaching requirements for students to fully understand and enhance skill acquisition, retention, and transfer (Phipps et al., 2008).

The use of specialized laboratories help to promote a positive attitude towards science based fields and experiments. Laboratories allow for real-time application of content learned in a classroom setting. Physical practice within a laboratory setting is an essential element to develop psychomotor skills (Phipps et al., 2008). Phipps et al. describe the importance of the idea of practicality in education; it allows for interest in the information and motivates students to seek for details. Application is the use of skills in the real world, this is also known as the “next level” of learning. Practice occurs under the supervision of an instructor within a laboratory, thus providing instant feedback and gratification for correct procedures (Phipps et al., 2008). Laboratories are crucial for students to go to the “next level” of learning through practice and application (Phipps et al., 2008).
Agricultural Laboratories

Agricultural laboratories are a major component of high quality Agricultural Education programs (Talbert et al., 2005). Agricultural Education programs range from middle school through college (Talbert et al., 2005). Laboratories are a crucial component of the teaching and learning program for education in agriculture. In Agricultural Education, agricultural laboratories can be a specialized laboratory, such as an agricultural mechanic shop, school farm, or a greenhouse facility (Franklin, 2008). Agricultural laboratories are areas in which students create projects and complete experiments through experiential learning. Agricultural laboratories include agriscience, food science, aquaculture, agricultural mechanics, horticulture, plant and soil science, animal science, natural resources, and livestock laboratories (Talbert et al., 2005). These nine agricultural laboratories are keen to promoting experiential learning in secondary Agricultural Education programs.

Statement of the problem

The use of experiential learning has been clearly stated within the subject of agriculture; however there is little concern to how experiential learning is used specifically used within livestock laboratories. Furthermore, there is limited content and research supporting of how land/laboratories promote student learning. The Department of Agricultural Education at the University of Arizona (1972), defined a livestock laboratory as “an extension of the classroom, crops and livestock enterprises. They should be short term, and should not be expected to be profitable” (p. 5). After an exhaustive literature review, there are limited to no details on livestock laboratories and the utilization of livestock laboratories. Knowing this, the problem statement follows: How are livestock laboratories utilized in Arizona secondary Agricultural Education programs to promote student learning?
Purpose of the Study

The purpose of this study was to describe how livestock laboratories are utilized in secondary Arizona agricultural programs to promote student learning. Specifically, the following research objectives guided the study:

Research Objectives

1. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a concrete experience. (Feeling)
2. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a reflective and observation experience. (Watching)
3. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an abstract conceptualization experience. (Thinking)
4. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an active experimentation experience. (Doing)
Significance of the Study

This study was deemed appropriate because the lack of current knowledge and findings on the utilizations and general information on secondary Arizona agricultural livestock laboratories. A need for this study was created by the researcher because the last found published resource on the utilization livestock laboratories was found to be written in the early 1970s.

In 1972, The University of Arizona published a handbook, which defined the techniques and guidelines in utilizing livestock laboratories in secondary Arizona agricultural programs. This handbook specifically mentions guidelines, legal aspects, and suggests outline for developing and maintaining a livestock laboratories. In 1971, Amador published an article in the magazine of Agricultural Education, addressing the structural framework of livestock laboratories. Amador (1971) also included which Supervised Agricultural Experience (SAE) projects should be implemented for all four class years in secondary Arizona agricultural programs.

The results of this study will contribute valuable information for the utilization, basic components, and how livestock laboratories promote student learning. Teachers and administrations at University of Arizona and secondary Agricultural Education programs will benefit from this research because livestock laboratories are vital for promoting student learning. This research will express livestock laboratories and there importance within secondary Agricultural Education programs.
Definition of Terms

Experiential Learning

Experiential learning provides an opportunity for students to actively engage in their experiences of learning and apply, through testing, acquired knowledge from the classroom to build a comprehensive understanding of physical science (Warner et al., 2006).

Agriculture Education

Vocational Education refers to the refined term known as “Agricultural Education,” which is a systematic program of instruction in agriculture and natural resources at the elementary, middle school, secondary, postsecondary, or adult level. This education has helps and guides students to: (1) Preparation for entry positions in an occupational or professional occupation, (2) Job entrepreneurship, and (3) Agricultural Literacy (Phipps et al., 2008, p. 527).

Career and Technical Education (CTE)

Organized educational activities that offer a sequence of courses that provides individuals with coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in current or emerging professions. CTE provides technical skills proficiency, an industry-recognized credential, a certificate, or an associate degree (ACTE, 2006).

Greenhouse Laboratory

A greenhouse is a structure with different types of covering materials, such as a glass or plastic roof and frequently glass or plastic walls; it heats up my utilizing incoming visible
solar radiation. Used to provide ideal environment for tropical plants and/or protect plants from extreme weather (Talbert et al., 2005).

_Agricultural Mechanics Laboratory_

Agricultural Mechanics Laboratory is mechanical shop that allows students to have direct hands-on experience with skills like, woodworking, metals and welding, large engines and hydraulics, small engine, electricity, and plumbing (Talbert et al., 2005).

_Livestock Laboratory_

A livestock laboratory is defines as an extension of the classroom, crops and livestock enterprises. They should be short term, and should not it should not be designed for profit (University of Arizona, 1972).

Limitations of the Study

The results of this study cannot be generalized to other agriculture secondary agricultural programs, outside of Arizona or to non-respondents. Some schools may not have a livestock laboratory therefore, asking the effectiveness of the livestock laboratory would not be relevant.

Basic Assumptions

Several assumptions were made due to the nature of this study. These study assumptions are as follows:

1. The data will be received, and processed within a reasonably timely manner.
2. All the reported data from the secondary Arizona agriculture teachers were complete and precise and formatting of data was consistent.
3. All teachers will have a basic knowledge of livestock laboratories.
4. All teachers will respond truthfully to the administered questionnaire.
5. All teachers will not feel the incentive for completing the questionnaire was intended to create biased results.
CHAPTER 2: LITERATURE REVIEW

Purpose of the Study

The purpose of this study was to describe how livestock laboratories are utilized in secondary Arizona agricultural programs to promote student learning. Specifically, the following research objectives guided the study:

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1. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a concrete experience. (Feeling)

2. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a reflective and observation experience. (Watching)

3. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an abstract conceptualization experience. (Thinking)

4. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an active experimentation experience. (Doing)
Historical Background

General discussion of vocational education in the United States was first brought to the federal legislation in 1862 and then again in 1890. Congress passed the Morrill Act in 1862, which provided aid to higher education (Lynch & ERIC, 2000). Lynch and ERIC wrote, “The Hatch Act of 1887 and the Adams Act of 1906, were two acts which allocated aid to agricultural experiment stations; these acts set-up the groundwork for the Smith Lever act of 1914.” The Smith–Lever Act of 1914 established a system of cooperative extension services connected to the land-grant universities in order to inform people about current developments in agriculture, home economics, and related subjects (Smith-Lever Act, 1914). This act of 1914 helped farmers learn new agricultural techniques through home instruction. Later in 1917, the Smith-Hughes National Vocational Education Act, also known as the Smith-Hughes Act, was put in place to adjust the Smith-Lever Act (Lynch & ERIC, 2000).

The Smith-Hughes Act was an expansion and modification of the 1914 Smith-Lever Act and both where based largely on a report and recommendation from Charles Allen Prosser’s Report of the National Commission on Aid to Vocational Education (Gadell, 1972). The Smith-Hughes Act set the foundational framework in promoting and funding vocational education to students in elementary and secondary education schools, by funding vocational education (Hillison, 1987). Essentially, The Smith-Hughes Act was the “rising influence of the progressives resulting in a series of changes at both the elementary and secondary level and in the way agriculture was taught in the schools” (Hillison, 1987). Vocational education was known as technical education and training, which prepared trainees or students for jobs based on manual or practical activities. Traditionally known as non-academic, activities are very specific to a certain trade, occupation, or job (Hillison, 1987). Vocational education is referred to as technical
education, because the trainee directly develops expertise in a particular group of techniques or technologies (Hillison, 1987). Lynch and ERIC (2000) stated, “The earliest vocational programs were grounded primarily in the need to prepare more immigrants and blue collar-type workers with particular skills for the nation’s farms, factories, and homes” (p. 9).

From 1900 to 1916, professional agricultural teacher education was finally recognized (Hillison, 1987). This period was known as a social Darwinism, which helped to catapult educational programs for gifted and talented individuals (Hillison, 1987). In the early 20th century, Agricultural Education became a sought after program. Hillison (1987) wrote, from 1906-1907 less than 100 public secondary schools had Agricultural Education programs, but in 1929 there were a total of 3,675 public secondary schools with Agricultural Education programs. The increase and expansion of Agricultural Education programs was most likely due to “the growing need to prepare young people for jobs created as a result of the industrial revolution” (Rojewski, 2002, p. 11). On March 12, 1917 Arizona was the third state to accept The Smith-Hughes act of 1917 (Stimson & Lathrop, 1942).

During the 1960s, vocational education experienced another large, exponential boom because of the technological advances and the need for skilled labor. The gap between the wealthy and poor widened; poverty stricken areas could not be ignored. Congress responded to this gap by enacting the Manpower Development and Training Act of 1961 (MDTA), followed by the Vocational Education Act of 1963 (VEA). A large change in federal policy altered direction in the early 1960s with the Vocational Education Act of 1963. The Vocational Act of 1963 was created to “serve poor and disabled persons and youth in economically depressed communities who had academic, socioeconomic, or other disadvantages that prevented them from succeeding in regular vocational education programs” (Lynch & ERIC, 2000, p. 9). In

One change did occur; Vocational Education was renamed Career and Technical Education. Lynch and ERIC (2000) wrote, “In December of 1998, the members of the American Vocational Association (AVA) voted to; change the name of their professional association to the Association of Career and Technical Education [CTE]” (p. 2). The most recent Perkins act, Perkins IV, was a reauthorization of the Carl D. Perkins Act of 1998. Perkins IV ultimately intended to strengthen the focus on responsiveness to the economy, while tightening up the accountability statement in regards to the integration of academic and technical standards” (Howell, 2007, p. 2).

The term CTE was used for several years before 1998, but Perkins IV was the first piece of legislation to officially implement the name. In 2006, the Carl D. Perkins Act was authorized for six years and is expected to allocate more than $1.3 billion in federal aid to CTE programs throughout all states (ACTE, 2006). Almost 50 years after the Smith–Hughes Act was established, the purpose of vocational education remained largely the same (Rojewski, 2002). Lynch and ERIC (2000) tell us that vocational education in secondary schools is now referred as to career and technical education.

Career and technical education has three known components: (1) Classroom/Laboratory Instruction (2) Supervised Agricultural Experience Programs (3) FFA Student Organization (Department of Public instruction, 2011).
(1) Classroom/Laboratory Instruction- quality instruction in and about agriculture that utilizes a "learning by doing" philosophy.

(2) Supervised Agricultural Experience Programs – programs provide individual instruction, but also give teachers an opportunity to develop a face-to-face relationship with parents and employers. With supervision from a quality agriculture educator, students should develop competencies, related interests, and career goals (Phipps et al., 2008; Talbert, et al., 2005).

(3) FFA Student Organization activities/opportunities – FFA activities are an integral part of the Agricultural Education program all Agricultural Education students should participate in FFA activities if they are to fully benefit from their enrollment in the program (Agricultural Education Program of Study, 2011).

Classroom/ laboratory instruction and supervised agricultural experience programs utilize experiential learning and hands-on learning to promote student education. Clark et al., wrote, “Experiential learning has been a major component of career and technical education for many years…” (p. 1). Experiential learning is any means by which an individual uses direct physical experience to gain knowledge and skills in a controlled environment (Warner et al., 2006).

Experiential/hands-on learning harkens back to Aristotle, who said, "For the things we have to learn before we can do them, we learn by doing them” (Bynum & Porter, 2005, p. n/a).

Experiential Learning

Experiential learning is any means by which an individual uses direct physical experience to gain knowledge and skills in a controlled environment (Warner et al., 2006). Many educators describe experiential learning as a “series of pragmatic activities sequenced in such a way that it is thought to enhance the educational experience” (Clark, Theeton, & Ewing, 2010, p. 1).

Practices are done in an authentic environment, utilizing models and behaviors specific to the
exercise, as well as appropriate feedback based on the work of the individual allowing him/her to apply hands-on knowledge to new situations (Knobloch, 2003). Although experiential learning is closely related to supervised agricultural experiences (SAE), it has more emphasis on learning in real-life contexts. A major contributor to the model of experiential learning was John Dewey. Dewey explained that “the continuity of experience motivates the learner to form attitude and desire for continuous learning” (Knobloch, 2003, p. 26).

Experiential learning encourages students to be actively engaged in their learning and to apply acquired knowledge from the classroom to build a comprehensive understanding of physical science. This comprehensive learning allows the individual to actively problem solve and rely on their own decision making, thus learning individual accountability (Warner et al., 2006). Experiential learning influences positive future experiences, as much of our perception is influenced by past experiences. The Department of Agricultural Education at the University of Arizona (1972) wrote, “… programs in Agricultural Education have adhered to the basic tenet that classroom theory must be intergraded with practical, realistic, hands on application” (p. 1).

Within Agricultural Education, learning experientially has been the foundation of teaching. Experiential learning in agriculture was greatly influenced by educational beliefs of academic philosophers in the early 20th century. The “father” of Agricultural Extension Education, Seaman A. Knapp presented the philosophy, “what a man hears, he may doubt, what he sees, he may also doubt, but what a man does, he cannot doubt” (Knobloch, 2003, p. 28). Knapp stressed the importance of “learning by doing”, and encouraged agriculture teachers to have practical instruction with easy application and purpose” (Knobloch, 2003, p. 26). Students who are taught through experiential learning show improved achievement, motivation, and work ethic. Due to the importance of learning by experience, agriculture teachers who use the
experiential learning model based on the philosophies of Dewey and Knapp are likely to provide a “sound psychological framework for learning” (Knobloch, 2003, p. 26).

There are many opportunities for experiential learning within the school and home environment. These opportunities may be dependent on the opportunities, especially agriculturally, within a given community as well as the interest of the individual (Cheek & Arrington, 1990). Within a laboratory setting, numerous activities may be performed. Students can gain hands on experience through livestock laboratories, green houses, agricultural mechanics laboratories, or any school facility (Cheek & Arrington, 1990). Clark et al. (2010) describes, “Experiential learning could naturally align with a contemporary career and technical education and/or Agricultural Education program, which prepare students for advanced level occupations in the workplace or post-secondary education” (p. 2). CTE “programs have integrated classroom instruction with laboratory experiences to provide students a significant opportunity to learn” (Clark et al., 2010, p. 1).

Laboratory/Classroom Instruction

Laboratory instruction is “organized instruction occurring in laboratories that, compared with classroom instruction, provide for greater freedom of movement for students, focus on psychomotor skills development, use special tools and equipment, and use student self- direction learning; educational emphasis placed on the application of hands-on learning through the conducting of experiments and the simulation of real world experiences” (Talbert et al., 2005, p. 516). Laboratory instruction involves teaching within a laboratory and learning activities, through hands-on learning (Talbert et al., 2005). Laboratories give students the environment to practice skill sets, and develop firsthand performance by allowing the student to develop and
learn kinesthetically (Phipps et al., 2008). Phipps et al. (2008) stated laboratory instruction involves students in experimentation, manipulation, practice, and performance.

Laboratory instruction must be effective and within students composition levels for a full understand to enhance skill acquisition, retention, and transfer of knowledge (Phipps et al., 2008). The use of specialized laboratories helps to promote a positive attitude towards science-based fields and experiments. When poor laboratory instruction is inducted into a program, science-related topics and interests are reduced drastically (Phipps et al., 2008). When laboratories are used as a teaching and learning tool, a foundational base of knowledge will help to stimulate mental cognitive growth (Talbert et al., 2005).

Laboratories allow for real-time application of content learned in a classroom setting. Physical practice within a laboratory setting is an essential element for the development of psychomotor skills (Phipps et al., 2008). The idea of practicality in education is critical; this allows for interest in the information and drives students to seek for details. In reference to laboratories, students can explore outside of the general content and develop skills practical to real-life application (Talbert et al., 2005). Application and practice are two skill sets that are used in a laboratory. Application is the use of skills in the real world; this is also known as the “next level” of learning (Phipps et al., 2008). Practice occurs under the supervision of an instructor within a laboratory, allowing for instant feedback and gratification for correct procedures (Phipps et al., 2008). Laboratories are crucial for student to achieve the “next level” of learning and inner-web practice within a laboratory and application (Phipps et al., 2008).

Kolb’s Learning Styles

Experiential learning theory offers fundamentally different views from those of from behavioral theories and implicit theories (Kolb, 1984). Kolb wrote, “the most different
perspective emerge some very different prescriptions of the conduct of education, the proper relationships among learning, work, and other life activities, and the creation of knowledge itself” (Kolb, 1984, p. 20). The perspective learning which Kolb mentions is called “Experiential learning”. There are two clearly reasons why this learning style is called experiential learning. The first is its intellectual origins from the work of Dewey, Lewin and Piaget and the second reason is to emphasize the central role that experience plays in the learning process (Kolb, 1984). Kolb explains, “The aim of this work is not to pose experiential learning theory as a third alternative to behavioral and cognitive learning theories, but rather to suggest through experiential learning theory a holistic integrative perspective on learn that combines experience, perceptions, cognition, and behavior” (1984, p. 20-21).

Kolb wrote “to learn is not the special province of a single specialized realm of human functioning such as cognition or perception” (Kolb, 1984, p. 31). Experiential learning is said to involve the integrated functioning of the total organism –thinking, feeling, perceiving, and behaving (Kolb, 1984, p. 31). Experiential learning has evolved with guidance of educational philosophers and methodologists over the past fifteen years (Tirmizi, 2000). Tirmizi wrote, “Amongst those whose work significantly influenced the evolution and development of experiential philosophy and principles four individuals stand out” (2000, p. 3). These inquisitive individuals include John Dewey, Kurt Lewin, Jean Piaget, and David Kolb, all of whom are credited for developing the foundational framework of experiential learning (Kolb, 1984; Tirmizi, 2000).

“When learning is conceived as a holistic adaptive process, it provides conceptual bridges across life situations such as school and work, portraying learning as a continuous, lifelong process. Similarly, this perspective highlights, the similarities among adaptive/learning activities
that are commonly called by specialized names—learning, creativity problem solving, decision making, and scientific research” (Kolb, 1984, p. 32-33).

Dewey (1938) offers knowledge which conflict between “traditional” education and his well-known “progressive” approaches for education. Dewey concentrated his study on experiential learning for higher education (Kolb, 1984). The core of Dewey’s work rationalized the idea that truth and knowledge are not stable but rather continuously evolve (Dewey, 1938). According to the findings of Dewey, all of one’s experiences influence one’s knowledge base and modify what is considered to be the truth (Dewey, 1938). The educational process “should recognize the importance of experience and be participatory and experience based” (Tirmizi, 2000, P. 3). Kolb (1984) describes how Dewey’s model of the learning process as being closely related to Lewinian model.

Kurk Lewin was a social physiologist who, was known for his vast knowledge base and his “profound influence on the discipline of social psychology and on its practice counterpart, the field of organizational behavior” (Kolb, 1984, p. 8). Lewin’s work with group dynamics in methodology was key component for action research (Kolb, 1984). From Lewin’s research in group dynamics, fundamental to the concept of laboratory-training methods and T-groups (T= training). This was possibly the most powerful educational innovation of this century (Kolb, 1984). The Lewinian model was based off of “feedback process by describing how learning transforms the impulses, feelings, and desires of concrete experience into higher order purposeful action” (Kolb, 1984, p. 22).

Lewin explains immediate concrete experiences are the basis for observation and reflection, which then these observations are assimilated into a “theory” and later lead to the creation of guidelines to act on new experiences (Kolb, 1984). Lewin was also well-known for
his here-and-now concrete experience to validate and test abstract concepts. Lewin denotes, “immediate personal experience is the focal point for learning, giving life, texture, and subjective personal meaning to abstract concepts and at the same time providing a concrete, publicly shared reference point for testing the implication and validity of ideas created during the learning process” (Kolb, 1984, p. 21). Lewin views the main aim of the laboratory methods and action research is to integrate these two perspectives into an effective, goal-directed learning process. Essentially Lewin played a major role in steering the foundational framework to allow Kolb to develop his model of experiential learning.

Another founding father for experiential learning is Jean Piaget, a French psychologist and epistemologist (Tirmizi, 2000). His work was based on describing how intelligence (learning) is shaped by experience. Learning is the product of interaction between a person and his environment, the action within this experience is key (Tirmizi, 2000). Piaget placed great importance on the education of children.

In the book Experiential Learning, David A. Kolb (1984) defined experiential learning as, “the process whereby knowledge is created through the transformation of experiences. Knowledge results from the combination of grasping and transforming experience” (p. 41). Kolb is widely-reputed for his “achievement in providing the missing link between theory and practice between the abstract generalization and the concrete instance between the effective and cognitive domains” (Kolb, 1984, p. 16). Kolb’s model portrays two dialectically related models of “grasping” experience: Concrete Experience (CE) and Abstract Conceptualization (AC). Two other related models are Reflective Observation (RO) and Active Experimentation (AE) (Kolb, Boyatzis, & Mainemelis, 2001). These relationships are depicted in figure # 1. Kolb describes a four-stage learning cycle model, which includes: Concrete Experience, Observation Reflection,
Abstract Conceptualization, and Active Experimentation (Boyatzis et al., 2001). Within these learning stages there are definitions for each of the following transitional states: Diverging, Assimilating, Converging, and Accommodating (Boyatzis et al., 2001). Kolb's model, therefore works on two levels a four-stage cycle:

1. Concrete Experience - (CE)
2. Reflective Observation - (RO)
3. Abstract Conceptualization - (AC)
4. Active Experimentation - (AE)

Kolb’s model also has a four-type definition of learning styles. These four styles are definitions of ones traits:

a. Diverging (CE/RO)
b. Assimilating (AC/RO)
c. Converging (AC/AE)
d. Accommodating (CE/AE)
Kolb’s Learning Styles

In more detail Kolb defines, four words for each corresponding items within the four learning styles - concrete experience (feeling), reflective observation (watching), abstract conceptualization (thinking), and active experimentation (doing) (Kolb, 1984). These words are key for having an understanding about the mental process in which occurs during each individual.

A concrete experience is when the students are able to involve themselves fully, openly, and without bias in new experiences (feeling) (Kolb, 1984). A concrete experience is much like...
shearing a sheep, the activity is a hands-on and a real-time experience that lead to a learned skill (Kolb, 1984). Concrete Experience is designed to immediately engage students in the learning process, unlike any other strategy (Phipps et al., 2008). This experience is ideal for the beginning of the learning process because “it motivates, clarifies, provides exposure and context, creates awareness and readiness, stimulates questions and creates uncertainty” (Phipps et al., 2008, p. 190). A well-planned, concrete experience engages students in the learning process better than other experiences, because the students have self-interest and involvement in the process (Phipps et al., 2008). Students should have a direct experience with the phenomenon; which allows the students to focus on what is currently happening, rather than try and recollect past experiences (Phipps et al., 2008). Students then think about what happened within the concrete experience and leads to the second stage of experiential learning: reflection/observation (Phipps, et al., 2008).

The second stage of Kolb’s experiential learning cycle is reflection observation (watching). Students must “be able to reflect on and observe their experience from many perspectives” (Kolb, 1984, p. 30). Concrete experience is the process of initially responding to the experience by mentally replaying, becoming aware of positive and negative feelings, and evaluating the experience (Phipps et al., 2008). Reflective process is known as reflection or a reflective activity, which allows students to create new knowledge by interlocking the new experience with their current knowledge. The reflection validates feelings and enhances the experience (Phipps et al., 2008). Many individuals believe the process of reflection is the most powerful element to the experiment, and can be enhanced when performed alongside other individuals (Phipps et al., 2008). Phipps et al. (2008) stated, “Students then use inductive reasoning to form concepts, principles, and generalizations about the experience” (p. 191).
The third stage is abstract conceptualization (thinking), observations are connected to the student’s current knowledge, teacher’s knowledge, and experts in the field. Kolb wrote, the student must “be able to create concepts that integrate their observations into logically sound theories” (1984, p. 30). After the student has generalized and conceptualized the experience, teachers verify accuracy and validity, and then the student modifies student’s generalization (Phipps et al., 2008). Abstract conceptualization is where the student makes relativity of all current knowledge on a given topic and then knowledge is brought out through direct instruction, inquiry, and classroom discussion (Phipps et al., 2008). The final and most crucial stage of learning is active experiment, where students “apply their newly formed generalizations to new situations” (Phipps et al., 2008, p. 191). These new learned skills can be leveraged to motive students to seek out new experiences (Phipps et al., 2008).

Active experimentation (doing) is defined as a process of completing a task that has done a full rotation within all of the other three learning styles. Kolb wrote, students must be “able to use these theories to make decisions and solve problems” (Kolb, 1984, p. 30). Here the students are able to apply all the other three stages, of feeling, watching thinking, and doing (Kolb, 1984). This learning style emphasizes practical application as opposed to reflective observation (Kolb, 1984).

Agricultural Laboratories

One of the primary reasons for agricultural education laboratories is to provide the application of the instruction taught in the classroom (McCormick, 1994). Talbert et al. (2005) wrote, the understanding that agricultural laboratories include: agricultural mechanics, greenhouses/ (horticulture) and livestock laboratories. Agricultural laboratories are areas in which students create projects and complete experiments through experiential learning. The three
major facilities in secondary agricultural programs promote learning through the use of hands-on experience. Agricultural laboratories are composed of three major facilities: greenhouses, agricultural mechanics laboratories, and livestock laboratories (Franklin, 2008).

Agricultural Mechanics Laboratories

Agricultural mechanic laboratories focus of the development of all of the skills and abilities that are needed in the mechanics portion of agricultural activities. Educational instruction must include teaching in the classroom as well as the opportunity for experiential learning, which helps students learning the manipulative skills of agricultural mechanics. In agricultural mechanics education, the development of psychomotor skills is critical; much of the instruction takes place in the school agricultural mechanics laboratory (Johnson, Schumacher, & Stewart, 1990). Oomes and Jurshack (1978) wrote that agricultural mechanics “…laboratory exercises provide the necessary skill development to allow students…to operate equipment in a proper and efficient manner” (p. 39). The use of agricultural mechanic laboratories has shown to enhance the ability of students in developing the needed skills and knowledge to become successful in the classroom (Oomes & Jurshak, 1978).

Greenhouses Laboratory Facilities

Laboratories used in the studies of horticulture encompass a wide variety of facilities ranging from greenhouses, head houses, landscaping areas for both indoor and outdoor along with areas used for floriculture, aquaculture and hydroponics (Talbert et al., 2005). A popular type of laboratory within horticulture is the greenhouse for landscaping facilities (Talbert et al., 2005). Rothenberger and Stewart’s (1995) conducted a study to determine if there was a significant difference in attitudes towards horticulture, among, student whose programs utilized classroom instruction as well as greenhouse laboratories and students whose programs consisted
solely of classroom instruction. Rothenbergers and Stewart (1995) found, students who
experienced dual learning through greenhouse laboratory experiences and classroom instruction
scored significantly higher on a knowledge test than the students who were taught the same
lessons without the greenhouse laboratory experience. Limited research is available when
“discussing the greenhouse facility as an effective teaching laboratory in Agricultural Education
(Franklin, 2008, p. 13).

In 2008, Franklin described the status of greenhouse facilities in secondary Agricultural
Education programs throughout Arizona. With teachers input he found that the greenhouse can
be an effective tool for teaching math and science concepts to students (Franklin, 2008).
Unfortunately, these Arizona Agricultural Education teachers have limited resources and
background to support a sustainable and productive greenhouse (Franklin, 2008). The teachers’
lack of knowledge is due in large part to insufficient instruction in managing greenhouses.
Franklin (2008) wrote, “Agricultural Education instruction in Arizona uses greenhouse facilities
as a way to provide hands-on (psychomotor) instruction to apply plant science knowledge
(cognitive) delivered in the classroom” (p. 44). Students’ use of the specialized laboratories and
facilities is essential for reinforcing concepts taught in the classroom, allowing students to have
further educational success (Franklin, 2008).

Livestock Laboratories

Livestock laboratories have been a part of secondary Agricultural Education to promote
student learning since vocational education (University of Arizona, 1972). Livestock laboratories
can range from SAE livestock projects to agriculture crop production (Talbert et al., 2005).
Livestock laboratories are designed to be an extension of classroom learning activities to
facilitate the practical, realistic application of the concepts and principals studied in the
classroom (University of Arizona, 1972). When organized and utilized in the above order, these laboratory facilities will supplement and enhance the continuing curriculum in operation. The schools responsible to ensure students develop competencies in the field of agriculture; experiential learning in a livestock laboratory is one method of assuring students’ competencies (University of Arizona, 1972).

Livestock laboratories can become an effective tool to assist teachers in achieving educational objectives (University of Arizona, 1972). A well-managed, diverse livestock laboratory can provide many learning opportunities for students (Phipps et al., 2008). Amator (1971) wrote, “a school operated laboratory can provide the facilities for demonstration teaching and practical agricultural experiences for students and continuously to positive student motivation and interest” (p. 74). Instructors must be continuously evaluated the effectiveness of their special laboratories while seeking, improvements to better link classroom and laboratory experiences (Phipps et al., 2008). Essentially, livestock laboratories offer limitless possibilities for promoting student learning, but making such possibilities a reality is difficult to achieve with a constantly evolving livestock laboratory (University of Arizona, 1972).

Livestock laboratories facilities should be designed using a master plan in order to build in as many learning experiences as possible (Talbert et al., 2005, p. 185). Teachers must learn to adapt to the evolution of experiences; the must ask frequent questions to help them evaluate the effectiveness of livestock laboratories (Phipps et al., 2008). The following questions are outlined by the advisory council members to evaluate the effectiveness of livestock laboratories:

What is the purpose of the land laboratory?

- How can I (the teacher) ensure that genuine learning takes place?
- How should students participate in managing the land laboratory?
• How should financial profits for land laboratories be used / dispersed?
• How should capital improvements of the land laboratory be financed?
• How will students be transported to and from the land laboratory?
• Under what rules will govern students’ employment on the land laboratory?
• How will land laboratories be maintained during the holiday seasons?
• What conditions will students be allowed to operate machinery on the land laboratory?
• How can the livestock laboratory be used to support students’ SAE programs?

The University of Arizona (1972) has provided guidelines for the way in which a Land/laboratory should provide an extension of the classroom to promote learning. Guidelines include:

1. The Laboratory should provide laboratory experiences for those principals studied in the classroom.
2. The Laboratory should be located as near to the high school campus as possible.
3. Facilities for students’ projects should not interfere with the class planned activities.
4. Demonstration plots should be emphasized rather than basic reach experimentation.

(Phipps, 2008, p. 325)

Amator (1971) wrote, “Studies indicate that school livestock laboratories have disadvantages which have caused vocational agriculture teachers to discontinue use and discouraged others from initiating their operations” (p. 74). With decreasing enrollment rates in secondary Agricultural Education programs thought-out Arizona, it is essential to identify new opportunities that connect classroom and real life agricultural situations (University of Arizona, 1972). Arizona has found one such vehicle: the use of livestock laboratories (University of Arizona, 1972). Supervised Agricultural experience within livestock laboratories have served, as
un unparalleled teaching /learning tool in assisting students in applying the concepts and principles taught in the classroom to the world of work in agriculture (University of Arizona, 1972).

Summary

Since the Morrill act of 1862, general understanding of learning stage has changed dramatically. One large component of learning with Agricultural Education is experiential learning. When discussing experiential learning four significant individuals must be recognized for the assembly of this concept: John Dewey, Jean Piaget, Kurt Lewin, and David Kolb. Kolb’s model portrays two dialectically related models of “grasping” experience, which are Concrete Experience (CE) and Abstract Conceptualization (AC); two other related models are Reflective Observation (RO) and Active Experimentation (AE).

Students that have both classroom and laboratory experiences tend to withhold more knowledge than ones with no lab experiences, seen in Rothenbergers and Stewart’s research on greenhouses. Agricultural laboratories are composed of three major facilities: Greenhouses, Agricultural Mechanics Laboratories, and livestock laboratories. Livestock laboratory will actually complement and supplement the continuing curriculum in operation the department of agriculture. Livestock laboratories can become an effective tool to assist the teacher in achieving the educational objectives.

Conceptual Framework for the Current Study

Based on the review of literature and theoretical foundation on experiential learning, Kolb’s model portrays two dialectically related models Concrete Experience (CE) and Abstract Conceptualization (AC) and Reflective Observation (RO) and Active Experimentation. (Kolb, 1984). All four learning processes are incorporated into the conceptualized framework below.
Figure 2. Conceptual Framework for the Study
CHAPTER 3: PROCEDURES

Purpose of the Study

The purpose of this study was to describe how livestock laboratories are utilized in secondary Arizona agricultural programs to promote student learning. Specifically, the following research objectives guided the study:

Research Objectives

1. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a concrete experience. (Feeling)

2. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a reflective and observation experience. (Watching)

3. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an abstract conceptualization experience. (Thinking)

4. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an active experimentation experience. (Doing)
Methodology

In this chapter the steps and methods used to collect, measure, and analyze data are outlined. Frame, sampling, selection and non-response error was addressed with solutions. The survey instrument and its validity and reliability procedures are outlined. A timeline, budget and other relevant items are included.

Research Design and Population

The design for this study was a descriptive-survey research, which is defined as research that asks questions about the nature, incidence, or distribution of variables; it involves describing but not manipulating variables (Ary, Jacobs, & Razavieh, 2010). This census was cross-sectional, meaning the target population was studied at one point in time (Ary et al., 2010).

The target population was Arizona secondary Agricultural Education teachers during the 2011-2012 academic school years. The target population for this study consisted of 93 Arizona high schools Agricultural Education teachers (N=93). Some programs have more than one agricultural educator employed at any given time. There was originally 104 teachers within the directory, but after the research purged the names of teachers which were long-terms substitutes or the chapter was not using their livestock laboratory the samples size dropped to 93 Agricultural education teachers. A census was taken to determine teachers’ perceptions regarding the utilization of livestock laboratories in promote student learning. The frame of the population was obtained from Arizona Agricultural Education directory (AZFFA, 2011). The study will use a target population of secondary Agricultural Education teachers in Arizona to determine how the utilization of livestock laboratories in Arizona promotes student learning.
Selection Error

Selection error was avoided by obtaining the current, up-to-date Agricultural Education teachers’ directory 2011-2012 academic years. This is a reliable frame and is updated annually by the Arizona Department of Education.

Frame Error

Frame error was avoided by obtaining the current, up-to-date Agricultural Education teachers’ directory 2011-2012 academic years from the AZFFA.ORG website. This frame or list of full time employees is updated annually by the Arizona department of Education. This ensures the list obtained it the most current available contact information and employee status.

Instrumentation

The instrument was in the form of a booklet questionnaire enclosing both eight point Likert-type scale and open-ended questions. This allowed for the questionnaire to be mailed measuring the utilization of Arizona secondary agricultural livestock laboratories. This questionnaire was created off the research objective. All the key words which represent the objectives were found and supported by the extensive literature review. This instrument was created and revised by experts in the field of Agricultural Education. Within the instrument, questions act to answer the problem statement of, how are livestock laboratories utilized in secondary Arizona agricultural programs to promote student learning.

Validity Procedures

Content validity was determined through using a panel of experts. The panel consisted of four individuals (see appendix A) that are knowledgeable in content-based relevance, instrumentation, insight on subjects and overall completion of instrument and ultimately the
determination of face and content validity. Modifications were made to the instrument based on the recommendations of the panel of experts.

Reliability Procedures

Ary et al., stated reliability of a measuring instrument is the degree of consistency with which it measures whatever it is measuring (2010). With this, a pilot study was completed to determine the instrument's reliability. Reliability for the instrument was determined with a sample size of n=12. The pilot sample was northern California secondary agricultural educators and retired Arizona secondary agricultural educators. These participants were not a part of the population, but they were approximate in characteristics of those who were studied. Northern California teachers were selected because the livestock laboratories have similar characteristics allowing for like results and retired agricultural teacher from Arizona have similar characteristics to the population.

Within the questionnaire there are four constructs represented: concrete experience (14 items), reflective experience (12 items), abstract conceptualization (11 items), and active experimentation (14 items). The questions on the questionnaire were randomly placed throughout the 51 questions; to reduce the chance of individuals from favoring one construct over another. Then the questions were reorganized into their appropriate constructs. The four constructs were then analyzed using SPSS where a Cronbach alpha was calculated, which was used to measure the reliability of the instrument. When reliability measures personality variables, results are harder to obtain; thus, these measures typically have only moderate reliability yielding values from .60 to .70 (Ary et al., 2010).

The concrete experience construct yielded a Cronbach’s alpha coefficient of .99. The reflective/observation experience construct yielded a Cronbach’s alpha coefficient of .98. The
abstract conceptualization construct yielded a Cronbach’s alpha coefficient of .99; and the active experimentation construct yielded a Cronbach’s alpha coefficient of .98. These results further asserted the instrument was reliable since all computed coefficients were higher than the suggested 0.60 to 0.70 minimum alpha level.

Data Collection Procedures

Data collection followed a modified Dillman’s (2009) recommendations for mailed questionnaires. Approval from the Institutional Review Board was sought; the research protocol was approved (IRB # F309) on January 19, 2012. Five points of contact were made to maximize a response rate amongst participants. A pre-notice e-mail was sent on April 30th 2012, as an initial contact to inform participants about the forthcoming questionnaire and its practicality. This e-mail will give the participant the option to opt from the study if they do not teach in a livestock laboratory.

On May 2nd 2012, participants were sent a data collection packet that consisted of a cover letter explaining benefits, initial printed questionnaire, prepaid postcard to ensure anonymous response, and a pre-addressed stamped envelope. Additionally, a crisp one dollar bill was included with the data collection packet as a token of appreciation for their participation. On May 11th 2012, a reminder e-mail was sent in the mail to remind participants to response.

The secondary data collection packet was sent to the non-respondents on May 18th 2012, this day also serves as the cutoff date for early respondent classification. Early respondent classification served as a control for the non-response rate during the data analysis process. This secondary data collection packet included a cover letter explaining benefits, duplicate printed questionnaire, prepaid postcard to ensure anonymous response, and a pre-addressed stamped
envelope. Lastly, a letter for final contact was mailed on May 25th 2012, to address any lingering non-respondents and encourage to their participation in completing the questionnaire. Data collection was stopped on June 6th 2012. The overall response rate for this questionnaire was (n=76) of the agricultural education teachers responded from the initial population of (N=93). This yielded a response rate of 82 percent.

Non-Response Error

Non-Response Error was not a concern due to the nature of this study and therefore ignored. The Findings are only generalizable to the population that responded to this study because a census was conducted.

Data Analysis

The data collected from was organized into tables based upon summated rating scales from the Likert-type scales. Statistical procedures were used to determine central tendency. Additionally from these tables mean and modes for all constructs were calculated. SPSS was used to statistical analyze the data collects. These statistical differences were reported within the findings.
CHAPTER 4: FINDINGS

Purpose of the Study

The purpose of this study was to describe how livestock laboratories are utilized in secondary Arizona agricultural programs to promote student learning. Specifically, the following research objectives guided the study:

Research Objectives

1. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a concrete experience. (Feeling)

2. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a reflective and observation experience. (Watching)

3. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an abstract conceptualization experience. (Thinking)

4. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an active experimentation experience. (Doing)

Research objectives one, two, three and four sought to describe Arizona secondary agricultural education teachers’ level of agreement ability to utilize the schools’ livestock laboratory to deliver various experiential learning experiences for student. These experiences are based upon Kolb’s four experiential learning constructs; concrete experience, abstract conceptual, reflective observational and active experiences (see Table 1).

Based upon an eight point agreement scale, teachers reported the mean level of agreement of 6.30 ($SD = 1.37$) to utilize the livestock laboratory to deliver an effective concrete experience.
experience for students (Table 1). Teachers reported the mean level of agreement of 6.13 ($SD = 1.37$) to utilize the livestock laboratory to allow students to make reflective observations. Teachers reported the mean level of agreement of 6.02 ($SD = 1.34$) to utilize the livestock laboratory to allow students to think abstractly and conceptualize content. Additionally, teachers reported the mean level of agreement of 6.17 ($SD = 1.30$) to utilize the livestock laboratory in allowing students to actively experiment within their experiences.

Table 1

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete experience</td>
<td>6.30</td>
<td>1.37</td>
</tr>
<tr>
<td>Reflective Observation</td>
<td>6.13</td>
<td>1.37</td>
</tr>
<tr>
<td>Abstract Conceptualization</td>
<td>6.02</td>
<td>1.34</td>
</tr>
<tr>
<td>Active Experimentation</td>
<td>6.17</td>
<td>1.30</td>
</tr>
</tbody>
</table>

*Note: 1 = Very Strongly Disagree; 2 = Strongly Disagree; 3 = Moderately Disagree; 4 = Mildly Disagree; 5 = Mildly Agree; 6 = Moderately Agree; 7 = Strongly Agree; 8 = Very Strongly Agree*

The following tables depict the frequencies and percentages of Kolb’s four experiential learning theory; concrete experiences (see Table 2), reflective observation (see Table 3), abstract conceptualization (see Table 4), and active experimentation (see Table 5) constructs. The frequencies and percentages are reported for each of the eight points of the Likert-type scale for the 14 items related to the concrete experience construct; 11 items related to abstract conceptualization construct; 12 items related to reflective observation construct; and 14 items related to active experimentation construct. For each data table, the statement items are arranged from high to low according to the frequency and percentage for the very strongly agree response category. To further summarize the data tables, the top and bottom item statements in the very strongly agree response category are narratively described.
Within the concrete experience construct (see Table 2), 40 percent ($n = 14$) of the teachers very strongly agreed with the statement that a livestock laboratory should be used to engage students in the subject matter. Thirty-seven percent ($n = 13$) of the teachers very strongly agree with the statement that students should complete hands-on learning experiences on their own. Thirty-five percent ($n = 12$) of the teachers very strongly agreed with the statement that a livestock laboratory should be used to engage students in the learning process; and 35 percent ($n = 12$) of the teachers very strongly agree with the statement that students need to become fully involved in the learning process while in the livestock laboratory. Regarding to notable bottom (low frequency) items, six percent ($n = 3$) teachers reported that a livestock laboratory is useful for students to become open minded in creating awareness (6%; $n = 3$) about the learning experiences.
<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engage in a hands-on manner</td>
<td>1</td>
<td>2.9</td>
<td>2</td>
<td>5.7</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>5.7</td>
</tr>
<tr>
<td>Actively complete hands-on learning experiences on their own</td>
<td>1</td>
<td>2.9</td>
<td>2</td>
<td>5.7</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>8.6</td>
</tr>
<tr>
<td>Be engaged in the learning process</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>2.9</td>
<td>2</td>
<td>5.7</td>
</tr>
<tr>
<td>Become fully involved in the learning process</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>8.6</td>
</tr>
<tr>
<td>Become engaged with the subject matter content</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Become engaged in the learning process</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>2.9</td>
<td>2</td>
<td>5.7</td>
</tr>
<tr>
<td>Become mentally stimulated</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>8.6</td>
</tr>
<tr>
<td>Have new livestock laboratory experiences</td>
<td>2</td>
<td>5.7</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Explore new ideas</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>4</td>
<td>11.4</td>
</tr>
<tr>
<td>Generate questions</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>5.7</td>
<td>6</td>
<td>17.1</td>
</tr>
<tr>
<td>Recall learning experiences</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Become motivated to creating new learning experiences</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Create awareness about learning experiences</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>6</td>
<td>17.1</td>
</tr>
<tr>
<td>Become open minded</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>2</td>
<td>5.7</td>
<td>0</td>
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</tbody>
</table>

*Note: 1 = Very Strongly Disagree; 2 = Strongly Disagree; 3 = Moderately Disagree; 4 = Mildly Disagree; 5 =Mildly Agree; 6 = Moderately Agree; 7 = Strongly Agree; 8 = Very Strongly Agree*
Within Kolb’s reflective observation construct (see Table 3), thirty-four percent \((n = 12)\) of the teachers very strongly agreed with the statement that a livestock laboratory should be used for students to create new knowledge. Twenty-six percent \((n = 9)\) of the teachers very strongly agreed with the statement that a livestock laboratory should help students become aware of positive hands-on learning experiences; and twenty percent \((n = 7)\) of the teachers very strongly agree with the statement that a livestock laboratory should validate feelings about hands-on learning experiences while in the livestock laboratory. Twenty percent \((n = 7)\) of the teachers very strongly agree with the statement that a livestock laboratory should help students create concepts related to the content. Regarding a notable bottom (low frequency) item, three percent \((n = 1)\) of the teachers reported that a livestock laboratory enhances the students learning experience though reflection.
<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create new knowledge</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5.7</td>
<td>10</td>
</tr>
<tr>
<td>Become aware of positive hands-on learning experiences</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.9</td>
</tr>
<tr>
<td>Validate feelings about hands-on learning experiences</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>8.6</td>
</tr>
<tr>
<td>Create concepts related to the content</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>14.3</td>
</tr>
<tr>
<td>Use inductive reasoning on generalizations from learn experiences</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reflect on learning experiences</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>7</td>
<td>20.0</td>
</tr>
<tr>
<td>Observe new learning experiences from multiple perspectives</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reflect positively about hands-on learning experiences</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>20.0</td>
</tr>
<tr>
<td>Recall previous learning experiences</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>5</td>
<td>8.6</td>
</tr>
<tr>
<td>Use inductive reasoning on concepts from learning experiences</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>5</td>
<td>8.6</td>
</tr>
<tr>
<td>Become aware of negative hands-on learning experiences</td>
<td>2</td>
<td>5.7</td>
<td>1</td>
<td>2.9</td>
<td>2</td>
<td>5.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Enhances learning experiences though reflection</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>5</td>
<td>14.7</td>
<td>7</td>
<td>20.6</td>
</tr>
</tbody>
</table>

Note: 1 = Very Strongly Disagree; 2 = Strongly Disagree; 3 = Moderately Disagree; 4 = Mildly Disagree; 5 =Mildly Agree; 6 = Moderately Agree; 7 = Strongly Agree; 8 = Very Strongly Agree
Within Kolb’s abstract conceptualization construct (see Table 4), twenty percent \((n = 7)\) of the teachers very strongly agreed with the statement that a livestock laboratory should be used for students to connect to their existing knowledge. Twenty percent \((n = 7)\) of the teachers very strongly agreed with the statement that a livestock laboratory should create concepts related to the content; and 20 percent \((n = 7)\) of the teachers very strongly agree with the statement that students should implement learned knowledge from experiences while in the livestock laboratory. Regarding a notable bottom (low frequency) item, three percent \((n = 1)\) of the teachers reported that a livestock laboratory is useful for students in creating theories.
Table 4

Frequencies and Percentages of Kolb’s Abstract Conceptualization Construct Items (n = 35)

<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connect to their existing knowledge</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>8.6</td>
</tr>
<tr>
<td>Create concepts related to the content</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Implementation of learned knowledge from experiences</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Make relativity of all current knowledge from learning experiences</td>
<td>2</td>
<td>5.7</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Logically analyze learning experiences, which occurred in the laboratory</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
</tr>
<tr>
<td>Modify their generalizations to theories</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
</tr>
<tr>
<td>Make connections of all new content from laboratory instruction</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Think logically, when planning for their experience</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Apply newly formed generalizations to new situations</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
</tr>
<tr>
<td>Integrate their observations into logical theories</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
</tr>
<tr>
<td>Create theories</td>
<td>2</td>
<td>5.7</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
<td>1</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Note: 1 = Very Strongly Disagree; 2 = Strongly Disagree; 3 = Moderately Disagree; 4 = Mildly Disagree; 5 = Mildly Agree; 6 = Moderately Agree; 7 = Strongly Agree; 8 = Very Strongly Agree
Within Kolb’s active experimentation construct (see Table 5), twenty-nine percent \((n = 10)\) of the teachers very strongly agreed with the statement that a livestock laboratory should be used for students to apply what they have learned in the past and apply this knowledge to a learning experience. Twenty-six percent \((n = 9)\) of the teachers very strongly agreed with the statement that a livestock laboratory should actively solve problems on their own while in the livestock laboratory; and seventeen percent \((n = 6)\) of the teachers very strongly agree with the statement that students need to become fully involved in the learning process while in the livestock laboratory. Seventeen percent \((n = 6)\) of the teachers very strongly agreed with the statement that a livestock laboratory should stimulate the “what if” thought process. Regarding a notable bottom (low frequency) item, zero percent \((n = 0)\) of the teachers reported that a livestock laboratory are useful for students in creating uncertainty about the learning process.
Table 5

Frequencies and Percentages of Kolb’s Active Experimentation Construct Items (n = 35)

<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply what they have learned in the past and apply this knowledge to a learning experience</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>2 5.7</td>
<td>6 17.1</td>
<td>14 40.0</td>
<td>10 28.6</td>
</tr>
<tr>
<td>Use practical application on the learning experience</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>1 2.9</td>
<td>6 17.1</td>
<td>17 48.6</td>
<td>9 25.7</td>
</tr>
<tr>
<td>Actively solve problem on their own</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>5 14.3</td>
<td>9 25.7</td>
<td>12 34.3</td>
<td>6 17.1</td>
</tr>
<tr>
<td>Stimulate the “what if” thought process</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>10 28.6</td>
<td>6 17.1</td>
<td>10 28.6</td>
<td>6 17.1</td>
</tr>
<tr>
<td>Fully complete a task</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>3 8.6</td>
<td>7 20.0</td>
<td>18 51.4</td>
<td>5 14.3</td>
</tr>
<tr>
<td>Gain interest for other learning experiences</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>14 40.0</td>
<td>14 40.0</td>
<td>5 14.3</td>
</tr>
<tr>
<td>Think differently when in a non-traditional thinking experience</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>5 14.3</td>
<td>15 42.9</td>
<td>8 22.9</td>
<td>5 14.3</td>
</tr>
<tr>
<td>Actively implement concepts learned in the laboratory</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>2 5.7</td>
<td>10 28.6</td>
<td>16 45.7</td>
<td>4 11.4</td>
</tr>
<tr>
<td>Make sound decisions</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>4 11.4</td>
<td>13 37.1</td>
<td>11 31.4</td>
<td>4 11.4</td>
</tr>
<tr>
<td>Become creative thinkers in the learning process</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>5 14.3</td>
<td>13 37.4</td>
<td>11 31.4</td>
<td>3 8.6</td>
</tr>
<tr>
<td>Actively adapt to learning experiences</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>6 17.1</td>
<td>12 34.3</td>
<td>11 31.4</td>
<td>3 8.6</td>
</tr>
<tr>
<td>Implement learning theories</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>4 11.4</td>
<td>14 40.0</td>
<td>10 28.6</td>
<td>3 8.6</td>
</tr>
<tr>
<td>Actively implement generalizations about experiences in the laboratory</td>
<td>2 5.7</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>0 0.0</td>
<td>3 8.6</td>
<td>14 40.0</td>
<td>13 37.1</td>
<td>1 2.9</td>
</tr>
<tr>
<td>Create uncertainty about the learning process</td>
<td>1 2.9</td>
<td>1 2.9</td>
<td>3 8.6</td>
<td>7 20.0</td>
<td>7 20.0</td>
<td>12 34.3</td>
<td>4 11.4</td>
<td>0 0.0</td>
</tr>
</tbody>
</table>

Note: 1 = Very Strongly Disagree; 2 = Strongly Disagree; 3 = Moderately Disagree; 4 = Mildly Disagree; 5 = Mildly Agree; 6 = Moderately Agree; 7 = Strongly Agree; 8 = Very Strongly Agree
CHAPTER 5:  
SUMMARY, CONCLUSION, IMPLICATIONS, AND RECOMMENDATIONS

Purpose of the Study

The purpose of this study was to describe how livestock laboratories are utilized in secondary Arizona agricultural programs to promote student learning. Specifically, the following research objectives guided the study:

Research Objectives
1. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a concrete experience. (Feeling)
2. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a reflective and observation experience. (Watching)
3. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an abstract conceptualization experience. (Thinking)
4. Describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an active experimentation experience. (Doing)

Summary of Finding
The study sought to describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory to deliver various experiential learning experiences from Kolb’s four experiential learning constructs. The four constructs are concrete experience, abstract conceptual, reflective observational and active experiences. The teachers were asked to respond with their level of agreement in their ability to utilize their school’s livestock laboratory to promote student learning based on Kolb’s experiential learning constructs. The Likert-type rating scale ranged from 1 to 8 with Very Strongly Disagree = 1, Strongly Disagree = 2, Moderately Disagree = 3, Mildly Disagree = 4, Mildly Agree = 5, Moderately Agree = 6, Strongly Agree = 7, Very Strongly Agree = 8.

Research Objective One

Research objective one sought to describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a concrete experience. For the concrete experience construct teachers reported the mean level of agreement of 6.30 ($SD = 1.37$) to utilize the livestock laboratory to deliver an effective concrete experience for students.

Research Objective Two

Research objective two sought to describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory to allow students to think abstractly and conceptualize content. For Kolb’s abstract conceptualization construct teachers reported the mean level of agreement of 6.02 ($SD = 1.37$) to utilize the
livestock laboratory in allowing the students to think abstractly and conceptualize content.

Research Objective Three

Research objective three sought to describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory to allow students to reflective on their observations. For Kolb’s reflective observation construct teachers reported the mean level of agreement of 6.13 (SD = 1.37) to utilize the livestock laboratory to allow students to make reflective observations

Research Objective Four

Research objective four sought to describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing students the ability to actively experiment within their experiences. For the Kolb’s active experimentation construct teachers reported the mean level of agreement of 6.17 (SD = 1.30) to utilize the livestock laboratory in allowing students to actively experiment within their experiences.

Conclusion, Implications, and Recommendations

Research objective one sought to describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a concrete experiences (Feeling).
The researcher concluded that Arizona agriculture teacher’s school livestock laboratory attributed and provided students with concrete experiences. Experiential learning is said to involve the integrated functioning of the total organism – thinking, feeling, perceiving, and behaving (Kolb, 1984). Kolb concluded that a concrete experience is when the students are able to involve themselves fully, openly, and without bias in new experiences (feeling) (Kolb, 1984). A concrete experience allows students to become interested and mentally engage in the content. Kolb supported the concrete experience construct because the experiential experience adds “validity of ideas created during the learning process” (1984, p. 21).

Kolb argued that the main reason for the concrete experience is to grasp student’s interest to promote the subsequent constructs: reflective observation, abstract conceptualization, and active experimentations (Kolb, 1984). Without the initial connection to the content through concrete experiences, students will likely lose interest; therefore stopping Kolb’s experiential learning cycle. The implication of a concrete experience is to immediately engage students in the learning process (Kolb, 1984). Moreover, a concrete experience is much like shearing a sheep, the activity is a hands-on and a real-time experience that lead to a learned skill (Kolb, 1984).

Based upon the conclusion and implications it is recommended that teachers provide opportunities for students be engaged in hands-on learning, actively complete hands-on learning experiences on their own, be engaged in the learning process and become fully involved in the learning process, all within the livestock laboratory. With this recommendation, students will become more driven and acquire a sense of ownership of their learning in their own livestock laboratory experiences. An example for a
concrete experience is having a student engaged in feeding a goat, actively clipping a goat or become fully involved in training a goat.

Research objective two sought to describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing a reflective and observation experience (Watching).

The researcher concluded that Arizona agriculture teacher’s school livestock laboratory provided students with reflective and observation experiences. Experiential learning is any means by which an individual uses direct physical experience to gain knowledge and skills in a controlled environment (Warner et al., 2006). Kolb concluded that the second stage of Kolb’s experiential learning cycle is reflection observation (watching). Students must to be able to have the opportunity to reflect and observe their experience to deepen their understanding of the experiential experience (Kolb, 1984).

Within Kolb’s reflective observation construct, “students should be allowed to reflect and observe on their experience from many perspectives” (Kolb, 1984, p. 30). Additionally, Reflective - observation is known as a reflection or a reflective activity which allows students to create new knowledge by interlocking the new experience with their current knowledge. The reflection process validates students’ feelings and enhances the experiential experience (Phipps et al., 2008).

Based upon the conclusion and implications it is recommended teachers provide students connect to their existing content, create concepts related to their content and implement what they have learned from experiences, within the livestock laboratory.
With these recommendations, teachers should allow students to become more reflective in their observations when participating in their livestock laboratory experience. An example for a reflective observation experience is having a student observe their own husbandry practice then make critical reflection in enhancing the learning experience, which is return will allow them to create their own concepts and ideas.

Research objective three sought to describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an abstract conceptualization experience (Thinking).

The researcher concluded that Arizona agriculture teachers’ school livestock laboratory provide students with an abstract conceptualization experience. Within a livestock laboratory setting, students may perform numerous activities. Students can gain hands-on experience through livestock laboratories, green houses, agricultural mechanics laboratories, or any school facility (Cheek & Arrington, 1990). Abstract conceptualization allows students to become open-minded and creative in the thinking process by allowing a conceptualization of the experiential experience (Kolb, 1984).

The third stage of Kolb’s experiential learning cycle is abstract conceptualization (thinking). Experiential observations connect students’ current knowledge, teacher’s knowledge, and experts in the field (Kolb, 1984). Additionally, Kolb wrote that the student must “be able to create concepts that integrate their observations into logically sound theories” (1984, p. 30). The finding implies that the abstract conceptualization experience allows students establish mental connections of all current knowledge on a
given topic followed by providing students with direct instruction, inquiry, and classroom discussion on new topics (Phipps et al., 2008).

Based upon the conclusion and implications it is recommended that teachers promote student’s ability to conceptualize abstract ideas. The livestock laboratory should allow students to create new knowledge and become aware of positive hands-on learning experiences. Additionally, teachers should use the livestock laboratory as a tool to validate students’ feelings about hands-on learning experiences and create concepts related to the content. Consequently, students will develop an interest in the livestock laboratory experience. An example for an abstract conceptualization experience is having a student reflect and combine new knowledge gained by further instruction and/or peer observation to better conceptual the learning experience pertaining to goal care and husbandry. This will lead the student to create new knowledge and validate their feelings of the student.

Research objective four sought to describe the ability of secondary agricultural education teachers in Arizona to utilize the schools livestock laboratory in providing an active experimentation experience (Doing).

The researcher concluded that Arizona agriculture teacher’s school livestock laboratory provide students with an active experimentation experience. According to Knoblock (2003), Knapp stressed the importance of learning by doing and encouraged agriculture teachers to have practical instruction with easy application and purpose. As such, students have the opportunity to implement their concrete experience, reflective observation experience and abstract conceptualization experience to complete Kolb’s cycle of experiential learning. When all the previous constructs have been completed
students will be positioned to adapt previously learned content in the livestock laboratory and promote further questions leading to new experiences and knowledge (Kolb, 1984).

Kolb wrote that students must be “able to use these theories to make decisions and solve problems” (Kolb, 1984, p. 30). At this stage, students are able to apply all the other three stages: feeling, watching thinking, and doing (Kolb, 1984). The active experimentation stage of Kolb experiential learning cycle emphasizes practical application as opposed to reflective observation (Kolb, 1984). The implication of this conclusion is that teachers have the opportunity to grow student learning by providing experiences that allow students to try new methods, strategies and procedures in a safe environment.

Based upon the conclusion and implication it is recommended that teachers allow students to actively experiment to gain new knowledge. The livestock laboratory should allow students to apply what they have learned in the past and apply new knowledge to the learning experience. Additionally the livestock laboratory should be used by teachers to allow for practical application by students within their learning experiences. An example for an active experimentation experience is having a student physically sheering a sheep, physically giving vaccines to a goat.

Recommendations for Further Study

While this study was generated to answer select questions there are more questions that should be approached. The following recommendations are suggested for additional research:
1. A study which evaluates the students and their perceived effectiveness to utilize the schools livestock laboratory.

2. Expand the study to other states in different geographical locations.

3. A study on livestock inventory and the bearing level of effectiveness to deliver an experiential experience.

4. The degree of use within the livestock laboratory amongst the teacher and student.

5. A study on which season yield a higher experiential learning experience

6. A study to define which type of livestock’s are most used within Arizona livestock laboratories.
References


Lynch, R. L., & ERIC Clearinghouse on Adult, Career, and Vocational Education. (2000). *New directions for high school career and technical education in the 21st century* ERIC Clearinghouse on Adult, Career, and Vocational Education, Center on Education and Training for Employment, College of Education, the Ohio State University.


University of Arizona. (1972). *Utilizing school livestock laboratories in Arizona*. Tucson University of Arizona-Department of Agricultural Education.

Appendix A: List of and Evaluation Form to Panel of Experts
Panel of Experts

Dr. Robert Torres, Professor  Agricultural Education

Dr. Edward Franklin, Professor  Agricultural Education

Dr. Steve E. Poe, Professor  Agricultural and Bio systems Engineering

Dr. Ryan Foor, Assistant Professor  Agricultural Education
Appendix B: Pre-Notice e-mail
Dear «Salu» «LName»;

In a few days you will receive a request by mail to complete a questionnaire regarding livestock laboratories. Livestock laboratories are important in promoting student learning, though the interaction of hands-on experiences. Your program has been identified as a high school Agricultural Education program within the Arizona teachers’ academic directory.

We are contacting you in advance to provide notice that the questionnaire will be delivered via the U.S. postal service.

In three to five days you will receive a questionnaire in the mail. We ask that you fill out the entire questionnaire at your earliest convenience. When completed please return the packet using the pre-addressed and stamped envelope. This research project will provide important information about livestock laboratories within Arizona and will guide in understanding the importance of these laboratories. Your participation in this study is invaluable. If your school does not have a livestock laboratory and you want to opt out of this study, please e-mail me at bpwatkins@email.arizona.edu or call (520) 621-1523 by Monday April 30th 2012.

Yours in quality education,

Brandon Watkins
Graduate Assistant

Ryan M. Foor, Ph. D.
Assistant Professor

P. S. We will enclose a token of our appreciation with your questionnaire as a way of saying thank you.
Appendix C: Cover Letter
April 27th 2012

«Salu» «FName» «LName»
«ChapName»
«Address1»
«City», AZ «Zip»

Dear «Salu» «LName»;

You have been identified as a secondary agricultural educator within the state of Arizona. You are being asked to voluntarily participate in a research study. This research study is intended to assess the utilization of livestock laboratories in promoting student learning.

Your responses to this questionnaire will greatly assist in improving teacher preparation and teacher education within Arizona. The questionnaire will take approximately 15 minutes to complete. There are no known risks to your participation in completing this questionnaire. Your participation is voluntary. If you decide to stop participating in the study, there will be no penalty to you, and you will not lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The University of Arizona. There is no cost to you except your time. You may answer some or none of the questions. Your results will be kept confidential; your name will not be associated with your responses.

Please complete the enclosed questionnaire, fold in half lengthwise, and return in the enclosed, self-addressed stamped envelope by May 14th. All answers to this questionnaire are completely anonymous. There is no identification number of any kind on the questionnaire. However, to let us know that your questionnaire has been returned, please print your name and return the enclosed post card separately in the mail so we can check your name off the mailing list. If you choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By participating in the study, you do not give up any personal legal rights you may have as a participant in this study.

If you have questions concerning your rights as a research subject, you may call The University of Arizona Human Subjects Protection Program at (520) 626-6721. Completing this questionnaire implies that you are giving permission for the investigator to use your responses for research purposes. For questions, concerns, or complaints about the study you may contact Brandon Watkins at (520) 343-2692.
A crisp dollar is enclosed as a token of appreciation to say thank you for your help.

Thank you for your time!

Brandon Watkins
Graduate Assistant
The University of Arizona

Ryan M. Foor, Ph. D.
Assistant Professor
The University of Arizona
Appendix D: Questionnaire
Appendix E: Postcard to Facilitate Anonymous Response
Questionnaire # xxx

This postcard is being returned to let you know that my questionnaire has been returned in a separate envelope.

________________________________________
Your name (please print)

Thank you very much for your help with this important study. We really appreciate it.

Ryan M. Foor, Ph. D.  Brandon Watkins
Assistant Professor  Graduate Associate
The University of Arizona  The University of Arizona
Appendix F: Reminder Postcard
Dear «Salu» «LName»;

Last week a questionnaire seeking information about the utilization of livestock laboratories in promoting student learning was mailed to you. You were selected because you were identified as secondary agricultural educator within the state of Arizona.

If you have already completed and returned the questionnaire to us, please accept our sincerest thanks. If not, please do so today. We are especially grateful for your help because it is only by asking people like you to participate that we can know how livestock laboratories are utilized within secondary agricultural education programs.

If you did not receive a questionnaire, or if it was misplaced, please call us at (520) 343-2692 or e-mail at bpwatkins@email.arizona.edu and we will get another one in the mail to you today.

Thank you for your time!

Brandon Watkins
Graduate Assistant
The University of Arizona

Ryan M. Foor, Ph. D.
Assistant Professor
The University of Arizona
Appendix G: Second Cover Letter
May 14th 2012

«Salu» «FName» «LName»
«ChapName»
«Address1»
«City», AZ «Zip»

Dear «Salu» «LName»;

About two weeks ago we sent a questionnaire to you that asked about the utilization of livestock laboratories in promoting student learning. To the best of our knowledge, the questionnaire has not yet been returned. The responses from people who have already returned the questionnaire include a variety of responses and the utilization of their schools livestock laboratory. We are writing again because of the importance your questionnaire has for helping to get accurate results.

Your responses to this questionnaire will greatly assist in improving the utilization of livestock laboratories and their ability to promoting student learning within Arizona. The questionnaire will take approximately 15 minutes to complete. There are no known risks to your participation in completing this questionnaire. Your participation is voluntary. If you decide to stop participating in the study, there will be no penalty to you, and you will not lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The University of Arizona. There is no cost to you except your time. You may answer some or none of the questions. Your results will be kept confidential; your name will not be associated with your responses.

Please complete the enclosed questionnaire, fold in half lengthwise, and return in the enclosed, self-addressed stamped envelope by May 21st. All answers to this questionnaire are completely anonymous. There is no identification number of any kind on the questionnaire. However, to let us know that your questionnaire has been returned, please print your name and return the enclosed post card separately in the mail so we can check your name off the mailing list.

If you choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By participating in the study, you do not give up any personal legal rights you may have as a participant in this study.

If you have questions concerning your rights as a research subject, you may call The University of Arizona Human Subjects Protection Program at (520) 626-6721. Completing this questionnaire implies that you are giving permission for the investigator to use your responses for research purposes. For questions, concerns, or complaints about the study you may contact Brandon Watkins at (520) 343-2692.

A crisp dollar bill is enclosed as a token of appreciation to say thank you for your help.

Thank you for your time!

Brandon Watkins
Graduate Assistant
The University of Arizona

Ryan M. Foor, Ph. D.
Assistant Professor
The University of Arizona
Appendix H: Final Contact e-mail
Dear «Salu» «LName»;

   During the past few months we have sent you several mailings and e-mails about an important research study we are conducting at The University of Arizona. We have reached the end of the study, but we are still in need of your response in knowing if your school has a livestock laboratory or not.

   Please communicate to Brandon Watkins at bpwatkins@email.arizona.edu or call (520) 621-1523, if your school has a livestock laboratory or not. We define a livestock laboratory as a livestock facility used as an extension of classroom teaching.

   Finally, we appreciate your willingness to consider our request as we conclude this effort to better understand livestock laboratories and how they promote student learning. Thank you very much.

   Sincerely,

   Brandon Watkins
   Graduate Assistant
   The University of Arizona

   Ryan M. Foor, Ph. D.
   Assistant Professor
   The University of Arizona