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Assessing Knowledge Acquisition Through Lecture and Cooperative Learning: Traditional and Non-traditional Secondary Students in Agriculture

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ASSESSING KNOWLEDGE ACQUISITION THROUGH LECTURE AND COOPERATIVE LEARNING: TRADITIONAL AND NON-TRADITIONAL SECONDARY STUDENTS IN AGRICULTURE

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ABSTRACT

Currently, students entering secondary agricultural education programs have less knowledge and hands-on experience about agriculture than previous generations. Agricultural educators are challenged to vary teaching practices to meet student needs. The purpose of this study was to determine if there is a difference in knowledge acquisition between students enrolled in secondary agricultural education classes taught by cooperative learning and lecture instruction. Additionally, this study explored the knowledge acquisition of traditional and non-traditional secondary agricultural education students and perceptions of instructional methods presented. Eight schools participated in the study. No significant difference was seen in test scores between methods of instruction, but a significant difference was noted between traditional and non-traditional students. Overall, students preferred the lecture based instruction. The study found that both methods of instruction improved knowledge acquisition. The study also found that traditional students had a higher gain in knowledge acquisition than non-traditional students.

This thesis is approved for recommendation
to the Graduate Council.

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DEDICATION

This thesis is dedicated to my husband, Christopher, for being my rock. You supported me and encouraged me to continue through my struggles and frustrations. Your love and godly spirit has been vital to the success of my post-secondary education. God has blessed me with a lifelong friend and love that continues to intensify. Thank you for being my other half and keeping God at the center of our marriage. I love you.

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I can do all things through Christ who gives me strength.

Philippians 4:13

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CHAPTER I: INTRODUCTION

Changes in Agriculture

"U.S. agriculture underwent a tremendous transformation during the 20th century—the structure of farming and rural life today barely resembles that of the early 1900s" (Dimitri & Effland, 2005, para. 1). Agriculture at this time was labor intensive, on a large number of diversified farms, averaging 146 acres, growing five or more different agricultural commodities. Approximately 60% of the United States population lived in rural areas and understood the agrarian way of life. Today, farms and ranches are large operations averaging 441 acres that are engaged in specialized agricultural production of 1.3 commodities on average (Dimitri & Effland, 2005). Presently, farms and ranches occupy 40.8% of U.S. land (United States Department of Agriculture [USDA], 2012); yet less than 1% of the over 300 million people in the U.S. claim farming as an occupation (United States Environmental Protection Agency [EPA], 2012). Similarly, only 16% of the U.S. population lives in rural areas (USDA-Economic Research Service, 2012). Change which has occurred in U.S. agriculture over the past 100 years is depicted in Table 1-1.

Table 1-1

100 Years of Structural Change in U.S. Agriculture adapted from Dimitri and Effland, 2005.

	1900	1930	1945	1970	2000/02
Number of farms (millions)	5.7	6.3	5.9	2.9	2.1
Average farm size (acres)	146	151	195	376	441
Average number of commodities produced per farm	5.1	4.5	4.6	2.7	1.3
Farm share of population (percent)	39	25	17	5	1
Rural share of population (percent)	60	44	36*	26	21

*Note: Data reported in 1950

Although the number of farms and ranches has declined, U.S. farmers and ranchers are among the most productive in the world (USDA, 2007). In fact, each farmer "produces food and fiber for 155 people in the U.S. and abroad" (American Farm Bureau, 2009, p. 6). Trade in agriculture has increased in volume so that agricultural products now represent 22.5% of the world exports (Levin Institute, n.d.).

Changes in the food and agriculture industry enable consumers around the world to enjoy a broader selection of products than they would if they only had access to domestically produced products. Yet as trade expanded in geographic scope, diversity, and quantity, the channels of trade also became more complex. The earliest transactions were face to face, but today there are many more entities that enable trade to be more efficient and convenient. Although farmers and ranchers are important employers in agriculture, purchasing managers, buyers, and purchasing agents are one of the largest groups employed in the agricultural sector, supporting 527,000 jobs (United States Bureau of Labor Statistics [BLS], 2010). Other employment sectors include agricultural and food scientists (31,000 jobs), farm and home management advisors (13,100 jobs), agricultural inspectors (16,600 jobs), and other agricultural workers (821,700 jobs) (BLS, 2010). Overall, agriculture is the U.S. largest employer, with more than 24 million people employed in some field of agriculture (National FFA Organization, 2011b). Because agriculture is so important in today's economy and job sector, instruction in and about agriculture is paramount for its continued success.

Instruction in Agricultural Education

At the turn of the century, instruction in agricultural education was greatly needed, both for farmers and youth. Attention was fixed upon the advancement of agriculture (Shepardson, 1929). Agricultural societies had been successful in sharing new information about farming and

promoting the use of better crops or livestock, but farmers felt little need to change the methods used by past generations. Schools were established to study agriculture as a result of pressure from the agricultural societies. This movement also helped influence the passage of the Morrill Acts of 1862 and 1890 which established land-grant colleges. These land-grant institutions were devoted to educate individuals whose lives would not be in the professions, but in business and trade of agricultural commodities (Seevers, Graham, & Conklin, 2007). Land-grants were allocated to each state in the U.S. to establish a college whose purpose was to provide a broad segment of the population with a practical education (Phipps, Osborne, Dyer, & Ball, 2008).

In 1914, the Smith-Lever Act established the Cooperative Extension Service to fulfill the needs of instruction to youth and adults not enrolled in college (Phipps et al., 2008). Three years later, the Smith-Hughes Act was proposed to educate the masses of the population, improve inadequate state schools, and expand agricultural education in the public schools. By enacting the Smith-Hughes Act of 1917 a focus was directed towards vocational education. This legislation impacted education in secondary schools by: (a) providing education with the purpose of career preparation, as opposed to a more liberal arts focus and (b) increasing federal funds for less than college-age education, which had primarily been a state affair (Roberts, 1957). The Smith-Hughes Act was "designed to promote and further develop vocational education programs which otherwise might not have been provided in state educational systems" (Phipps et al., 2008, p. 28). The Smith-Hughes act was the first national legislation for vocational education instruction in agriculture, trades, and home economics.

When first funded, instruction and training in agriculture was delivered to rural males to gain technical skills needed to work on the farm (Phipps et al., 2008). Six abilities were

developed to guide instruction in vocational agricultural education (Stimson & Lathrop, 1942). They included the ability to:

1. Make a beginning and advance in farming.
2. Produce farm commodities efficiently.
3. Market farm products advantageously.
4. Conserve soil and other natural resources.
5. Manage a farm business.
6. Maintain a favorable environment.

These abilities have provided the foundation for vocational agricultural instruction. Today, agricultural education is described as "a systematic program of instruction available to students desiring to learn about the science, business, technology of plant and animal production and/or about the environmental and natural resources systems" (National FFA Organization, 2011a, The Three-Circle Model section, para. 3). The Three-Circle Model developed by the National FFA Organization (2011a) illustrates how students are presented with the major components of agricultural education instruction in present day programs. The three parts of an agricultural education program are:

1. Classroom/laboratory instruction (contextual learning),
2. Supervised Agricultural Experience (SAE) programs (work-based learning)
3. Student leadership organization (National FFA Organization, 2010).

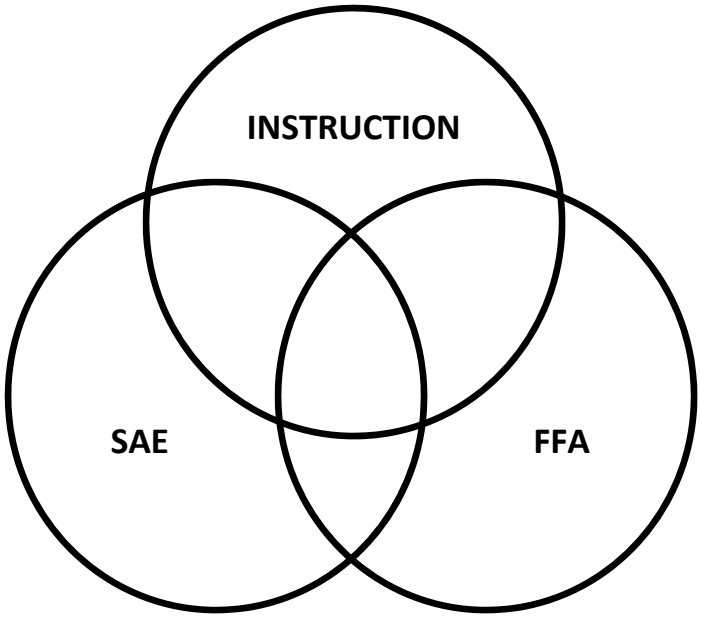

Figure 1-1. The Three-Circle Model of agricultural education programs. Adapted from the National FFA Organization, 2011a.

Many changes in vocational agricultural instruction have been further shaped by federal legislation. In 1963, a series of changes were legislated through the Vocational Education Act, followed by the Carl Perkins Act of 1984. Vocational education is now referred to as Career and Technical Education (CTE). The focus of CTE programs is to aid students in developing knowledge and skills to be successful in a given industry (Roberts & Ball, 2009). But, changes were slow to occur in agricultural education programs and in 1980, a national study reported that (a) "agricultural education must become more than vocational agriculture" and (b) "major revisions are needed within vocational agriculture" (National Research Council, 1988, p. 1).

More recently, the Elementary and Secondary Education Act of 2001 has had a profound impact on the instructional efforts in agricultural education. Commonly known as the No Child Left Behind Act (NCLB) (Phipps et al., 2008), the Elementary and Secondary Education Act was established to "close the achievement gap with accountability, flexibility, and choice, so that no

child is left behind" (Public Law 107-110, 2002, p. 1425). NCLB ensures that all children receive a fair and equal opportunity to obtain a high-quality education, the intent being that all students may perform proficiently on state academic standards and their assessments. In order to maintain standards, curriculum frameworks are used as a guide for educators to teach students 21st century skills. With the changes in accountability, secondary agricultural education students have begun to be tested through End-of-Course (EOC) exams, to ensure students are reaching at least state minimum proficiency requirements (Martin, Fritzsche, & Ball, 2006). Initially, teachers and professionals perceived that NCLB Act would eliminate CTE and discourage students from enrolling in agricultural education courses due to an increase in core academic requirements (Martin et al., 2006). But agricultural educators are using different methods of instruction, resulting in "more application of core academics in the agricultural classroom to help fulfill the NCLB legislation's education requirements" (Martin et al., 2006, p. 107).

Agricultural education continues to react to legislative directives and adjust curricula for young men and women who aspire to have careers in the diverse areas found in agriculture (National Research Council, 1988). With a large population of employers in agriculture, agricultural education programs prepare students "for more than 300 careers in science, business, and technology of agriculture" (National FFA Organization, 2011b, para. 4). According to the National Council for Agricultural Education (1999), "only six percent of the high school population successfully completes coursework in agriculture" (p. 3).

In 1988, the National Research Council proposed that agriculture should be taught to a larger percentage of students to keep the public informed about agricultural issues. And in 1989, the National Summit on Agricultural Education's recommended the primary goal for agricultural education was to update instruction and expand programs nationwide. While agricultural

education programs have addressed these challenges, the number of secondary students who complete four years of agricultural education courses has declined (Herring, Marshall, & Briers, 1989). This decline has been attributed to students waiting to enroll into agricultural education courses in their junior and senior years, or seeking courses that best fit their specific interests (Herring et al., 1989). Roberts et al. (2009) noted that current agricultural education demographics do not align with the 21st century population of many public schools. The 2011(b) National FFA membership records indicated that 70% of FFA members live in rural farm areas, 19% live in small towns, and 10% live in urban and suburban areas. Additionally, there are 540,379 members of the FFA aged 12 through 21, of which 46% are female, 76% are Caucasian, 16% Hispanic, 4% African-American, and 2% Native American.

"As agricultural education enters the 21st century, it [education and agriculture] must change with emerging trends in society and the agricultural industry" (Talbert, Vaughn, & Croom, 2005, p. 61). As the U.S. population moves away from rural areas, students are further removed from agricultural production and have little knowledge of its related career fields. These changes increase the need to more effectively teach agriculture to an audience who is uneducated about agriculture and its practices.

A traditional method of teaching agriculture has been lecture followed by skill development in a laboratory setting: however, Newcomb, McCracken, Warmbrod, and Whittington (2004) concluded that agricultural education has overused lecture to teach. Agricultural educators are constantly looking for new methods that engage high school agricultural education students.

Changing student demographics has resulted in an increase in non-traditional students being enrolled in agricultural education classes. Because of changing student demographics,

agricultural education teachers are challenged to educate students with varying levels of knowledge and skills about agriculture. Therefore, understanding how best to educate a highly diversified student population in today's schools is needed.

Statement of the Problem

Changes in school requirements and demographics have impacted student enrollment in secondary agricultural education programs. Students are more diverse in knowledge and experience about agriculture than previous generations of students. Hoover and Scanlon (1991) stated that agricultural educators should vary teaching practices to meet the needs of students with less hands-on experience. However, questions remain as to the best method to educate secondary agricultural education students. The increased number of non-traditional students has challenged teachers to educate students with vastly different expectations (Marshall, Herring, & Briers, 1992).

Purpose

The purpose of this study was to determine if there is a difference in knowledge acquisition between students enrolled in secondary agricultural education classes taught by cooperative learning and lecture instruction. Additionally, this study explored the knowledge acquisition of traditional and non-traditional secondary agricultural education students and perceptions of instructional methods presented.

Key Terms

Cooperative Learning – a teaching method using a variety of learning activities in small groups or teams to successfully improve subject comprehension (Kagan & Kagan, 2009).

FFA Doors for the Future Instruction Materials – instructional materials (lesson plans, case study, and roundtable worksheet) created by the researcher covering careers in

agriculture, scholarship opportunities, and higher education opportunities taught using lecture and cooperative learning instruction.

Kagan Structure – a simple, step-by-step instructional strategy designed to increase student engagement and cooperation during cooperative learning activities (Kagan & Kagan, 2009).

Knowledge acquisition – the amount of information able to be recalled immediately after a presentation; knowledge difference between pretest and posttest (Bloom, Engelhart, Furst, & Hill, 1956).

Lecture – a short-term retention method to present content, key points, and concepts in a classroom setting primarily using only verbal communication (Newcomb et al., 2004).

Non-traditional secondary agriculture student – a student who does not live on farm or in a rural area (Bellah, Mayfield, & Neal, 2008), with four or less courses taken in secondary agricultural education and who is not a member of the FFA (Baggett-Harlin & Weeks, 2000).

Roundtable – a Kagan structure in which students take turns generating written responses and making contributions as a team on a task provided by the instructor (Kagan & Kagan, 2009).

Rural – an area of land encompassing less than 2,500 persons (United States Census Bureau, 1994).

Rural Farm – a rural area of land encompassing less than 2,500 persons and earns an agricultural income of 1,000 dollars or more per year (United States Census Bureau, 1994).

Secondary Agricultural Education – a systematic framework of instruction in agriculture and natural resources for the purpose of (1) preparing students for successful careers, (2) job

creation and entrepreneurship, and (3) agricultural literacy in order for individuals to make a lifetime of informed choices in the global agriculture, food, fiber, and natural resources systems (National FFA Organization, 2011a). This term was previously known as vocational education until 1998.

Suburban – an area of land encompassing 2,500 to 50,000 persons (United States Department of Commerce [Commerce], 2010).

Traditional secondary agriculture student – a student who has taken more than four secondary agricultural education courses prior to his/her junior or senior year of high school (Baggett-Harlin & Weeks, 2000), live in rural or rural farm areas, and is a member of the FFA.

Urban – an area of land encompassing more than 50,000 persons (Commerce, 2010).

Assumptions

The following assumptions were made prior to and during this study:

1. The instrument was a valid form of measuring the subject knowledge acquisition.
2. The instruction was taught consistently during each control and treatment group at each location.
3. The treatment was different enough to produce variability of the control.
4. The convenience sample was representative of secondary agricultural education students in the state of Arkansas.
5. The participants have no specific information about FFA scholarship opportunities prior to this study.
6. The participants had not participated in classes providing prior knowledge of the *FFA Door for the Future* instructional materials.

7. The participants had no physical disability preventing them from seeing and/or hearing the instruction.
8. The participants had no learning disability affecting their cognitive performance.
9. The participants answered all questions honestly and to the best of their ability.

Limitations

The following limitations should be considered when reading this study:

1. The sample used in the study was a convenience sample and not randomized. Therefore, generalizing the conclusions, results, and implications of this study beyond the sample is inappropriate.
2. The degree to which the instrument was utilized was a valid and reliable measure of the variables being studied.
3. The research design does not control for interaction of selection.
4. The research design does not control for interaction of testing and selection bias or experimental treatment of external validity.
5. Schools with junior high programs could have a negative effect on the statistical power of this study.

CHAPTER II: REVIEW OF LITERATURE

Introduction

"Most Americans know very little about agriculture" (National Research Council, 1988, p. 9). As a result, students enter agricultural education classrooms with less hands-on experiences and varying perceptions of agriculture and agricultural education (Hoover & Scanlon, 1991). Teachers are challenged to educate all students with varying degrees of knowledge and experience about agriculture. According to Newcomb et al. (2004), lecture has been the primary teaching method used in agricultural education, but with changes in student knowledge, skills, or experiences, agricultural educators need to vary teaching practices to better meet the needs of students (Hoover & Scanlon, 1991).

In this chapter, the literature review presents the conceptual and theoretical frameworks relating to lecture and cooperative learning instruction in secondary agricultural education settings. Literature was gathered focusing on the following areas: instructional techniques, cooperative learning, and constructivist theories to develop the study's foundation.

Conceptual Framework

Vocational Education

Vocational education began in the 1900s with the Smith-Lever and the Smith-Hughes Acts and continued until the 1980s when the Carl D. Perkins Act shifted the focus toward career and technical education (Day, 2009). The Vocational Education Act of 1963 was passed to "strengthen and improve the quality of vocational education and to expand vocational education opportunities in the nation" (Phipps et al., 2008, p. 29).

Vocational education is defined as courses designed to prepare students for paid and unpaid employment through instruction and apprenticeships (Hayward, 1993). Charles Prosser

summarized that "the purpose of vocational education is to help a person secure a job, train him so that he can hold it after he gets it, and assist him in advancing to a better job" (as cited in "History and development of agricultural education," n.d., para. 3). Vocational education was once intended for individuals to gain skills or competencies through instruction or apprenticeships. However, instruction is now directed towards all facets of agriculture, including non-farming activities in preparation for college (Talbert et al, 2005).

Vocational education has provided students with instructional methods of teaching that are organized and systematic (Talbert et al., 2005). In the effort to aid students to develop skills and master knowledge, "vocational agriculture instructions are challenged by students with a wide variety of learning styles" (Rollins, 1990, p. 64). Individual learning styles are influenced by personal learning methods and impact teaching methods (Whittington & Raven, 1995). Teachers should develop lessons which encompass both individual and student group learning (Landrum & McDuffie, 2010).

Instructional Techniques

"Curriculum is the set of experiences, courses of study, and activities outlined by an educational program in which students must engage to achieve the desired educational outcomes of the program" (Phipps et al., 2008, pp. 112-113). Similarly, a student's academic performance is a product of experiences brought forth during educational tasks and situations (Rollins, 1990). Curricula are an essential aspect of education and serve as a guide for teachers; however, agricultural education curricula differ from traditional academic curricula (Phipps et al., 2008). Agricultural education curricula are designed for students to learn through application (Phipps et al., 2008). The concept of designing agricultural education curricula to learn through application is expressed in the National FFA Organization (2010) motto "learning to do, doing to learn,

earning to live, living to serve" (p. 17). Humans retain information using a variety of methods, developing methods to acquire information, or master skills that suit them the most (Landrum & McDuffie, 2010).

Lecture Method

Lecture is the most common method of instruction for passing on information to students (Kindsvatter, Wilen, & Ishler, 1995; Waldron & Moore, 1991). Lecture based instruction is a one-way, teacher centered presentation of information and ideas (Kindsvatter et al., 1995; Waldron & Moore, 1991; Morrison, Ross, Kemp, & Kalman, 2011). More commonly, lecture based education is the study of facts and ideas that have occurred in the past (Dewey, 1938). In using lectures, teachers should follow a few guidelines. Lectures should be clearly developed, organized, and complete using an outline or lesson plan that highlights content, key points, or concepts (Newcomb et al., 2004). Introducing new concepts and ideas, lecture should be communicated in a relatively short period of time (Sallee, 2010). Teachers need to be prepared and knowledgeable about the material in order for lecture to affect student learning (Newcomb et al., 2004). Lecture is designed as a good teaching method to present factual information, directions, suggestions, and comments, yet lectures have been overused and abused (Newcomb et al., 2004). Although lecture allows for student learning, lecture only permits little opportunity for communication between the instructor and students. Another method of conveying information and allowing for communication is to use cooperative learning.

Cooperative Learning

Cooperative learning is an aspect of both social constructivism and learning styles. Cooperative learning is "a successful teaching strategy in which small teams; each with students of different level of ability use a variety of learning activities to improve understanding of a

subject" (Balkcom, 1992, What Is It section, para. 1). Balkcom (1992) indicated that cooperative learning improves academic achievement, behavior and attendance, self-confidence, motivation, and classroom comradery. In 2009, Kagan and Kagan indicated that "students coming from classrooms that include cooperative learning are better prepared for higher education" (p. 1.19). Kesler (1998) concluded that the majority of students learned more from lecture, but found group activities more challenging and enjoyable. Cooperative learning is frequently used to increase active learning (speaking, listening, writing, and reflection) and social learning (Kose, Sarin, Ergun, & Gezer, 2010).

Cooperative learning allows student to work together in groups to learn and to teach one another until all group members successfully understand and complete the assignment (Haller, Gallagher, Weldon, & Felder, 2000). Cooperative learning is successful in that members of the team are responsible for not only learning the material taught, but also for contributing to classmates, thereby creating achievement ("Cooperative learning," n.d.). Research has further elaborated on this achievement by the following benefits of group activities/peer learning:

1. Increases student interest and retention.
2. Teaches teamwork, critical thinking, and responsibility.
3. Encourages competition and development of public speaking skills.
4. Motivates students through involvement and challenges.
5. Promotes positive relations among different ethnic groups.
6. Implements peer coaching.
7. Establishes environments where academic accomplishments are valued (Balkcom, 1992).

Alternative teaching methods have been studied over the past 100 years and numerous alternative teaching methods have been identified. Most teaching methods have been compared to the lecture methods. From a 2005 study, a significant difference was noted in students taught with cooperative learning compared to students taught with lecture method. The results showed an increase in test scores of students taught with cooperative learning (Yoder & Hochevar, 2005). The results of this study compliment the idea that students learn more by being active than by simply watching and listening (Bonewell & Eison, 1991).

In a second study conducted by Kesler (1998), students taught using cooperative learning indicated that the teaching method was challenging and complementary to the lecture. The study analyzed questionnaire responses comparing and contrasting lecture and cooperative learning teaching methods of college biology students. Kesler (1998) noted that 71% of students learned more from lecture, but the majority of the students rated cooperative learning as enjoyable. Contradictory to Kesler's study, Kose et al. (2010) found that "cooperative learning is more effective than direct instruction with respect to achievement and attitudes" (p. 178).

Engagement

Student engagement or "learner engagement is the extent to which all learners (a) are motivated and committed to learning, (b) have a sense of belonging and accomplishment, and (c) have relationships with adults, peers, and parents that support learning" (Jones, 2009, p. 24). According to Schunk, Pintrich, and Meece (2008), "students are more likely to be engaged in tasks that take advantage of their backgrounds, interests, and experiences" (p. 370). Above all, engagement must happen before students begin to apply higher order, creative thinking skills (Jones, 2009). "If a student is interested and becomes meaningfully engaged…then their

attitudes will be positive towards the lesson. Subsequently, this positive attitude will affect the student's level of knowledge" (Johnston & Roberts, 2011, p. 151).

In a study on student engagement of FFA members and non-members, Talbert and Balschweid (2004) found that perceptions of agriculture and agricultural education courses impacted student engagement. The respondents indicated that their participation in the National FFA Organization increased their perception and engagement in agriculture. Talbert and Balschweid (2004) summarized results by noting "that students who are FFA members see greater value in their agricultural education classes; therefore, they are more engaged in their agricultural education classes" (p. 39).

Theoretical Framework

Constructivism

For the past decade, the theory of constructivism has been examined by a number of researchers as the framework best suited for education and more specifically, agricultural education (Doolittle & Camp, 1999). Agricultural education programs have utilized constructivism as the "learning by doing" theory in which lessons are based upon.

Constructivism consists of a collection of theories, including generative learning (Wittrock, 1990), discovery learning (Bruner, 1961), and situated learning (Brown, Collins, & Duguid, 1989). Constructivism has been utilized in both philosophy and psychology (Doolittle & Camp, 1999). Constructivism is "based on the premise that we all construct our own perspective of the world, based on individual experience and schema" (Schuman, 1996, Constructivism section, para. 4) in order to prepare learners to solve problems in ambiguous situations. Doolittle and Camp (1999) summarized constructivism as acknowledging:

> the learner's active role in the personal creation of knowledge, the importance of experience (individual and social) in this knowledge creation process, and the realization that the knowledge created will vary in its degree of validity as an accurate representation of reality (Constructivism section, para. 3).

Constructivism strategies are school requirements throughout America and "is currently discussed in many schools as the best method for teaching and learning" (Powell & Kalina, 2009, p. 241). Constructivism consists of two main strategies to affect students both cognitively and socially as individuals collaborate with other learners (Doolittle & Camp, 1999; Duffy, Lowyck, & Jonasses, 1993; Powell & Kalina 2009). Constructivism consists of eight essential factors which aid teachers in adapting to the constructivist theory in the classroom. The essential factors of constructivist pedagogy are:

1. Learning should take place in authentic and real-world environments.
2. Learning should involve social negotiation and mediation.
3. Content and skills should be made relevant to the learner.
4. Content and skills should be understood within the frameworks of the learner's prior knowledge.
5. Students should be assessed formatively, serving to inform future learning experiences.
6. Students should be encouraged to become self-regulatory, self-mediated, and self-aware.
7. Teachers should serve primarily as guides and facilitators of learning, not instructors.

8. Teachers should provide for and encourage multiple perspectives and representations of content (Doolittle & Camp, 1999; Essential Factors of Constructivist Pedagogy section, para. 1-18).

Social Constructivism

Social constructivism is an aspect of constructivism. Bandura's (1986) social constructivism theory takes into account that individuals develop and function within numerous social influences instead of an isolated environment. Prawatt and Floden (1994) explained the focus of social constructivism as a shared social experience and social negotiation of meaning emphasized through the social nature of knowledge, and belief that knowledge is the result of social interaction and language usage. "Social constructivism is based on the social interactions of a student in the classroom along with a personal critical thinking process" (Powell & Kalina, 2009, p. 243).

Doolittle and Camp (1999) used social constructivism as a social learning experience "through teacher-student interactions, cooperative learning groups, or classroom discussions" (Social constructivism section, para. 3). Social constructivism is an effective teaching method that benefits all students through incorporating collaboration and social interaction (Powell & Kalina, 2009). Vygotsky (1978) believed social interaction is an integral part of learning and that social interaction and cultural influences highly affect students and how students learn. Social constructivism theory entails that cooperative learning created deeper understanding and aided in developing a social constructivist classroom (Powell & Kalina, 2009).

Chapter Summary

Cooperative learning has a place in education and more specifically agricultural education as students need to receive instruction through varying teaching methods. In using

cooperative learning, students communicate and work in groups to learn material and assist team members to achieve a common goal. While achieving a common goal, students are challenged to develop social skills to explore and negotiate with classmates and the instructor using constructs of social constructivism.

This review of literature established the importance and effects of cooperative learning for students. Cooperative learning was one of two teaching methods used to determine the impact of knowledge acquisition and perceptions on secondary agricultural education students. These methods and concepts were selected to guide the researcher in answering the specific research objectives and hypotheses of this study.

CHAPTER III: METHODOLOGY

Introduction

Today, more non-traditional students are enrolled in secondary agricultural education programs. The lack of hands-on experiences challenges teachers to educate students who are further removed from agriculture. The conceptual and theoretical framework of this study was guided by the central tenets of social constructivism and cooperative learning. Together, these frameworks helped form the objectives towards determining student perceptions of agriculture and student learning in a secondary agricultural education setting providing predictions of each hypothesis. A quasi-experimental, nonequivalent control group design with pretest-posttest from Campbell and Stanley (1963) was utilized for this study. In the chapter, methods used to address the research questions are discussed. This chapter reports the procedures, research design, population and sample, instrumentation, data collection procedures, and data analysis techniques.

Statement of the Problem

Changes in school requirements and demographics have impacted student enrollment in secondary agricultural education programs. Students are more diverse in knowledge and experience about agriculture than previous generations of students. Hoover and Scanlon (1991) stated that agricultural educators should vary teaching practices to meet the needs of students with less hands-on experience. However, questions remain as to the best method to educate secondary agricultural education students. The increased number of non-traditional students has challenged teachers to educate students with vastly different expectations (Marshall et al., 1992).

Purpose

The purpose of this study was to determine if there was a significant difference ($p \leq .05$) in the knowledge acquisition between students enrolled in secondary agricultural education classes taught by cooperative learning instruction compared with lecture of the *FFA Doors for the Future* instructional materials. A secondary purpose was to explore the difference in knowledge acquisition of tradition and non-traditional secondary agricultural education students. In addition, this study looked to identify any differences in student perceptions of instruction.

Research Objectives

The following objectives were developed from the literature to guide this study:

1. Describe selected demographic and contextual characteristics of secondary agricultural education students.
2. Classify students as traditional or non-traditional secondary agricultural education students.

Hypotheses

The following hypotheses were formulated to guide this study:

Null Hypotheses

Ho_1: There will be no significant difference in knowledge acquisition found between students taught by lecture instruction compared with cooperative learning instruction through the *FFA Doors for the Future* instructional materials.

Ho_2: There will be no significant difference in knowledge acquisition found between traditional and non-traditional students through the *FFA Doors for the Future* instructional materials.

Ho_3: There will be no significant difference in student perceptions of the methods of instruction through the *FFA Doors for the Future* instructional materials.

Alternative Hypotheses

Ha_1: There will be a significant difference in knowledge acquisition between students taught by lecture instruction compared with cooperative learning instruction through the *FFA Doors for the Future* instructional materials.

Ha_2: There will be a significant difference in knowledge acquisition between traditional and non-traditional students through the *FFA Doors for the Future* instructional materials.

Ha_3: There will be significant difference in student perceptions towards methods of instruction through the *FFA Doors for the Future* instructional materials.

Data Collection and Procedures

Research Design

This study was guided by Campbell and Stanley's (1963) quasi-experimental design utilizing a nonequivalent control group design with pretest-posttest. They described a quasi-experimental design as follows:

> There are many natural social settings in which the research person can introduce something like experimental design into his scheduling of data collection procedures (e.g., the when and to whom of measurement), even though he lacks the full control over the scheduling of experimental stimuli (the when and to whom of exposure and the ability to randomize exposures) which makes a true experiment possible (p. 34).

This study conformed to design #10 (Campbell & Stanley, 1963). An alpha level was set *a priori* at 0.05. This level was consistent with similar research prominent in the review of literature. An outline of the study design follows in Table 3-1.

Table 3-1

Modified Nonequivalent Control Group Research Design #10 by Campbell and Stanley, 1963.

Group	Pretest	Lesson	Posttest
1	O_1	X_{C1}	O_2
2	O_1	X_{L1}	O_2

Note. O = observations, X = treatment, C = cooperative learning, and L = lecture.

In this research design, observations (O) occurred through assessments (pretest and posttest). The treatment (X) consisted of a unit of instruction designed by the researcher, called *FFA Doors for the Future* which focused on careers in agriculture, scholarship options through FFA, and higher education options at the University of Arkansas. Approval to conduct this research was granted by the Institutional Review Board (IRB) and is included as Appendix A.

Instructional material was taught via lecture or cooperative learning with the instruction following developed lesson plans. Appendix B is the lecture lesson plan while Appendix C is the lesson plan for cooperative learning. The case study used with the cooperative learning lesson is included as Appendix D with the accompanying worksheet as Appendix E.

The following resources were used to develop lesson plans: Ag Day (2011), Arkansas FFA Foundation (2010, November 8), Georgia Agricultural Education (2011), Kagan and Kagan (2009), National FFA Organization (2011c), National FFA Organization (2011d), National FFA Organization (n.d.), and University of Arkansas Dale Bumpers College of Agricultural, Food & Life Sciences (n.d.).

Descriptive statistics were used to characterize the study population. Inferential statistics were used to complete analyses of pretests and posttests. Data were collected during the fall 2011 semester from participating schools. Data were analyzed using Statistical Package for the Social Sciences (SPSS©) PASW Statistics 18 software package.

Population and Sampling Procedures

The target population for this study was students enrolled in high school agriculture courses at eight Arkansas secondary schools during the 2011-2012 academic year. A convenience sample of schools who participated in the *Visual Communications on the Road in Arkansas: Video and Creative Projects to Promote Agriculture* (mobile classroom) project conducted through the University of Arkansas Agricultural and Extension Education Department was used in the study. Eight Arkansas secondary public schools participated in the study. Teachers of participating schools were informed of the research study that would take place during breakout sessions coinciding with the mobile classroom visits. All teachers and students consented to participate in the study. The parental/student consent form is contained in Appendix F.

Instrumentation

Instruments developed for this study were constructed from the literature to measure the main constructs found in the *FFA Doors for the Future* instructional materials. Instruments were developed based on current literature and reviewed by a panel of agricultural education, communications, and technology experts familiar with secondary agricultural education instruction to maintain face and content validity. The panel also reviewed the instructional materials used in the research. Improvements were made to insure the instruments were valid to test the hypotheses of this study. Instruments consisted of two sections: (a) a pretest with

demographics and (b) a posttest with perceptions of each instructional method were administered.

The pretest was composed of two sections (see Appendix G). The first section, knowledge, was comprised of 10 multiple choice questions regarding material presented in the *FFA Doors for the Future* instructional materials. The knowledge section was divided into three subsections; agriculture careers, scholarships, and higher education. The second section, demographics, was composed of 11 questions covering (a) basic demographics (gender, ethnicity, and grade level), (b) questions associated with number of courses taken in agriculture as well as (c) participation in the FFA. This information was used to classify students as either traditional or non-traditional secondary agricultural education students.

The posttest was composed of two sections (see Appendix H). The knowledge portion was comprised of the same 10 multiple choice questions regarding material presented in the *FFA Doors for the Future* instructional materials as the pretest. The knowledge section of the posttest was broken into the three subsections; agricultural careers, scholarships, and higher education. The student perceptions questions were adapted from an instrument by Silance and Remmers (1934) to fit each method of instruction. Twenty one questions were used for the students to rank on a Likert scale from one to seven: 1 = *strongly disagree* and 7 = *strongly agree*. Questions were developed about student perceptions pertaining to the instructional topic and likelihood of going to college and/or seeking a degree in agriculture.

Internal and External Validity

According to Campbell and Stanley (1963), the nonequivalent control group design does not control for all threats to internal and external validity. Schools used in this study were selected based on their teacher's voluntary participation in the mobile classroom school visit.

Thus, the secondary agricultural science students in this study were a convenience sample enrolled in classes that did not participate in the mobile classroom activities. Selection posed the greatest threat to internal validity as the students of each class differed in age, ability, gender, race and agricultural experience which could affect the results. A minor threat was mortality as students left the classroom for other school functions, causing the population of the study to decline. The setting of the research was controlled because the students took part in the study for approximately 50 minutes—one class period. Thus, the administration of the pre-test/post-test in this time period may have influenced the post-test results. By minimizing the amount of time used to conduct each control and treatment, participants had no chance to communicate with each other. History, instrumentation, statistical regression, and maturation were not considered threats to internal validity.

External validity is also a threat to a nonequivalent control group design (Campbell & Stanley, 1963). The interaction effects of testing, selection bias, and experimental treatment were considered the primary threats to external validity. The pre-test provided clues to the information being taught in the class and may have affected the post-test answers. Because the classes were intact groups, the results of the knowledge acquisition for the two teaching methods cannot be generalized to all student populations. The reactive effects of experimental arrangement and multiple treatment interferences were not considered threats.

Pilot

A pilot was conducted using participants of schools who participated in the mobile classroom project during the spring 2011 semester. Consent forms were sent to the participating schools' secondary agricultural education instructors prior to the visit. These forms were collected before students received the pretest, which was followed by either lecture instruction or

cooperative learning instruction. Following each teaching method, participants were given a posttest. After the pilot was completed, adjustments were made to the curriculum and instruments to make the information.

Reliability

Instrument reliability was tested for internal consistency. The Cronbach's Alpha statistic was calculated at .93 to test the instrument consistency of participants' answers for similar questions. No questions from the instrument were changed or eliminated to improve the reliability based on this result.

Treatments

The researcher compared two forms of instruction—lecture and cooperative learning. These two independent variables were chosen in order to maximize variance between methods of instruction as suggested by Kerlinger (1973). The researcher-created instructional materials were based on investigation of careers in agriculture, scholarship options through FFA, and higher education options at the University of Arkansas.

Lecture instruction was presented by the researcher teaching the lesson, *FFA Doors for the Future* lesson plan (see Appendix C). The researcher made all explanations verbally. Cooperative learning instruction (see Appendix D) included a group activity case study (see Appendix E) covering the material in the *FFA Doors for the Future* lesson plan. The cooperative learning instruction also included a Kagan Cooperative Learning structure worksheet (see Appendix F), which was answered within each group after reading the case study. The researcher provided copies of the case study to each member of the group.

Conditions for Testing

Data were collected during their regularly scheduled class period in their classroom in the fall semester of 2011. Classes took place throughout the day of the visit. Participants completed two separate instruments for data collection. The first test was given at the beginning of class period prior to the instruction for the study. Following the pretest, the participants were taught using the first treatment. After completion of the lecture or cooperative learning treatment, participants completed the posttest. Participants were taught and administered tests during a 50 minute class period.

Data Collection Procedures

All participants in the study were provided a consent form (see Appendix B) prior to data collection. Students were required to have a parental/guardian sign a consent form to participate in the study. Consent forms were collected on the day data was collected at each school.

Data were collected from the study's participants two separate times. The researcher was present for all class periods in which lecture instruction or cooperative learning instruction was administered. Before each test, the researcher informed the participants that a grade would not be assigned on the tests. The participants were, however, encouraged to answer each question to the best of their ability and as honestly as possible. The instruments consisted of questions covering important constructs in the lecture and the cooperative learning activity, questions on perceptions of the curriculum and teaching method, demographics, and courses taken in a secondary agricultural education program.

The participants' initial knowledge acquisition for the *FFA Doors for the Future* instructional materials was measured using a pretest at the beginning of the lecture or cooperative learning instruction class period. The *FFA Doors for the Future* instructional

materials were administered by the researcher after all pretests were collected. Following *FFA Doors for the Future* instructional materials, the posttest was administered and collected.

Methods of teaching, lecture or cooperative learning, were randomized from class to class throughout the visit. The first class received a traditional lecture following the lesson plan, *FFA Doors for the Future*. The lecture required approximately 30 minutes of the class period used for treatment implementation.

The next class received the *FFA Doors for the Future* instruction through cooperative learning using the Kagan Cooperative Learning structures worksheet. The cooperative learning instruction was based on students learning in groups about the curriculum from given materials. The time allotted for participants was approximately 30 minutes.

Following each method of teaching, posttests were administered to the participants to assess knowledge acquisition. The posttests used the same constructs found in the pretest. There was also an additional section covering the student's perception of the lesson and method of instruction.

Chapter Summary

A quasi-experimental design utilizing a nonequivalent control group design with pretest-posttest (Campbell & Stanley, 1963) was used for this study. A convenience sample of enrolled agricultural education students at eight schools who participated in the *Visual Communications on the Road in Arkansas: Video and Creative Projects to Promote Agriculture* (mobile classroom) project was utilized in the study. Instruments were developed to determine knowledge acquisition for lecture and cooperative learning instructional methods. Methods of teaching were randomized for each school.

CHAPTER IV: FINDINGS

Purpose

The purpose of this study was to determine if there was a significant difference ($p \leq .05$) in the knowledge acquisition between students enrolled in secondary agricultural education classes taught by cooperative learning instruction compared with lecture of the *FFA Doors for the Future* instructional materials. A secondary purpose was to explore the difference in knowledge acquisition of tradition and non-traditional secondary agricultural education students. In addition, this study looked to identify any differences in student perceptions of instruction.

Results obtained through hypothesis testing compared traditional lecture to cooperative learning lesson activities presented to participants of this study. Specifically, knowledge acquisition, student perceptions, demographic characteristics of traditional and non-traditional students, and methods of instruction are reported.

Demographics

The population for this study was students enrolled in eight high school agriculture programs in the state of Arkansas. Schools were chosen based on participation in the *Visual Communications on the Road in Arkansas: Video and Creative Projects to Promote Agriculture* (mobile classroom) project. However, the population for this study was students that did not participated in the activities of the mobile classroom.

Data were collected in the fall of 2011. Of the original 548 students enrolled in agricultural education classes, 108 students were removed due to an absence of any instrument (pretest or posttest) and/or consent form required for the study, resulting in a usable sample size of 440 ($n = 440$) participants. This resulted in an 80.3% response rate of potential participants. Participate demographics include gender, grade classification, ethnicity, method of instruction, and student classification.

Results

Research Objective One: Describe selected demographic and contextual characteristics of secondary agricultural education students.

Gender

Table 4-1 contains the gender of the 440 participants of the study. Gender classification was obtained to help describe the enrollment in the agricultural education programs. Results show that a majority of the participants was male (76.8%) and (23.2%) were female.

Table 4-1

Participant Gender (*n* = 440)

Gender	*f*	*%*
Male	338	76.8
Female	102	23.2
Total	440	100.0

Grade Classification

Grade classification was used as a variable of study to further delineate participants and is presented in Table 4-2. Students in the 9th grade comprised the largest percentage of students (30.0%) while 10th grade students represented 25.2% of participants in the study. Eleventh graders comprised 17.5% and 12th graders represented 17.0% of the participants for this study. A small number of 7th graders (4.3%) and 8th graders (5.9%) participated in the study.

Table 4-2

Participant Grade Classification (*n* = 440)

Grade Level	*f*	%
7	19	4.3
8	26	5.9
9	132	30.0
10	111	25.2
11	77	17.5
12	75	17.0
Total	440	100.0

Ethnicity

Participants of the study were of various ethnic backgrounds as shown in Table 4-3. The majority of the participants' indicated they were Caucasian (72.0%) with the second largest percentage of participants indicated that they were Hispanic/Latino (7.3%). Twenty seven participants indicated they were of another ethnicity (6.1%). The remaining participants reported being African American (4.8%), American Indian/Alaskan Native (4.8%), and Foreign (0.9%). Additionally, 18 participants (4.1%) did not report their ethnicity.

Table 4-3

Participant Ethnic Background (*n* = 440)

Ethnicity	*f*	%
African American	21	4.8
American Indian/Alaskan Native	21	4.8
Caucasian	317	72.0
Foreign	4	.9
Hispanic/Latino	32	7.3
Other	27	6.1
Missing Responses	18	4.1
Total	440	100.0

Methods of Instruction

Data were collected on method of instruction received by the students. The methods of instruction used in this study were classified as lecture or cooperative learning. Table 4-4 shows that the majority (55.2%) of the participants received instruction through a lecture, with 44.8% of participants received cooperative learning instruction.

Table 4-4

Participant Method of Instruction Received (*n* = 440)

Student Classification	*f*	%
Lecture	243	55.2
Cooperative Learning	197	44.8
Total	440	100.0

Research Objective Two: Classify students as traditional or non-traditional secondary agricultural education students.

Student Classification

Table 4-5 shows that 55.0% of participants were classified as traditional students, meaning they had taken more than four secondary agricultural education courses prior to the junior or senior year of high school. Traditional students are also members of the FFA. Non-traditional students are students not from a farm or rural area, with four or fewer courses taken in secondary agricultural education and who were not members of the FFA. Non-traditional students represented 45.0% of the participants.

Table 4-5

Participant Student Classification (n = 440)

Student Classification	*f*	%
Traditional	242	55.0
Non-traditional	198	45.0
Total	440	100.0

Null Hypothesis One: There would be no significant difference in knowledge acquisition between students taught by lecture instruction compared to those who received cooperative learning instruction of the FFA Doors for the Future instructional materials.

To test this hypothesis, participants were administered a pretest and posttest. Table 4-6 displays the mean scores for the pretest and posttest for both lecture and cooperative learning (n = 440). The pretest and posttest consisted of 10 multiple choice questions to assess knowledge acquisition. Each question was worth one point and resulting sums by each participant were used to test hypothesis one on a 0 to 10 scale. While the lecture group had a pretest average mean of 3.44 (SD = 1.45), the cooperative learning group pretest mean was 3.38 (SD = 1.32). Mean

posttest scores for the lecture group was 5.19 (*SD* = 1.90) with the cooperative learning group recorded mean score of 5.11 (*SD* = 1.87). The mean scores show about the same level of knowledge before and after the lessons; however, students in the cooperative learning classes had the lowest mean scores on the pretest and posttest.

Table 4-6

Knowledge Acquisition Means for Methods of Instruction (*n* = 440)

		Pretest		Posttest	
	n	*M*	*SD*	*M*	*SD*
Lecture	243	3.44	1.45	5.19	1.90
Cooperative Learning	197	3.38	1.32	5.11	1.87
Total	440				

Note. Knowledge acquisition scores were assessed on a scale of 0 to 10, with 0 representing no knowledge and ten representing correct responses for all questions.

An independent samples *t*-test was used to test hypothesis one, which stated that there would be no significant difference in knowledge acquisition between students taught by lecture instruction compared with cooperative learning instruction of the *FFA Doors for the Future* instructional materials. Means for knowledge acquisition were analyzed for the lecture and cooperative learning groups by using gain scores (subtracting the pretest mean from the posttest mean). Results indicated about the same level of change occurred with both methods of instruction at about the same level of change. Mean gain score of the lecture method was 1.76 (*SD* = 2.08); cooperative learning methods mean gain score was 1.74 (*SD* = 1.91). Table 4-7 showed no significant difference in knowledge acquisition between the lecture instruction and cooperative learning instruction, $t\ (438) = .11$; $p = .91$. The null hypothesis failed to be rejected ($p = .91$). Knowledge acquisition was greater for students in lecture based instruction.

Table 4-7

t-test for Knowledge Acquisition in Methods of Instruction (n = 440)

Instructional Methods	*n*	*M*	*SD*	*t*	*p*
Traditional Lecture	243	1.76[1]	2.08		
				.11	.91
Cooperative Learning	197	1.74[1]	1.91		

Note: [1] Derived from gain score (pretest score subtracted from posttest score).

Null Hypothesis Two: There would be no significant difference in knowledge acquisition between traditional and non-traditional students of the FFA Doors for the Future instructional materials.

Null hypothesis two was tested using an independent samples *t*-test. Means for knowledge acquisition were calculated for the lecture and cooperative learning groups by using gain scores (subtracting the pretest mean from the posttest mean). Traditional students had a mean gain score of 2.05 (SD = 1.88) for knowledge acquisition and non-traditional students mean gain score was 1.38 (SD = 1.08). A significant difference was found in knowledge acquisition between traditional and non-traditional secondary agricultural education students, $t(438) = 3.51$; $p = .001$, resulting in the null hypothesis being rejected. This data is shown in Table 4-8. Traditional students' knowledge acquisition was greater than non-traditional students.

Table 4-8

t-*test for Knowledge Acquisition in Student Classifications* (n = 440)

Student Classifications	*n*	*M*	*SD*	*t*	*p*
Traditional	242	2.05[1]	1.88		
				3.51	.001*
Non-traditional	198	1.38[1]	1.08		

Note: [1] Derived from gain score (pretest score subtracted from posttest score).
Note: * denotes that p significant < .05

Null Hypothesis Three: There would be no significant difference in student perceptions towards methods of instruction of the FFA Doors for the Future instructional materials.

Perceptions were measured using a Likert Scale from 1 to 7 with 1 = *strongly disagree* to 7 = s*trongly agree*. The means of perception toward the methods of instruction (traditional lecture and cooperative learning) are noted in Table 4-9 by each statement. Missing responses were noticed for both lecture and cooperative learning groups. The number of responses varied due to students not answering perception statements. The statement, *I hate the lesson,* received the highest score by both lecture (M = 5.81; SD = 1.59) and cooperative learning (M = 4.99; SD = 1.98) groups and *the lesson amazed me* perception statement received the lowest score by both lecture (M = 3.72; SD = 1.79) and cooperative learning (M = 3.21; SD = 1.81) groups.

Table 4-9

Perceptions for Methods of Instruction (n = 440)

	Lecture		Cooperative Learning	
Statements	*n*	*M*(*SD*)	*n*	*M*(*SD*)
I really enjoyed the lesson.	241	4.60 (1.49)	197	3.94 (1.67)
The lesson is very practical.	241	4.93 (1.44)	197	4.38 (1.58)
I could do very well without the lesson.	238	4.61 (1.65)	196	4.05 (1.85)
The lesson is okay.	243	4.60 (1.53)	194	4.47 (1.57)
The lesson is a waste of time.	240	5.68 (1.55)	196	4.82 (1.86)
I am not interested in the lesson.	242	4.98 (1.90)	197	4.44 (1.95)
I have no desire for the lesson.	241	5.22 (1.80)	194	4.36 (2.01)
I have seen no values in the lesson.	241	5.59 (1.62)	193	4.55 (1.97)
The lesson is a good subject.	241	5.09 (1.68)	194	4.46 (1.71)
I hate the lesson.	241	5.81 (1.59)	195	4.99 (1.98)
The lesson amazed me.	240	3.72 (1.79)	196	3.21 (1.81)
The lesson did not hold my interest at all.	240	5.00 (1.71)	192	4.36 (1.86)
The lesson is interesting.	242	4.56 (1.62)	196	3.87 (1.78)
To me the lesson is boring.	241	4.98 (1.79)	194	4.15 (2.02)
The lesson is dull.	238	4.78 (1.90)	193	4.29 (1.98)
The lesson can be used in real life.	240	5.47 (1.65)	192	4.68 (1.81)
All the materials in the lesson are not interesting.	240	5.28 (1.71)	193	4.44 (1.90)
The lesson cannot benefit me.	241	5.31 (1.87)	194	4.65 (1.88)
The lesson is enjoyable.	241	4.51 (1.69)	196	4.12 (1.87)

Note: Likert Scale of 1 to 7 with 1 representing *strongly disagree* to 7 representing *strongly agree*.

An independent samples *t*-test was also used to test hypothesis three. Students in the lecture method of instruction reported a higher mean score (M = 4.94, SD = 1.09) than those in

the cooperative learning session (M = 4.28, SD = 1.27). This difference was found to be significant, $t(438) = 5.78$; $p = .000$. This finding resulted in the null hypothesis being rejected ($p = .000$) (Table 4-10). Lecture was the preferred method of instruction based on perception response.

Table 4-10

t-*test for Perceptions in Methods of Instruction* (n = 440)

Instructional Methods	*n*	*M*	*SD*	*t*	*p*
Lecture	243	4.94[1]	1.09		
				5.78	.000*
Cooperative Learning	197	4.28[1]	1.27		

Note: [1]Derived from grand mean [sum of all means divided by number of perception statements (19)].
Note: * denotes that p significant < .05

Chapter Summary

This chapter presented findings obtained from this study by the research objectives and hypotheses. Demographics from the sample were provided in an effort to fully describe the participants (n = 440). Knowledge acquisition was based on methods of instruction received and student classification. Hypothesis one presented no significant difference in knowledge acquisition of participants taught by lecture and cooperative learning instruction when learning about the *FFA Doors for the Future* instructional materials. A significant difference was found for hypothesis two with traditional students displaying higher gains in knowledge acquisition than non-traditional students. The findings for hypothesis three regarding the perception of the methods of instruction were significant with students indicating a preference for the lecture method of instruction more than cooperative learning.

CHAPTER V: CONCLUSIONS AND RECOMMENDATIONS

Summary of Findings

The findings of this study are summarized in this chapter using the objectives and hypotheses presented in earlier chapters.

Research Objective One

Research objective one sought to describe selected demographic and contextual characteristics of secondary agricultural education students. The majority of respondents were male (76.8%), Caucasians (72.0%) who received lecture based instruction (55.2%). Of the respondents, 30.0% indicated 9th grade as their school classification.

Research Objective Two

Research objective two guided the study to classify participants as traditional or non-traditional secondary agricultural education students. In the study, 55.0% of participants were traditional students. The remaining participants were non-traditional students (45.0%).

Null Hypothesis One

The data revealed that the method of instruction received did not have a significant effect on test scores, $t(438) = .11$; $p = .91$. Traditional lecture method participants recorded a mean score of 1.76 ($SD = 2.08$) while cooperative learning method participants was 1.74 ($SD = 1.91$). Null hypothesis one failed to be rejected.

Null Hypothesis Two

Analysis revealed a significant difference of knowledge acquisition between traditional and non-traditional students, $t(438) = 3.51$; $p = .001$. Traditional students received a knowledge acquisition mean gain score of 2.05 ($SD = 1.88$) and the non-traditional students obtained a mean

gain score of 1.38 (*SD* = 1.08). Null hypothesis two was rejected and the alternative hypothesis was accepted.

Null Hypothesis Three

Results of this analysis showed a significant difference, $t(438) = 5.78$; $p = .000$ in perception of the methods of instruction. For the lecture group, a mean perception score of 4.94 (*SD* = 1.09) was reported, while the cooperative learning group had a mean perception score of 4.28 (*SD* = 1.27). The perception statement *I hate the lesson* had the highest mean score from both traditional lecture (*M* = 5.81; *SD* = 1.59) and cooperative learning (*M* = 4.99; *SD* = 1.98) groups. The lowest ranked item statement was, *the lesson amazed me*, with the students receiving the lecture method rating this statement with a mean of 3.72 (*SD* = 1.79); while students in the cooperative learning classes reporting a mean score of 3.21 (*SD* = 1.81). Null hypothesis three was rejected and the alternative hypothesis was accepted.

Conclusions

Because the sample used in this study was not randomly selected, the following conclusions were drawn based on the findings and apply only to the population of this study.

1. When examining the enrollment in agricultural education programs, the participants were predominately white males, enrolled in the ninth grade and classified as traditional students.
2. When teaching secondary agricultural education students, equivalent knowledge acquisition can occur regardless of method of instruction.
3. When determining difference in knowledge acquisition between traditional students and non-traditional students, traditional students were identified as having a greater gain in knowledge acquisition.

4. When student perceptions of the different methods of instruction were evaluated, students tended to prefer lecture instruction over cooperative learning instruction.

Discussion and Implications

Landrum and McDuffie (2010) stated that humans retain information using a variety of methods. By using the *FFA Doors for the Future* instructional materials, research was conducted to determine if two methods of teaching had an effect on knowledge acquisition of students. Through understanding the impact of differentiated methods of instruction, decisions can be made towards selection of presentation methods used in agriculture classrooms.

Null Hypothesis One

No significant difference was found in knowledge acquisition between the lecture and cooperative learning instruction. Although the study did not reveal significant difference between methods of instruction, it should be noted that improvements in knowledge acquisition was evident in both the lecture and the cooperative learning groups. Based on previous research (Haller et al. 2000; Newcomb et al, 2004), lecture and cooperative learning have both been identified as good teaching styles. Knowing that knowledge was gained through lecture and cooperative learning, lessons should incorporate both individual and group learning (Landrum & McDuffie, 2010).

Given the setting in which this study was conducted, lecture and the cooperative learning instruction served the students equally well when taught the *FFA Doors for the Future* instructional materials. Contrary to the result of this study, a study by Yoder and Hochevar (2005) revealed an increase in test scores of students taught with active [cooperative] learning, compared to those students taught with lecture method. Similar research by Kesler (1998) discovered that the majority of students learned more from lecture, but found group activities challenging and enjoyable.

Although many people have called for the use of cooperative learning in education (Balkcom, 1992; "Cooperative Learning," n.d.; Powell & Kalina, 2009; Yoder & Hochevar, 2005), results of this study revealed that cooperative learning instruction served no greater benefit at producing increased knowledge than did lecture. However, results may have been impacted by students' learning styles. Whittington and Raven (1995) discovered that individual learning styles are influenced by personal learning methods. Depending on how students prefer to learn, knowledge acquisition can be affected. If no significant difference actually exists, the field of agricultural education should reexamine the impacts of cooperative learning instruction in the classroom in order to establish a better understanding of its advantages and disadvantages for future recommendations. If this study were to be replicated in the future, the instruments and design of the study should be reexamined, in order to correlate lecture and cooperative learning on knowledge acquisition

These results mirror other research results of no significant difference in knowledge acquisition when various forms of cooperative learning instruction were utilized (Kesler, 1998; Powell & Kalina, 2009; Yoder & Hochevar, 2005). However, the findings of hypothesis one were inconsistent with the results of a previous study (Kose et al., 2010), which found a significant effect on student knowledge acquisition through cooperative learning instruction. Based on the findings, it is predicted that if the lesson taught was a science based lesson, students would have learned more from cooperative learning than lecture instruction. It was also noted that the cooperative learning lesson could have had a greater impact if classmates contributed information to each other. Cooperative learning requires students to contribute knowledge to classmates for learning to occur ("Cooperative learning," n.d.). However, students were from various grades which could have impacted the communication between members of cooperative

learning groups. The educational effects of lecture and cooperative learning instruction appear to be far from settled and deserve further study.

Null Hypothesis Two

Rollins (1990) stated that students' academic performance is a product of experiences, such as those provided in FFA. According to Talbert and Balschweid (2004), "students who are FFA members see greater value in their agricultural education classes; therefore, they are more engaged in their agricultural education classes" (p. 39). Once students are engaged in the class they begin to apply higher levels of learning as explained by Bloom's Taxonomy (Jones, 2009). This study classified students as traditional and non-traditional as a means for evaluation of knowledge acquisition. The researcher defined traditional students as students who have taken more than four secondary agricultural education courses prior to his/her junior or senior year of high school (Baggett-Harlin & Weeks, 2000) and members of the FFA. In contrast, non-traditional students were defined as students not from a farm or rural area (Bellah et al., 2008). Non-traditional students were further defined as students with four or less courses taken in secondary agricultural education and not members of the FFA (Baggett-Harlin & Weeks, 2000). The results for hypothesis two showed significant difference between knowledge acquisition of traditional and non-traditional students; therefore, the researcher must assume that students who have experience, a background, and interests in agriculture and are FFA members are more engaged to learn in agricultural education classes. This conclusion was supported through research by Schunk et al. (2008), who discovered that instruction that takes advantage of students' background, interests, and experiences are more engaged in learning. The *FFA Doors for the Future* lesson appealed to traditional student's since the lesson covered agriculture and FFA concepts.

Null Hypothesis Three

Cooperative learning has been associated with increased interest and enthusiasm in the classroom (Balkcom, 1992). Research by Kesler (1998) found that students rate cooperative learning as enjoyable as well as challenging. It should be noted engagement is a key component that must be ensured before higher order thinking is expected of students. Based on the tenets of lecture, presentation of facts and ideas that have previously occurred guides its use (Dewey, 1938). In contrast, cooperative learning supports the improvement of understanding of a subject and increased active learning (Balkcom, 1992; Kose et al., 2010).

A significant difference was found in relation to student perceptions of traditional lecture and cooperative learning instruction; therefore, null hypothesis three was rejected. Lecture was perceived as a more preferred method of instruction. Considering Newcomb et al. (2004) explained that lecture is the most common and overused teaching method in agriculture one explanation of this finding is that students were accustomed to lecture. Given these results, instructors could continue to use lecture as the main method of instruction as students view lecture more positively than cooperative learning. However, instruction should incorporate aspects of cooperative learning instruction as humans retain information using a variety of instructional methods (Landrum & McDuffie, 2010).

Another explanation may be that the curriculum taught for this study may not support the tenets of cooperative learning instruction. It is surmised by the researcher that if participants had been asked to qualitatively compare and contrast lecture and cooperative learning instruction, the researcher would have gained more insight towards personal preference of the two methods of instruction. This should be studied further. With the wide variety of students who enroll in agricultural education courses, secondary agricultural education programs are challenged to meet the educational needs of students in order for each student to learn (Rollins, 1990). Teachers

should develop lessons which encompass both lecture and cooperative learning to meet the educational needs of students as suggested by Landrum and McDuffie (2010).

Using a Likert-style instrument with a range from one to seven (1 = *strongly disagree* and 7 = *strongly agree*), the researcher viewed any mean perception score between 1.00 and 3.99 as negative and between 4.01 and 7.00 as positive. Based on this scale, students perceived both lecture and cooperative learning positively; however, lecture had a significantly higher mean score than cooperative learning meaning students preferred the lecture over cooperative learning instruction. The results of hypothesis three contradict a previous study (Kesler, 1998) where subjects rated cooperative learning above lecture. This serves as an additional reason for replication of this study in order to establish consistent findings in this area.

Recommendations for Future Research

The foundation for this research was based on the social constructivism theory that defines the nature of knowledge as a social experience that is shared rather than being individual (Doolittle & Camp, 1999; Powell & Kalina, 2009). Cooperative learning is a method of instruction that is social and to a great extent a shared experience under the guidance of an instructor. Through social interaction, knowledge is gained through experience which is enriched with culture, language-based interaction, and social interaction. Vygotsky (1978) believed social interaction is an important aspect of learning and by understanding social interaction and cultural influences we should better understand how students learn (Powell & Kalina, 2009). For this study, the researcher sought to understand the effects of cooperative learning versus lecture towards knowledge acquisition and compare knowledge acquisition of traditional and non-traditional students. Cooperative learning is frequently used across the world to increase active learning and social learning (Kose et al., 2010). In addition, cooperative

learning can be easily implemented by the teacher into the classroom and is a cost effective teaching method (Balkcom, 1992). For example, this study used a RoundTable cooperative learning activity that consisted of four questions to be answered in groups. The researcher did not have to spend money to develop the questions for this activity.

Because cooperative learning is considered as a challenging method of instruction by students and is a complementary component to lecture (Kesler, 1998), further research on types of cooperative learning instruction to facilitate learning is warranted. In addition, further research is needed in order to determine why students learn more from lecture than cooperative learning (Kesler, 1998), as cooperative learning has repeatedly been identified as a method of instruction to improve learning and understanding (Balkcom, 1992; "Cooperative learning," n.d.; Kagan & Kagan, 2009; Kose et al., 2010; Yoder & Hochevar, 2005). Research results in these areas could impact the methods of instruction used in current and future classroom settings in agriculture.

The results revealed a significant difference on student knowledge acquisition of traditional and non-traditional students using the *FFA Doors for the Future* instructional materials. Future research should be conducted to determine if the difference in traditional and non-traditional students is in lecture or cooperative learning methods of instruction. More care should be taken in choosing an instructional unit to test student learning gain based on instructional techniques.

The sample for this study consisted primarily of ninth grade students. A future study of this type should investigate the effects of age and number of agricultural education courses has on student knowledge acquisition. When replicating this study in the future, researchers should include a larger sample size to ensure a more uniform, representative population is measured of

both traditional and non-traditional students and methods of instruction received. Increasing the sample size would assist in gaining a better understanding of the potential difference in knowledge acquisition of traditional and non-traditional students. Increasing the sample size would also aid in further understanding of the impacts of both lecture and cooperative learning. Additionally, replication should occur in other secondary agricultural education programs in the state of Arkansas, as well as nationwide to obtain a better understanding of the potential impact cooperative learning has on the *FFA Doors for the Future* instructional materials.

It is recommended that future studies should examine the implementation of different lessons with similar instruments. More-in-depth lessons or science based lessons would allow the incorporation of different instructional strategies utilizing higher order thinking skills to measure achievement between lecture and cooperative learning groups. Also by adding a qualitative approach to gathering student perceptions may reveal the subjects' detailed perceptions when comparing lecture to cooperative learning instruction. Consistent findings on student interest in cooperative learning instruction would help to organize lesson plans and meet the needs of diverse learners within secondary agricultural education classrooms.

Finally, it is recommended that the instrument demographics should be reexamined in order to effectively classify students based on the definitions used in this study. Based on the review of literature, classification of students based on their agricultural and FFA background is not conclusive. Reviewing previous definitions of traditional and non-traditional students should be evaluated in order to adequately analyze and classify subjects to guide future studies.

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APPENDICES

APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

May 19, 2011

MEMORANDUM

TO:	Beth Ann Bills-Hunt Donna Graham Don Edgar Leslie Edgar
FROM:	Ro Windwalker IRB Coordinator
RE:	New Protocol Approval
IRB Protocol #:	11-05-655
Protocol Title:	*The Effects of Cooperative Learning in Agriculture Courses on Traditional and Non-Traditional Students versus a Traditional Course Lesson*
Review Type:	☒ EXEMPT ☐ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 05/19/2011 Expiration Date: 05/18/2012

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (http://vpred.uark.edu/210.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 1500 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu.

APPENDIX B

FFA DOORS FOR THE FUTURE

LECTURE LESSON PLAN

Visual Communications on the Road in Arkansas: Video and Creative Projects to Promote Agriculture
Breakout Sessions

I. **Course Integration:** *Visual Communications on the Road in Arkansas: Video and Creative Projects to Promote Agriculture*
Unit: Recruitment
Lesson: *FFA Doors for the Future* (Lecture)

II. **Situation:** Secondary agricultural education class. Students enrolled in secondary agricultural education are provided with basic knowledge and are preparing for a future based in agriculture. In this lesson, students will be introduced to careers, scholarship, and higher education in agriculture.

III. **Materials:**
a. Pretest
b. Posttest
c. Computer/TV
d. USB/DVD
e. Projector/Video Player
f. Recruitment Cards

IV. **Teacher Objectives:**
At the conclusion of this lesson, students will be able to:
a. Identify career areas in agriculture on an exam with 75% accuracy.
b. Identify levels in which agriculture scholarships are available to secondary agricultural education students and FFA members with 90% accuracy.
c. List scholarships available to secondary agricultural education students and FFA members with 80% accuracy.
d. Describe potential options for higher education in agriculture with 85% accuracy.

Teaching Procedure:

I. **Interest Approach:**
a. Did you know?
- What is the first career you think of when you hear agriculture?
  1. Most think farming and ranching
  2. Did you know that only 10 percent of Americans are involved in traditional farming?
- Approximately 22 million people work in agriculture related fields.
- Agriculture offers over 200 rewarding and challenging careers/jobs.

Transition to Reasons to Learn: Now that we know what are going to be learning about, why do we need to know about opportunities of FFA for the future?

II. **Reasons to Learn:**

a. Why do I need to know about careers are associated with agriculture?
   - To know about possible opportunities in agriculture

b. Why do I need to know where to find scholarships?
   - To know where to locate scholarship applications
   - To know who offers scholarships opportunities

c. Why do I need to know about scholarships I can apply for?
   - To know what scholarship applications I qualify for

d. Why do I need to know about degrees I could earn in higher education in agriculture?
   - To know about opportunities available in agriculture after high school

We have now established reasons to learn about FFA for the future, so what questions do we need to answer in order to learn about FFA for the future?

III. **Questions to Answer:**

a. What types of careers are available in agriculture?
   - Farmer
   - Agriculture Teacher
   - Veterinarian

b. What levels of agriculture scholarships are offered to FFA members?
   - Chapter

c. At each level, what scholarships are available?
   - Chapter Alumni

d. What options are available for higher education in agriculture?
   - College
   - Technical school
   - Farming

We now know what questions we need to answer about FFA for the future, so what are the solutions to our problems or questions?

IV. **Solutions to Problems:**

a. <u>Problem 1</u>: Identify careers in agriculture
   - Agricultural careers are divided into 11 career areas (clusters).
     1. Agribusiness Management
        a. Focuses on the managerial functions performed by organizations throughout the food system.
        b. Sample job titles:
           i. Commodity Trader
           ii. Agricultural Production Specialist
           iii. Purchasing Manager
           iv. Financial Manager
           v. Farm Owner and Manager
     2. Agricultural and Natural Resources Communications

    a. Focuses on careers in journalism, public relations, and advertising/marketing.
    b. Sample job titles:
        i. Marketing Communications Manager
        ii. District Sales Representatives
        iii. Advertising Manager
        iv. Reporter
        v. Editor
3. Building Construction Management
    a. Focuses on land development and structural buildings.
    b. Sample job titles:
        i. Project Manager
        ii. Estimator
        iii. Construction Scheduler
        iv. Controller
        v. Purchasing Agent
4. Agriscience
    a. Provides a foundation for careers in agricultural and natural resources industries.
    b. Sample job titles:
        i. Agriscience Educator
        ii. Extension Educator
        iii. Farmer
        iv. Human Resource Director
        v. Zoologist
5. Resource Development and Management
    a. Focuses on policy analysis, planning, evaluation, budgeting, and program management.
    b. Sample job titles:
        i. Environmental Analyst
        ii. Environmental Planner
        iii. Solid Waste Coordinator
        iv. Water Resource Specialist
        v. Economic Development Specialist
6. Parks, Recreations, and Tourism Resources
    a. Focuses on planning and managing programs, areas, and facilities that are designed to meet people's leisure needs and enhance quality of life.
    b. Sample job titles:
        i. Park Ranger
        ii. Interpreter/Naturalist
        iii. Environmental Educator
        iv. Travel and Convention Planner
        v. Youth Program Director
7. Packaging

    a. Focusing on food packaging, health care and pharmaceutical packaging, and industrial packaging.
    b. Sample job titles:
        i. Packaging Engineer
        ii. Quality Control Coordinator
        iii. Laboratory Manager
        iv. Package Designer
8. Horticulture
    a. Focuses on the science and art concerned with culture, marketing, and utilization of high value, intensively cultivated fruits, flowers, vegetables, and ornamental plants.
    b. Sample job titles:
        i. Retail Manager
        ii. Landscape Designer
        iii. Entrepreneur
        iv. Florist
        v. Contractor
9. Forestry
    a. Focuses on the science and art of managing natural resources that occur on forest lands.
    b. Sample job titles:
        i. Forester
        ii. Forest Ranger
        iii. Consulting Forester
        iv. Naturalist
        v. Timber Buyer
10. Food Science
    a. Focuses on the development of new foods, investigation of new production and processing methods, and research ways to insure a safe, nutritious and economical food supply.
    b. Sample job titles:
        i. Food Technician
        ii. Laboratory Technician
        iii. Food Chemist
        iv. Quality Control Manager
        v. Meat Scientist
11. Fisheries/Wildlife
    a. Focuses on environmental management, conservation, and wildlife ecology and management.
    b. Sample job titles:
        i. Land Management Specialist
        ii. Water Quality Specialist
        iii. Habitat Specialist
        iv. Fish Hatchery Manager
        v. Game Warden

Transition: We know the careers associated with agriculture, but now we need to know what options are available to earn a degree in agriculture.

b. Problem 2: Higher education opportunities in agriculture
   - University
     1. University of Arkansas
   - College of Agriculture
     1. Dale Bumpers College of Agricultural, Food and Life Sciences
        a. A number of the career clusters need a college education
        b. Degree options pertaining to careers in the 11 career clusters
   - Department
     1. Agricultural and Extension Education
   - 3 Concentrations
     1. Agricultural Communications
     2. Agricultural Education
     3. Agricultural Systems Technology Management

Transition: We know what the careers are associated with agriculture and higher education options in agriculture, but what scholarships are available for FFA members and non-FFA members?

c. Problem 3: Available scholarships at each level
   - FFA – 3 levels of scholarships
     1. Chapter
        a. Contact your FFA advisor and alumni committee
     2. State [Arkansas]
        a. 7 scholarships
           i. Marvin Vines Memorial Scholarship
           ii. Landy Nelson Doyle Sr. Memorial Scholarship
           iii. Orval Childs Memorial Scholarship
           iv. Jack Justus Scholarship
           v. I.L. "Ish" Stivers Memorial Scholarship
           vi. Jack Warnock Memorial Scholarship
           vii. Heather Wilf Memorial Scholarship
     3. National
        a. 3 major sponsored scholarships
           i. FORD – Built Ford Tough
              - Up to 500 scholarships of $1,000 each
           ii. Cargill Community Scholarship
              - 350 scholarships of $1,000 each
           iii. Monsanto – Commitment to Agriculture
              - 100 scholarships of $1,500 each
   - Others that do not require FFA membership
     1. Community
        a. Contact your school counselor

2. University
    a. Contact the financial aid office or recruitment coordinator
3. Departmental
    a. Contact department head or recruitment coordinator

Summary and Transition: We now have gone over each objective, but let's review each for comprehension.

V. **Discussion Based Review/What did you learn?:**

Go over answers to objectives as a class and discuss each briefly

- a. Careers
    - 11 areas
    - Over 200 career possibilities
- b. Higher Education in Agriculture
    - University
    - College of Agriculture
    - Department
    - Concentrations
- c. Scholarships
    - FFA (3 levels)
        1. Chapter
        2. State
        3. National
    - Others (non-FFA members)
        1. Community
        2. University
        3. College
        4. Department

Summary and Transition: We now have reviewed each objective, but now let's test your knowledge.

VI. **Evaluation:**

a. Student will complete a posttest after the completion of the lesson. The exam will consist of Multiple Choice and Perception questions at the conclusion of the unit.

VII. **Video and Wrap-up:**

a. Play departmental recruitment video
b. Hand out and collect recruitment card

VIII. **References:**

Ag Day (2011). Educational resources: Careers in agriculture. Retrieved from http://www.agday.org/education/careers.php

Arkansas FFA Foundation (2010, November 8). The Arkansas FFA Foundation has the following endowed scholarships. Retrieved from http://arkansasffa.org/default.aspx?ID=6328

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APPENDIX C

FFA DOORS FOR THE FUTURE

COOPERATIVE LEARNING LESSON PLAN

Visual Communications on the Road in Arkansas: Video and Creative Projects to Promote Agriculture
Breakout Sections

I. **Course Integration:** *Visual Communications on the Road in Arkansas: Video and Creative Projects to Promote Agriculture*
Unit: Breakout Sessions
Lesson: *FFA Doors for the Future* (Cooperative Learning)

II. **Situation:** Secondary agricultural education class. Students enrolled in secondary agricultural education are provided with basic knowledge and are preparing for a future based in agriculture. In this lesson, students will be introduced to careers, scholarship, and higher education in agriculture.

III. **Materials:**
a. Pretest
b. Case Study Folders (roles)
c. Three-minute Review Questions
d. Posttest
e. Computer/TV
f. USB/DVD
g. Projector/Video Player
h. Recruitment Cards

IV. **Teacher Objectives:**
At the conclusion of this lesson, students will be able to:
a. Identify career areas in agriculture on an exam with 75% accuracy.
b. Identify levels in which agriculture scholarships are available to secondary agricultural education students and FFA members with 90% accuracy.
c. List scholarships available to secondary agricultural education students and FFA members with 80% accuracy.
d. Describe potential options for higher education in agriculture with 85% accuracy.

Teaching Procedure:

V. **Interest Approach:**
a. Did you know?
- What is the first career you think of when you hear agriculture?
  1. Most think farming and ranching
  2. Did you know that only 10 percent of Americans are involved in traditional farming?
- Approximately 22 million people work in agriculture related fields.
- Agriculture offers over 200 rewarding and challenging careers/jobs.

Transition to Reasons to Learn: Now that we know what are going to be learning about, why do we need to know about opportunities of FFA for the future?

VI. **Reasons to Learn:**

a. Why do I need to know about careers are associated with agriculture?
   - To know about possible opportunities in agriculture

b. Why do I need to know where to find scholarships?
   - To know where to locate scholarship applications
   - To know who offers scholarships opportunities

c. Why do I need to know about scholarships I can apply for?
   - To know what scholarship applications I qualify for

d. Why do I need to know about degrees I could earn in higher education in agriculture?
   - To know about opportunities available in agriculture after high school

We have now established reasons to learn about FFA for the future, so what questions do we need to answer in order to learn about FFA for the future?

VII. **Questions to Answer:**

a. What types of careers are available in agriculture?
   - Farmer
   - Agriculture Teacher
   - Veterinarian

b. What levels of agriculture scholarships are offered to FFA members?
   - Chapter

c. At each level, what scholarships are available?
   - Chapter Alumni

d. What options are available for higher education in agriculture?
   - College
   - Technical school
   - Farming

We now know what questions we need to answer about FFA for the future, so what are the solutions to our problems or questions?

VIII. **Solutions to Problems:**

a. **Case Study:**
   - Divide the class into groups of 5
   - Hand out case studies
   - Groups assign roles from the 5 in the case study
   - Groups go through the case study in a role play manner
   - At the conclusion of the case study, groups most notify the instructor to receive questions
   - Group members work together to answer questions based on the information in the case study

IX. **RoundTable**

a. When groups have completed the case study, one member from each team is to notify the instructor to receive review questions.
    - Before each group begins, ask each group individually if they have any questions.
b. *Directions:* As a group/team, work together to answer and discuss the following questions based on the information in the case study. Each student should contribute to each of the following questions and take turns generating written responses.
    - What are the eleven career clusters of agriculture discussed?
    - What are the three levels of agriculture scholarships available to FFA members?
    - What are the options available in agriculture at higher education institutions?
    - What are the three concentrations in the Department of Agricultural and Extension Education?
c. Once all groups have completed the review, ask if they have any questions.

X. **Discussion Based Review/What did you learn?:**

Go over answers to objectives as a class and discuss each briefly

a. Careers
    - 11 areas
    - Over 200 career possibilities
b. Higher Education in Agriculture
    - University
    - College of Agriculture
    - Department
    - Concentrations
c. Scholarships
    - FFA (3 levels)
        1. Chapter
        2. State
        3. National
    - Others (non-FFA members)
        1. Community
        2. University
        3. College
        4. Department

Collect all materials before evaluation

XI. **Evaluation:**

a. Student will complete a posttest after the completion of the lesson. The exam will consist of Multiple Choice and Perception questions at the conclusion of the unit.

XII. **Video and Wrap-up:**

a. Play departmental recruitment video
b. Hand out and collect recruitment card

XIII. **References:**

Ag Day (2011). Educational resources: Careers in agriculture. Retrieved from http://www.agday.org/education/careers.php

Arkansas FFA Foundation (2010, November 8). The Arkansas FFA Foundation has the following endowed scholarships. Retrieved from http://arkansasffa.org/default.aspx?ID=6328

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National FFA Organization (2011d). Scholarships. Retrieved from https://www.ffa.org/programs/grantsandscholarships/Scholarships/Pages/default.aspx

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APPENDIX D

FFA DOORS FOR THE FUTURE

COOPERATIVE LEARNING CASE STUDY

FFA Doors for the Future
Cooperative Learning – Case Study

Directions: Once in groups of 5, groups members will be assigned a role/character in the case study (role will be highlighted). Throughout the case study each group member is responsible for acting as the assigned character. Remember, this is kind of like a play. After reading through the case study, a member from each group must notify the instructor to receive questions.

Moderator:

Beau Vine is a junior at Watusi High School. A few days ago a college recruiter spoke with the junior class about life after high school. Beau began to wonder about his future and what he wanted to do in a career. Beau thought about his interests and the extracurricular activities that he was involved in. Beau is on the football team and a student council member, but Beau does not feel that these activities will help in the future with college or a career. Then Beau begins to consider agriculture. Beau has taken three agriculture classes and has been a member of the Watusi FFA chapter for one year.

Beau completed introduction to agriculture, agriculture mechanics, and leadership and communications courses. Beau's agriculture teacher, Mrs. Galloway, helped him get a summer job with the local newspaper. Beau then decided to look at careers and college options in agriculture.

While in agriculture class, Beau spoke with Mrs. Galloway about careers and colleges in agriculture.

Beau:

Mrs. Galloway, for the past few days I have been thinking about college and career options, and I think I want to go into agriculture, but I'm not sure what options there are.

Mrs. Galloway:

Well Beau, there are 11 of career areas (clusters) in agriculture. You may choose to study agribusiness, agricultural and natural resources communications, construction, agriscience, resource development, parks and recreation, packaging, horticulture, forestry, food science, or wildlife. I know this decision can be overwhelming, but knowing you, you would be more interested in agriculture and natural resource communications, agribusiness, or agriscience.

Beau:

Those sound interesting, but what can I do in a career if I choose to study one of these career clusters?

Mrs. Galloway:

Agribusiness focuses on managing agricultural production and business with job options in managing production agriculture, such as farms, or purchasing. Agricultural and natural resources communications focuses on writing and photography with jobs in magazines or company marketing and reporting. Agriscience focuses on agriculture and industry foundations, such as extension or agricultural education.

Beau:

Wow!!! I have a lot to think about.

Mrs. Galloway:

Beau, do you know where you want to go to college?

Beau:

No, and I do not know if I can afford it.

Mrs. Galloway:

Well, there are a number of colleges offering degrees in agriculture and scholarships are available. Let me see if I can setup an appointment with the school counselor tomorrow during lunch and the three of us will discuss your options.

Beau:

Okay, thank you.

Moderator:

When Beau got home from school, he spoke with his parents about his conversation with Mrs. Galloway. Beau's parents encouraged him to do some research.

The next day, at lunch, Beau met with Mrs. Galloway and the school counselor; Mr. Salers.

Beau:

I did some research last night and found a few career paths that I think I would enjoy.

Mrs. Galloway:

Good, what did you find?

Beau:

I think I would like a job in communications or production agriculture. I found jobs in graphic design and photography, but I also found a job in production management for John Deere. However, I am not sure what a production manager does.

Mrs. Galloway:

A production manager oversees production of agriculture equipment, operations, and sales

Beau:

Hmmm…

Mr. Salers:

Do you know where you want to go to college?

Beau:

I don't think I can afford to go out of state.

Mr. Salers:

There are colleges in Arkansas that offer degrees in agriculture.

Mrs. Galloway:

The University of Arkansas has a college of agriculture – Dale Bumpers College of Agricultural, Food and Life Sciences. Within the college they have an Agricultural and Extension Education Department, which focuses on three concentration areas; agricultural education, agricultural communications, and agricultural systems technology management.

Beau:

Wow, that covers all the areas I'm interested in.

Mrs. Galloway:

It sure does.

Beau:

But, how do I afford to go to a university?

Mr. Salers:

Scholarships! You can apply for community, university, and departmental scholarships, as well as FFA scholarships.

Mrs. Galloway:

There are many of scholarships offered through FFA. There are three levels of FFA scholarships; chapter, state, and national. We have some local scholarships offered through the chapter and the alumni. But, you should also apply for state and national scholarships.

Beau:

I never knew there were so many opportunities to find financial support to attend college.

Mr. Salers:

I recommend you contact the Agricultural and Extension Education Department at the University of Arkansas to find out more information. And remember, if you have any questions I can answer, you know where my office is located.

Beau:

Thank you, Mr. Salers.

Mrs. Galloway:

Let's go to my classroom and you can look up other FFA scholarships.

Moderator:

Beau got on the computer and found a list of scholarships offered through the state and national FFA. There are seven Arkansas FFA state scholarships, for example **Marvin Vines Memorial Scholarship, Orval Childs Memorial Scholarship, and Jack Justus Scholarship. Beau also found three major National FFA scholarships, which includes** FORD – Built Ford Tough, Cargill Community Scholarship, and Monsanto – Commitment to Agriculture.

Later that day, Beau called the Agricultural and Extension Education Department and spoke with Mrs. Cox – the department recruiter. Beau told her about his interests and concerns with attending college. Mrs. Cox gave Beau a list of requirements necessary to gain admittance into the University and told him about scholarship opportunities specific to the department, college, and university. She also told him about other options for securing financial aid.

Mrs. Cox:

Beau, our program has three areas of concentration; agricultural education, agricultural communications, and agricultural systems technology management.

Beau:

I am interested in agricultural communications and agricultural systems technology management, but I am not sure which I would like best.

Mrs. Cox:

With our program you take courses in all concentrations, even if you want a degree in one over the other.

Moderator:

Mrs. Cox proceeds with her conversation with Beau and later discusses an agricultural communications program – *Visual Communications on the Road in Arkansas: Video and Creative Projects to Promote Agriculture* – offered by the department to high school agriculture classes.

Mrs. Cox:

For this program, Mrs. Galloway would teach curriculum over photography, writing, and videography and then we could bring the mobile classroom to the school to help the students develop a video.

Beau:

WOW!!! I would love to do that. That sound like a great program. I will have to tell Mrs. Galloway. Thank you.

Moderator:

The next day Beau told Mrs. Galloway about his conversation with Mrs. Cox and suggested they participate in the *Visual Communications on the Road in Arkansas: Video and Creative Projects to Promote Agriculture* program.

Mrs. Galloway decided to have her leadership and communications class participate in the program.

APPENDIX E

FFA DOORS FOR THE FUTURE

COOPERATIVE LEARNING ROUNDTABLE WORKSHEET

Names of Group Members: _____
Date: _____ School: _____

FFA Doors for the Future
Case Study Questions
RoundTable

Directions: As a group/team, work together to answer and discuss the following questions based on the information in the case study. Each student should contribute to each of the following questions and take turns generating written responses.

1. What are the eleven career clusters of agriculture discussed?

2. What are the three levels of agriculture scholarships available to FFA members?

3. What are the options available in agriculture at higher education institutions?

4. What are the three concentrations in the Department of Agricultural and Extension Education?

APPENDIX F

PARENTAL/STUDENT CONSENT FORM

UofA
UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE

Department of
Agricultural and Extension Education

UNIVERSITY OF ARKANSAS
DALE BUMPERS COLLEGE
OF AGRICULTURAL, FOOD & LIFE SCIENCES

205 Agriculture Building, University of Arkansas, Fayetteville, AR 72701-1201
479-575-2035 • Fax: 479-575-2610 • aeed.uark.edu

Dear students and parents:

I am a graduate student at the University of Arkansas working on my master's thesis. The goal of my research is to determine if a change in the method of instruction significantly affects students' knowledge, engagement, and perception. Your son/daughter was chosen for this study because the school is participating in a project: *Visual Communication on the Road in Arkansas: Video and Creative Projects to Promote Agriculture*. This project is being sponsored by the University of Arkansas, Department of Agricultural and Extension Education.

I am requesting permission for your student to participate in one of two methods of teaching a lesson called *FFA Doors to the Future*. During the lesson students will learn about careers in agriculture, scholarships, and higher education. They will be given tests to determine prior knowledge, knowledge gained, and knowledge retained from the lessons. Student perceptions will also be collected regarding cooperative learning and traditional forms of lecture.

There are no risks connected to this project. The benefit of participation in this study is the opportunity of learning information about careers in agriculture, scholarship opportunities, and higher education benefits. Participation in the project is voluntary, and if students wish not to participate in the research project their grade in the class will not be jeopardized. Student will still have the opportunity to participate in the lecture.

This study is confidential and all information gained will be coded by the researcher. The records for the study will be maintained in a private location until the study is completed. No identifiers linking your student to the study will be included in any report or publication.

By signing below you authorize your child to participate in the research project and have data collected on their knowledge acquisition and perceptions. If you have any questions you can contact me at xxxx@uark.edu or xxx-xxx-xxxx. Thank you for your support and participation.

Sincerely,

Beth Ann J. Bills-Hunt
Graduate Student

Donna L. Graham
Professor

Participant (Student):	_____	_____	_____
	Signature	Print name	Date
Parent or Guardian:	_____	_____	_____
	Signature	Print name	Date

This research study has been reviewed by the Institutional Review Board at University of Arkansas. For research-related problems or questions regarding subjects' rights, you can contact Ro Windwalker, the University's Compliance Coordinator, at 479-575-2208 or email irb@uark.edu.

APPENDIX G

FFA DOORS FOR THE FUTURE

PRETEST INSTRUMENT

Name: _____ Date: _____ School: _____

FFA Doors for the Future Curriculum Pretest

Section I: Knowledge

Circle the best choice for each of the following questions or statements.

Agriculture Careers

1. How many career area (clusters) options are in agriculture?
   a. 11 b. 54
   c. 103 d. 200

2. Which of the following is a career area (cluster) in agriculture?
   a. Irrigation Technology b. Agricultural and Natural Resource Communications
   c. Farm Equipment Mechanics d. Aquaculture

3. Which of the following is NOT a career area (cluster) in agriculture?
   a. Forestry b. Agriscience
   c. Irrigation Technology d. Agbusiness Management

Scholarships

4. FFA members can apply for chapter, _____, and national FFA scholarships.
   a. State b. District
   c. School d. University

5. You should ask your school counselor about _____ scholarships.
   a. Community b. Organization
   c. University d. FFA

6. A college recruiter can inform you about scholarships that are available for the University of Arkansas, college, and/or _____.
   a. School b. State
   c. Community d. Department

7. How many Arkansas FFA scholarships are offered?
   a. 5 b. 7
   c. 10 d. 11

8. Which of the following is/are NOT a major scholarship offered by the National FFA Organization?
   a. Tyson – Feeding America b. FORD – Built Ford Tough
   c. Cargill Community Scholarship d. Monsanto – Commitment to Agriculture

Higher Education

9. In the Agricultural and Extension Education Department at the University of Arkansas, how many areas of concentration are offered?
    a. 1
    b. 2
    c. 3
    d. 4

10. Which is/are NOT a concentration area offered in the Agricultural and Extension Education Department at the University of Arkansas?
    a. Agricultural Communications
    b. Agricultural Education
    c. Agricultural Systems Technology Management
    d. Extension Education

Section II: Demographics

Circle the best choice for each of the following questions or statements.

1. What is your gender?
    a. Male
    b. Female

2. What is your current grade classification?
    a. 7th
    b. 8th
    c. 9th (Freshman)
    d. 10th (Sophomore)
    e. 11th (Junior)
    f. 12th (Senior)

3. What is your ethnic background?
    a. African American
    b. American Indian/Alaskan Native
    c. Caucasian
    d. Foreign
    e. Hispanic/Latino
    f. Other

4. How many agricultural science courses have you taken? (Include all courses previously and currently enrolled.)
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5
    f. 6
    g. 7
    h. 8 or more

5. How many agricultural science courses are you currently taking?
    a. 1
    b. 2
    c. 3
    d. 4 or more

6. Do you live in a rural or urban area?
    a. Rural – less than 2,500 persons
    b. Rural Farm – less than 2,500 persons and have an agricultural income of $1,000 or more
    c. Suburban – 2,500 to 50,000 persons
    d. Urban – more than 50,000 persons

7. If you live in a rural area, do you live on a farm?
    a. Yes
    b. No

8. Did you have any experience with agriculture before enrolling into an agriculture class?
    a. Yes
    b. No

9. If you have had experience with agriculture before enrolling into an agriculture class, how many years?
    a. 1 – 2 years
    b. 3 – 4 years
    c. 4 – 5 years
    d. More than 5 years

10. Are you an FFA member?
    a. Yes
    b. No

11. If you are an FFA member, how many years have you been a member?
    a. 1 year
    b. 2 years
    c. 3 years
    d. 4 years

APPENDIX H

FFA DOORS FOR THE FUTURE

POSTTEST INSTRUMENT

Name: _____ Date: _____ School: _____

FFA Doors for the Future Curriculum Posttest

Section I: Knowledge

Circle the best choice for each of the following questions or statements.

Agriculture Careers

1. How many career area (clusters) options are in agriculture?
   a. 11 b. 54
   c. 103 d. 200

2. Which of the following is a career area (cluster) in agriculture?
   a. Irrigation Technology b. Agricultural and Natural Resource Communications
   c. Farm Equipment Mechanics d. Aquaculture

3. Which of the following is NOT a career area (cluster) in agriculture?
   a. Forestry b. Agriscience
   c. Irrigation Technology d. Agbusiness Management

Scholarships

4. FFA members can apply for chapter, _____, and national FFA scholarships.
   a. State b. District
   c. School d. University

5. You should ask your school counselor about _____ scholarships.
   a. Community b. Organization
   c. University d. FFA

6. A college recruiter can inform you about scholarships that are available for the University of Arkansas, college, and/or _____.
   a. School b. State
   c. Community d. Department

7. How many Arkansas FFA scholarships are offered?
   a. 5 b. 7
   c. 10 d. 11

8. Which of the following is/are NOT a major scholarship offered by the National FFA Organization?
   a. Tyson – Feeding America b. FORD – Built Ford Tough
   c. Cargill Community Scholarship d. Monsanto – Commitment to Agriculture

Higher Education

9. In the Agricultural and Extension Education Department at the University of Arkansas, how many areas of concentration are offered?
    a. 1
    b. 2
    c. 3
    d. 4

10. Which is/are NOT a concentration area offered in the Agricultural and Extension Education Department at the University of Arkansas?
    a. Agricultural Communications
    b. Agricultural Education
    c. Agricultural Systems Technology Management
    d. Extension Education

Cooperative Learning Only

11. If you participated in the role play activity, what character (role) were you?
    a. Moderator
    b. Beau Vine
    c. Mrs. Galloway
    d. Mr. Salers
    e. Mrs. Cox

Section II: Perceptions

Please circle the group you were in: Lecture Cooperative Learning

DIRECTIONS: Please indicate your level of agreement with each of the following statements. Circle one response for each statement which most closely reflects your agreement / disagreement with that statement.

Level of agreement scale: **1**=strongly disagree; **2**=somewhat disagree; **3**=slightly disagree; **4**=neutral; **5**=slightly agree; **6**=somewhat agree; **7**=strongly agree.

Think about today's lesson – *FFA Doors for the Future*…

	Disagree						Agree
1. I really enjoyed the lesson.	1	2	3	4	5	6	7
2. The lesson is very practical.	1	2	3	4	5	6	7
3. I could do very well without the lesson.	1	2	3	4	5	6	7
4. The lesson is okay.	1	2	3	4	5	6	7
5. The lesson is a waste of time.	1	2	3	4	5	6	7
6. I am not interested in the lesson.	1	2	3	4	5	6	7
7. I have no desire for the lesson.	1	2	3	4	5	6	7
8. I have seen no value in the lesson.	1	2	3	4	5	6	7
9. The lesson is a good subject.	1	2	3	4	5	6	7
10. I hate the lesson.	1	2	3	4	5	6	7
11. The lesson amazed me.	1	2	3	4	5	6	7
12. The lesson did not hold my interest at all.	1	2	3	4	5	6	7
13. The lesson is interesting.	1	2	3	4	5	6	7
14. To me the lesson is boring.	1	2	3	4	5	6	7
15. The lesson is dull.	1	2	3	4	5	6	7
16. The lesson can be used in real life.	1	2	3	4	5	6	7
17. All the materials in the lesson are not interesting.	1	2	3	4	5	6	7
18. The lesson cannot benefit me.	1	2	3	4	5	6	7
19. The lesson is enjoyable.	1	2	3	4	5	6	7

Adapted from Purdue Research Foundation's (1986) Attitudes Toward Any School Subject instrument.

DIRECTIONS: Please indicate your level of agreement with each of the following statements. Circle one response for each statement which most closely reflects your agreement / disagreement with that statement.

Level of agreement scale: **1**=strongly disagree; **2**=somewhat disagree; **3**=slightly disagree; **4**=neutral; **5**=slightly agree; **6**=somewhat agree; **7**=strongly agree.

Answer the statements below regarding your future education.

	Disagree						Agree
20. I plan to pursue a college degree?	1	2	3	4	5	6	7
21. I plan to pursue a college degree in agriculture?	1	2	3	4	5	6	7

Thank You!!!