

KNOWLEDGE AND PERCEPTIONS OF SECONDARY STUDENTS TOWARD
AGRICULTURAL CAREERS AND TECHNOLOGIES UPON COMPLETION OF AN
EDUCATIONAL PROGRAM

By

Eric R. Koennecke, B.S.

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ABSTRACT

There are nearly 60,000 annual job opportunities expected for agricultural graduates between 2020 and 2025. However, as the pool of agricultural graduates becomes more urbanized, these positions are expected to become harder to fill. While previous research heavily indicates secondary student perceptions of agricultural careers and the factors behind career choices, there is little research in career education programs for the agricultural industry. The Social Learning Theory of Career Decision Making and Kolb's Experiential Learning Theory were used as theoretical frameworks in designing this study. Selected students participated in an immersive career education experience hosted at West Texas A&M University over three days prior to data collection. The target population for this study consisted of secondary students enrolled in Agriculture, Food, and Natural Resources (AFNR) courses at high schools in the Texas Panhandle. Targeted students should be entering grades 11 or 12 and come from a non-traditional agricultural background. Due to a lack of applicants in a local area, the population was extended to include secondary students enrolled in AFNR programs in Texas. Eleven participants applied and were accepted to the program, encompassing students from traditional and non-traditional agricultural backgrounds. Data for this mixed-method study was collected via a retrospective pre-post survey questionnaire and phenomenological focus group interviews following the completion of an immersive career education program. The survey included five-point Likert-type scale questions assessing participant knowledge

prior to and following program completion. Focus group questions assessed participant knowledge based on previous experiences in agriculture and with agricultural career areas. The researcher found that participant knowledge of agricultural career opportunities was low prior to the program, particularly in animal sciences, plant, soil, and environmental sciences, and knowledge of agricultural technologies. Through quantitative and qualitative data collection, secondary student participation in an immersive career education program was found to improve knowledge in all areas assessed. Participants were found to possess varying levels of knowledge about agricultural career areas, and were most confident in areas they held previous experience. Recommendations were made for additional research on this topic with larger samples and in varying geographical areas to further the opportunity for generalization.

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E.R.K.

Approved:

Dr. Kevin Williams, Chairman, Thesis Committee [Date]

Dr. Tanner Robertson, Thesis Committee [Date]

Dr. Troy Tarpley, Thesis Committee [Date]

Dr. Nathan Wolf, Thesis Committee [Date]

Dr. Lance Kieth, Department Head [Date]

Dr. Kevin Pond, Dean [Date]

Dr. Angela Spaulding, Dean Graduate School [Date]

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CHAPTER I

INTRODUCTION

Background

As of June 2022, the United States of America has a population of approximately 332 million people (United States Department of Commerce, n.d.). Colby and Ortman (2015) posited that the population is expected to increase to 400 million by 2051. According to Maslow (1968) each of these people need to eat and be clothed due to their need for physical survival, and will also need security of employment. The agricultural industry, providing both of these facets, accounts for 22.2 million job opportunities annually (Kassel & Martin, 2022). Of these many job opportunities, only 2.6 million are employed directly on a farm. According to the U. S. Bureau of Labor Statistics (2022), there is projected to be an average of 138,900 job openings for agricultural workers annually from 2020 to 2030. The job description used for agricultural worker by the U. S. Bureau of Labor Statistics (2022) is that agricultural workers maintain crops and tend livestock. While this shows openings in existing job roles, the National Institute of Food and Agriculture further predicts that college graduates in the United States can expect around 59,400 new job opportunities

annually between 2020 and 2025, which is indicative of a 2.6% growth from the previous five years (United States Department of Agriculture, 2020). Of these new job opportunities, 42%, will be in agricultural management and business, while only 13% of opportunities will be in food and biomaterials production (Fernandez, et al., 2020).

According to the United States Department of Agriculture (USDA), (2020), approximately 92% of jobs in food, agriculture, renewable natural resources, and the environment will go to graduates of agricultural degree programs. Despite these estimations, that were described as “extremely challenging to project” by a representative of Purdue University, agriculturalists are worried about a lack of interested students pursuing careers in agriculture as “the pool of graduates that agricultural students are recruited from becomes more urbanized” (Mount, 2021, p. 2; United States Department of Agriculture, 2020, para. 4).

To date, there is a strong body of research looking into factors that affect the career choices of students who study agriculture as well as the perceptions that high school students hold of their potential career opportunities in agriculture (Jones & Larke, 2003; Jones & Larke Jr., 2001; Kotrlik & Harrison, 1987; Overbay & Broyles, 2008; White, et al., 1991). There is limited research investigating the effect of an in-depth career education program on students’ career perceptions, and most of this research is focused on the perceived value of agricultural education programs in schools rather than specific career education (Osborne & Dyer, 2000; Rayfield, et al., 2012).

The United States Census Bureau (2021) reported 80.7% of the population of the U. S. lives in an urban area; indicating that a significant percentage of the future

agricultural workforce may come from an urban background with little in-depth career education. With an increasing percentage of the population being removed from agriculture and agricultural production, a survey conducted by Kirshenbaum and Buhler (2018) showed that almost half of the U. S.'s population never or rarely seeks information on the production and origin of their food. Additionally, they also report that “more than one-third of Americans do not know that foods with no genetically modified ingredients contain genes...” (Kirshenbaum & Buhler, 2018, para. 1). This stands as another piece of evidence that the American population is becoming more removed from agricultural practices and understanding the sources and methods of production for the products that they consume.

As found by White, et al. (1991), many inner-city students believe people working in agriculture should come from an agricultural background and be prepared to work heavily outdoors. This is not necessarily the case for the majority of agricultural careers. Only 13% (2.6 million) of agricultural jobs are in farming; showing there are a multitude of agricultural job opportunities that may not involve the intense labor that many expect (Kassel & Martin, 2022; Moyer, 2022). There is not a high level of agricultural career education that occurs while students are taking on their education, so this knowledge is not being spread. Though previous studies have reported that agricultural science teachers have an impact on students' career choices, there is not a high level of career education taking place within high school Agriculture, Food, and Natural Resources classrooms (Kotrlik & Harrison, 1987).

Kotrlik and Harrison (1987) and Fizer (2013) found students self-report their parents to be the largest influences in their career decisions. This was also represented by a study conducted by Jones and Larke, Jr (2001), which found that “respondents were more likely to pursue an agriculture-related career if their father’s occupation was agriculture-related” (p. 41). Fizer’s (2013) study also showed the career path of veterinary science was a large draw for students who did not grow up with an agricultural background, citing that 56% of surveyed students in veterinary or veterinary technician paths did not grow up on a farm. It was also stated in this study that 66% of students who had a plan to work in agricultural production were raised on a farm (Fizer, 2013). These numbers show that students not raised in or alongside agricultural production often gain an interest in the career field. Regardless of background, some students still find themselves drawn to aspects of the agricultural industry.

Statement of the Problem

With the United States Department of Agriculture (2020) estimating that “employer demand will exceed the supply of available graduates with a bachelor’s degree or higher in agriculture-related fields,” the agricultural industry needs to be thinking about how to recruit students to its various career fields (para. 1). In 2009, the National Research Council stated that “public understanding of agriculture is poor, and many people are barely aware of where their food comes from” (p. 25). This, coupled with the fact that it is hard to recruit students to agricultural degrees who have no prior experiences in the field of agriculture, leads to the labor shortage that is seen in agriculture today. According to AgAmerica Lending (2022), the number of hired farm

hands declined 52% from 1950 to 2000, with another 7% decline in 2018. “The agriculture industry is having trouble competing with corporate jobs that offer higher pay and work-at-home options” (AgAmerica Lending, 2022, para. 5). A study by White et al. (1991) concluded that many inner-city students are of the belief that a person working in agriculture should come from an agricultural background. While there are thousands of producers across the globe from non-agricultural backgrounds, the lack of career education in classrooms does not work to share this knowledge with students (The Institute for Agriculture and Horticulture, 2022).

Purpose and Research Questions

The purpose of this study is to determine whether secondary students enrolled in Agriculture, Food, and Natural Resources (AFNR) courses at their local high school have a higher self-perceived understanding of careers and technologies in agriculture after the completion of an immersive educational program. The study will seek to answer the following three research questions.

1. What level of knowledge do high school students have about the career opportunities available to them in the agricultural industry?
2. What areas of the agricultural industry are secondary AFNR students the most familiar with based on their prior experiences?
3. Will an immersive educational program increase student knowledge of career opportunities and technologies?

Significance of the Study

Overbay and Broyles (2008) observed farming was an agricultural career recognized by a vast majority (94.9%) of students surveyed, but that the majority were not interested in the career due to its risk and physical demands. Conversely, 17% and fewer students in the study mentioned careers such as scientist, lobbyist, or grocer as opportunities in the agricultural industry, with only 1% of respondents mentioning the last option. The same study found that student views of agriculture continue to be limited, stating, “they perceive agriculture as an industry of low wages and mainly manual labor” (Overbay & Broyles, 2008, p. 7). Despite this common thought, there are many agricultural job opportunities that go beyond the traditional production agriculture setting with which manual labor is associated (Wildman & Torres, 2001). With sources stating that the fewest jobs from 2020-2025 will be in food and biomaterials production, students need further career education than what is currently provided (USDA, 2020; Fernandez, et al., 2020).

A study by Makransky, et al. (2020) found that an immersive virtual reality experience increased aspiration to a career in science for females of the sample studied. It would stand to reason that a physical immersive career education experience will also have an impact on career opportunity perceptions for secondary students in high school AFNR courses.

Assumptions

There were assumptions made prior to and during completion of this study. The researcher assumes that responses were made honestly to reflect the impact that an in-

depth career education program had on student participant knowledge of agricultural careers and technology. Additionally, the assumption was made that focus group responses did not reflect the phenomenon of “groupthink” as defined by Schmidt (2016). It was also assumed that all demographic information was provided truthfully and accurately. Student participants were assumed to have understood the wording of all questions asked and provided applicable responses.

Limitations

The following are limitations of this study that should be considered when reaching conclusions based on study findings:

1. Qualitative research methods allow for the selection of research participants. Therefore, any assumptions should be made cautiously as the use of these findings outside of study participants could be limited.
2. Focus group responses were evaluated solely by the researcher, which could have led to unintentional skewing of the information.
3. Data collection was limited to students who were enrolled in at least one Agriculture, Food, and Natural Resources course at their high school during the previous academic year and were a current member of their school’s FFA chapter.
4. One student participant had just graduated high school and began studying in the agricultural sciences at a university during the Fall of 2022.
5. Data was collected from a small group of participants with an interest in pursuing an agricultural career.

6. Data was not collected from high school students under the age of 16, or any outside the state of Texas.
7. Focus group and survey participation was completely voluntary. A participant could choose to participate in both items, only one item, or neither item.
8. This sample does not accurately represent the entirety of students involved in agri-science courses across Texas.
9. This sample does not accurately represent the entirety of students involved in agri-science courses across the United States.
10. Focus group responses were limited to time and participant opportunity to speak amongst others.
11. Data was only collected at one time, and it is unknown how much information has been retained by participants since the study took place.

CHAPTER II

REVIEW OF LITERATURE

Introduction

This study was developed through a review of literature deemed relative to the area of research interest. This chapter will discuss the main focuses of this research: agricultural career opportunities, agricultural career education, and the impact of immersive educational programs on student knowledge. It was important to identify knowledge that high school students have about agricultural careers and technology applications.

Purpose and Research Questions

The purpose of this study was to determine whether secondary students enrolled in Agriculture, Food, and Natural Resources courses at their local high school have a higher self-perceived understanding of careers and technologies in agriculture after the completion of an immersive educational program. The study will seek to answer the following three research questions:

1. What level of knowledge do high school students have about the career opportunities available to them in the agricultural industry before participating in an immersive educational program?
2. What areas of the agricultural industry are secondary AFNR students the most familiar with based on their prior experiences?
3. Will an immersive educational program increase student knowledge of career opportunities and technologies?

Theoretical Framework

There are two theoretical frameworks that guided this study. The first was the Social Learning Theory of Career Decision Making (SLTCDM), first explained by Krumboltz et al. (1976). The SLTCDM aims at explaining the acquisition of occupational preferences and skills, and how career decisions are made through four categories of influencing factors on a person (Krumboltz et al., 1976). These four categories are genetic endowment and special abilities, environmental conditions and events, learning experiences, and task approach skills. This research focused on environmental conditions and events and learning experiences as influencers for participant career decision making.

Environmental conditions and events are the factors of influence which usually occur outside of the control of one individual (Krumboltz et al., 1976). Whether due to human action (legislation or cultural factors) or natural forces (natural resource availability or natural disasters), these factors are linked to the career preferences and plans of the individual (Krumboltz et al., 1976). Several examples of environmental conditions include the number of job opportunities, training for these job opportunities,

technological developments, and community influences. As described by Krumboltz et al. (1976), these environmental factors highlight differences in opportunity available geographically and over time to certain individuals.

Previous learning experiences also impact occupational decision making, though there is unlimited variability in the patterning of stimuli and reinforcement in learning (Krumboltz et al., 1976). Instrumental learning experiences (ILEs) and associative learning experiences (ALEs) are the two experiences posited to impact career decision making by Krumboltz et al. (1976). Instrumental learning experiences are those in which the individual acts in a way that will produce certain outcomes. These outcomes can be desirable or undesirable, but all lead to cognitive and emotional responses by the individual. An example of an ILE for two individuals in the same scenario would be two teammates each hitting a baseball. The first batter hits a home run, the other strikes out. The praise received by the first batter and the lack of praise received by the second all form into a learning experience for both individuals (Krumboltz & Nichols, 1990). Krumboltz and Nichols (1990) state “through instrumental learning experiences people develop a preference for activities in which they succeed or are rewarded, and they tend to lose interest in activities in which they fail and for which they receive no reward or are punished” (pp. 162-163).

The other form of learning experience discussed by Krumboltz et al. (1976) is the associative learning experience (ALE). These are defined as a learning experience that occurs when an individual’s response pattern is a reaction to external stimuli (Krumboltz et al., 1976). These can include occurrences where the pairing of two events in a time or

location transform a previously neutral situation to be associated with negative or positive feelings. According to Krumboltz et al. (1976), an ALE can be created from phrases heard, images in film or television, reading in a book, observations, and from individual experiences. An example of this is provided by Krumboltz and Nichols (1990).

“Attractive pictures and words, when associated with certain industries and occupations, can create desirable images in the minds of observers. Negative words and pictures can represent other occupations as dull and boring” (p. 163). The aspect of observational learning allows the individual to learn from either the real or fictitious models of careers presented to them (Krumboltz et al., 1976).

The second theory that guided this research is Kolb’s Experiential Learning Theory (ELT), first conceptualized by Kolb and Plovnick (1974). ELT allows for a means of conceptualizing the learning process through the identification of different learning styles and corresponding environments (Kolb & Plovnick, 1974). Kolb and Plovnick’s (1974) theory posited that learning is conceived of a cycle with four stages. “The learner, if he is to be effective, needs four different kinds of abilities – concrete experience abilities (CE), reflective observation abilities (RO), abstract conceptualization abilities (AC), and active experimentation (AE) abilities” (Kolb & Plovnick, 1974, p. 5). The Theory of Experiential Learning suggests that the learner must involve themselves in new experiences, observe and reflect on these experiences from multiple angles, create concepts that merge into theories, and actively use those theories to solve problems. Kolb and Plovnick (1974) suggested this cycle of learning is difficult to achieve, often involving the learner moving from one who acts, to one who observes, from being specifically involved to analytically detached (p. 5).

In his work, Kolb (1984) asserts learning as being the process of knowledge creation via transformation of an experience (p. 38). The Experiential Learning Theory puts forth two ideals that lead the learner to choose continually which learning abilities they will use in different situations (Kolb & Plovnick, 1974). These two ideals are broken into the sections of ELT, with one dimension representative of concrete experiences and abstract conceptualization, while the other dimension represents active experimentation and reflective observation (Baker et al., 2012; Kolb & Plovnick, 1974). Baker et al. (2012) state “ELT explains that knowledge results from experiences that have been grasped and transformed (Kolb, 1984)” (p. 3). This transformation and the type of knowledge that results differs depending on how the knowledge was grasped, as well as how the knowledge is transformed (Baker et al., 2012; Kolb, 1984).

Though widely influential in adult learning, ELT is not without criticism (Bergsteiner et al., 2010; Morris, 2019). One critique cited by Morris (2019) states that Kolb’s (1984) interpretation of the works from which the theory was built provides a flawed picture of the original theories. Morris further states “Kolb’s model remains the principle and most influential model in experiential learning theory (Seaman et al., 2017). Nevertheless, the lack of empirical foundation to the model remains a foremost concern” (Section 2, para. 7). Criticism of the model itself rather than the theory’s language has also been published. Bergsteiner et al. (2010) note that Kolb avoids confirming whether the ELT model is representative of learning stages or his four learning styles. “The difference is fundamental since learning styles can be related to inherited or acquired personality types, while learning stages refer to sequential steps in a learning cycle” (Section “Issues with Kolb’s Theory”, para. 1).

Despite this criticism, the model of ELT was explained by Baker et al. (2012) as being cyclical to the learning stages, beginning with a concrete experience. Kolb and Plovnick (1974) state that ELT and its model are a simple description of the learning cycle, telling how experiences translate into concepts to guide the choosing of new experiences.

Both SLTCDM and Kolb's ELT provided important theoretical frameworks for this study because of attention paid to the factors that impact career decisions and an often-used cycle to model how people learn. Environmental factors and types of learning experiences described by the SLTCDM helped the researcher understand varying aspects that lead to career decisions made by individuals. Similarly, ELT allowed the researcher to create an immersive experience which permitted participants maximum opportunity for knowledge acquisition.

Career Opportunities in Agriculture

The U. S. is home to over 300-million citizens, and the world population is slightly above 7.9 billion (United States Department of Commerce, n.d.). As stated in a publication by the Food and Agriculture Organization of the United Nations "food provides nutrients so we can grow and be...healthy" (Burgess & Glasauer, 2004). Not only does U. S. agriculture contribute over \$1 trillion to the gross domestic product and 19.7 million jobs to the nation, but it is projected that the world's agricultural production will need to increase by 70% in the next 35 years to feed a continually growing population (Kassel & Martin, 2022; Moyer, 2022). The United States Department of Agriculture published a press release in 2020 titled "Employment Outlook is promising

for New College Graduates in Agriculture”. It is expected that the employment opportunities for new college graduates with an interest in agriculture, food, and natural resources will remain strong through the year 2025 (Fernandez, et al., 2020). The acting director of the National Institute of Food and Agriculture is quoted as saying “future development of our complex global food system requires the brightest minds from a wide range of backgrounds, cultures and disciplines working together to solve the challenges before us” (United States Department of Agriculture, 2020, para. 2).

Sometimes, though, the agricultural industry has difficulty bringing in those bright-minded people from a range of cultures. It has been found that inner city students believe agricultural employees should have a background in agriculture (White et al., 1991). Additionally, Jones and Larke Jr (2001), found students are more likely to pursue an agricultural career if their father was in an agriculture-related occupation. Esters and Bowen (2005) found that female and male guardians of students from urban agricultural education programs accounted for two-thirds of the top three individuals that influence the student’s career choice. This supported the findings of Kotrlik and Harrison (1987) as they reported “parents influence these students’ career choices more than any other person” (p. 55). Additionally, though, vocational agriculture students are also found to use their level of interest in the work, the conditions of the work, and their personal satisfaction to influence career selection (Kotrlik & Harrison, 1987). Agricultural jobs are in demand of employees, especially with the growing threat of climate change and a severe shortage in labor (Moyer, 2022). Producers are struggling to find and pay for adequate labor, and the agricultural industry is continuing to grow (AgAmerica Lending, 2022). Specifically, Moyer (2022) states “the agriculture industry is growing at an

incredibly rapid pace and as it does, the demand for qualified candidates increases right along with it” (“10 Benefits of a Career in Agriculture” section, para. 7).

Despite the aforementioned growth in the agricultural industry, food production labor has been decreasing over time, especially on farms. AgAmerica Lending (2022) cites the average age of a principal farm operator is 59.4 years old and that the U. S. saw a 73% decrease in the number of self-employed and family farm workers from 1950 to 2000. Moyer (2022) additionally states that, despite the immense growth in agricultural career opportunities, there are only expected to be 35,000 annual graduates with agricultural degrees. AgAmerica Lending also notes that, due to the reduction in farm labor forces over time, there was a 73.9% increase in imported fresh produce, which was also accompanied by an increase in food waste in the U. S. “The Natural Resources Defense Council (NRDC) reported in 2012 that nearly 20% of U. S. produce never left the farm due to a lack of farm labor” (AgAmerica Lending, 2022, para. 9).

While the number of employees and workers has been trending downward, there are some aspects of agricultural careers that have been trending in a positive direction. A USDA study in 2018 found the average workforce age across agriculture was 40-years-old, down from the average age of 55.9 in 2012 (Moyer, 2022, “10 Benefits of a Career in Agriculture” section, para. 9). Additionally, AgAmerica Lending (2022) stated that “this downward trend [in labor force] is translating into higher labor wages for these workers. For instance, in 2018 the agriculture industry experienced a seven percent decline in hired help and a five percent increase in labor wages” (para. 4).

The lack of workers in the agricultural industry can be due to many factors, and Moyer (2022) asked the question, “Why aren’t there more college grads and young job seekers champing at the bit?” (para. 3). There could be several answers to this question. Some students may not perceive there to be as many job opportunities as the agricultural industry has, as found by Jones and Larke (2003). Some, as found by Fizer (2013), may not feel that agricultural careers are personally rewarding, and thus do not want to pursue them. As in the study by Esters and Bowen (2005), perhaps they just do not have an interest in agriculture or an agricultural career. Osborne and Dyer (2000) found that 90% of students and parents surveyed had a positive attitude toward agricultural career fields, but their parents were less likely to recommend those career fields. The lack of interested parties in agricultural careers was noticed by the Indian Council of Agricultural Research as well. They published an article in *Indian Farming* highlighting various career opportunities in agriculture and similar sciences, stating “... agricultural education has not received much attention due to lack of matching publicity and visibility” (Rana, et al., 2018, p. 41). Overbay and Broyles (2008) noted career choices are primarily governed by the values of that person, and their perceptions of that industry. Research has shown that students expressing an interest in careers that are traditionally related to agriculture, such as veterinary medicine, farming, animal biology, or landscaping, have a greater idea of the variety of jobs available within agriculture than do the students who are interested in a field that falls within the agricultural “industry concept” as used by Conroy (2000). The work Conroy describes an industry as “the aggregate of work, scholarship, and ancillary activity in a particular field” (p. 77).

In the U. S., agriculture is a multi-billion-dollar industry, having contributed five % (\$1.055 trillion) to the United States gross domestic product (GDP) and having made up 10.3% of United States jobs (19.7 million positions) in the year 2020 (Kassel & Martin, 2022; Moyer, 2022). In all, a relatively low percentage (13.2%) of agricultural jobs were on-farm employment in 2020. As shown in the graphics of an Economic Research Service publication, the agricultural industry's contribution to the United States GDP steadily increased from 2010 to 2019, and food expenditures were the third-highest expenditures by households in 2020 at a rate of 11.9% (Kassel & Martin, 2022, graphic 1, 3). With employment opportunities high for agricultural graduates, labor wages steadily increasing over time, and a large body of research into career decision factors, further research will be needed to ascertain why students are not pursuing these many opportunities in agriculture. (AgAmerica Lending, 2022; Esters & Bowen, 2005; Fernandez, et al., 2020; Fizer, 2013; Jones & Larke, 2003; Kotrlik & Harrison, 1987; United States Department of Agriculture, 2020).

Agricultural Career Education

Dailey et al. (2001) posited “Agriculture by definition is an applied science that combines the principles of the physical, chemical, and biological sciences in the production of food and fiber” (p.12). The researchers also noted that agricultural education has included aspects of instruction in mathematics and science since its inception during the 18th century. According to the Texas Education Agency (TEA) (2022), the Agriculture, Food, and Natural Resources (AFNR) program of study is an approved Career and Technical Education (CTE) course, with an original framework

released in the fall of 2019. Howell et al. (2019) stated that more than 12 million United States high school and post-secondary students were enrolled in CTE classes, including the agricultural sciences, that provide them with academic and technical skills, and necessary training to find success in future careers. The authors further state that CTE courses represent “a crucial path from education to employment” (p. 1). When looking at careers that fall under the umbrella of “traditional agriculture”, only 8.2% of Conroy’s (2000) respondents had an interest in pursuing careers in agriculture (p. 76). However, Conroy found that 54.8% of student respondents expressed interest in a career area within the agriculture, food, fiber, and natural resources industry when traditional and “broadly defined industry” responses were combined (p. 77). Conroy posed the question in this study of whether or not students were aware of the connection that occupations such as engineering, pharmaceuticals, and journalism have to the agricultural industry, and mentioned that student recruitment into high school agricultural science programs may require some awareness to these connections.

Hoyt (2001) stated that “career education was first promoted as a proposal for education reform in the early 1970s” and it received federal funds appropriations totaling \$130 million throughout the decade (p. 327). Since the repeal of the Career Education Incentive Act in 1981, it has become clear that education and employment have a close relationship that is growing closer (Hoyt, 2001). Previous studies have shown that career education and work-integrated learning aid in increasing students’ employment potential (Reddan and Rauchle, 2012). Hoyt (2001) further mentions that career education is still the most validated and demonstrated proposal for education reform in the United States. Career education is not only important for students entering the work force, but also for

students deciding on a major when entering post-secondary education. Gaylor and Nicol (2016) mention that Canadian secondary schools have mandatory courses to help students get ready for the transition from school to work. The researchers further state that students' post-secondary transition plans and career decision-making skills are underdeveloped following the completion of high school.

The Canadian shift toward a knowledge-based economy means that a majority of students consider post-secondary training (Truong, 2011). ... A 2010 Statistics Canada report, however, estimated that 50% of Canadian university students fail to finish their first degree within five years. (Gaylor & Nicol, 2016, p. 3)

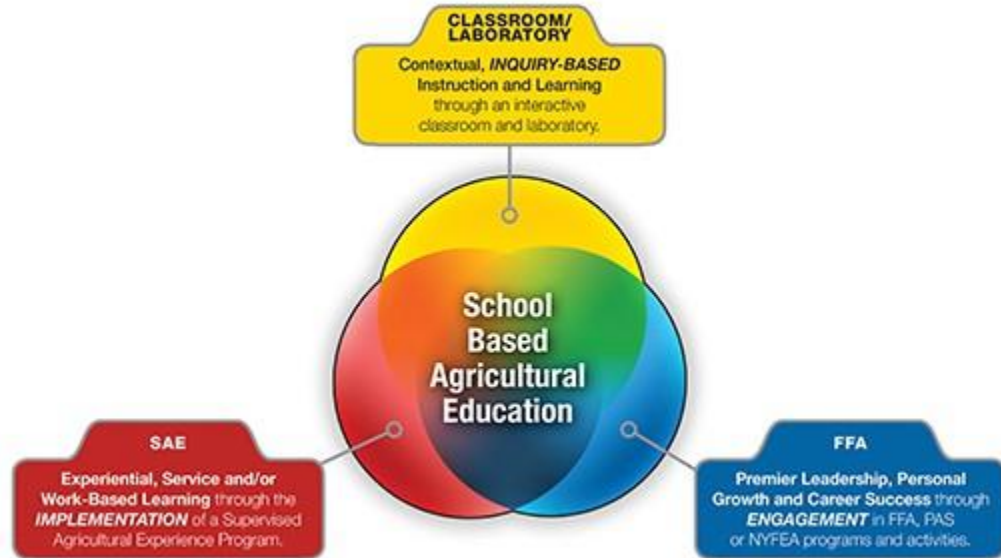
The above quotation exemplifies the point of transition plans after secondary school seeming to be underdeveloped, in that students seem to feel pressured to attend a post-secondary institute of education even though they may not receive their degree. As further noted by Gaylor and Nicol (2016), less than 50% of junior high-school students would feel comfortable discussing their desired career with a person who is actively employed in that profession. The researchers continued to cite research that indicated a low level of career exploration by students, though 98% of a cited sample reported they'd already made a post-secondary decision (Gaylor & Nicol, 2016). Gaylor and Nicol suggested this shows students are making decisions to enter career fields with only surface-level knowledge of what is involved in those fields. As a prime example, Conroy (2000) found their research to support previous research suggesting that most students perceive agriculture as primarily farming and ranching, and seldom recognize the

multitude of other career opportunities within the agricultural industry. Esters and Bowen (2005) found that some former students who had been enrolled in agricultural education courses chose a career outside of agriculture due to a perceived “lack of career opportunities.” The lack of opportunity for a career in agriculture that some secondary agriculture students perceive points to a deficiency of career education occurring within these programs. Cockle (1978) stated “career education is an important fundamental of an agricultural education system” (p. 6). There is a portion of the agricultural education system that touches specifically on career education that many of the United States’ students participate in annually.

As many may be aware, agricultural education in the United States is built around what is known as “The Three-Component Model” (National FFA Organization, 2019a). This agricultural education model consists of a three-part Venn diagram, with the three essential components being “Classroom/Laboratory Instruction”, “SAE”, and “FFA”. As mentioned by Davidson (2020), the purpose of this model is to allow students opportunity in these three areas “that will prepare them for the workforce” (p. 12). The National FFA Organization’s (2019a) Three-Component Model is shown in Figure 1.

Figure 1:

Three-Component Model of Agricultural Education



Supervised Agricultural Experience, or SAE, is a component of this model dealing with various forms of experiential learning that includes work-based learning for exploring career interests of students (National FFA Organization, 2019a; National FFA Organization, 2019b). Dailey et al. (2001) stated that using SAEs was designed to close the gap between student classroom learning and the work environment, allowing learners the opportunity to transfer classroom knowledge and skills to a real-world situation. Despite this crucial component of student experiences in agricultural education courses, Conroy (2000) found that there is “a need to re-examine how career education is addressed within the agricultural education program” (p. 82). Conroy’s work found that 40% of their student respondents expressed interest in an occupational area that fits within the agricultural industry, including areas such as administrative support, natural resources, and retail/food service (pp. 81, 83). Despite this, there are few publications

looking into career education for secondary agricultural science students and the impact it may have on their career choices.

There are publications speaking to the benefits of career education in various forms for other areas of study, however. For example, Makransky et al. (2020) looked into whether virtual reality simulations increased career aspirations of students in the field of science. These immersive simulations showed an increase in career self-efficacy in all participants, and a positive change in career aspirations in a portion of the sample. Reddan and Rauchle (2012) noted in a study on work-integration in exercise science that this type of program has been available for vocational degrees in Australian universities for many years. The researchers found that, in the cohort of students at the time, the top five most important take-aways from their program of study “demonstrated a mix of career education and work-integrated learning outcomes, emphasizing the importance of providing both aspects in courses of this nature” (Reddan & Rauchle, 2012, p. 44). Reddan and Rauchle further found that 100% of their sample felt career education should be an aspect of work experience courses, with reasons including that the career education component helped to provide a clearer career path for the students. Hoyt’s (2001) publication mentioned that, if we want teachers to use a career education approach in their instruction, they must first learn that their pupils will learn more and that they will likely receive some credit for that learning.

Dailey et al. (2001) noticed that the agricultural education program has not adequately defined or described its meaning or purpose, and stated that “the view of agricultural education varies between and among groups ... and has evolved according to

global, regional, and local pressures” (p. 11). The research team also noted that agricultural education courses can provide an opportunity for students to explore mathematical and biological skills that they may not receive in traditional classroom settings. With this in mind, Agriculture, Food, and Natural Resources curricula have the potential to be greatly beneficial for many students as they look to enter the workforce.

Impact of Career Education Programs on Student Knowledge

Since the Texas Cattle Feeders Association (TCFA) was founded in 1967, its mission has been “to ensure the sustainability of cattle feeding by serving and advancing the economic, political, environmental and cultural interests of cattle feeders and feedyard members, enhancing the reputation of fed beef production, and increasing consumer confidence in beef” (Texas Cattle Feeders Association, 2018a, para. 3). As part of this mission, the TCFA hosts a variety of youth immersive educational experiences, having started with the Junior Fed Beef Challenge 25 years ago (Texas Cattle Feeders Association, 2018b). The Texas Cattle Feeders Association (2018b) has two additional programs that are more recent in nature, the Feedyard Technician Program, and the Junior Fed Beef Career and Leadership Program. The latter, specifically, is a well-known program that is put on by TCFA every summer, with the multi-day program “giving students an in-depth look into all aspects of the beef industry” (Texas Cattle Feeders Association, 2018b, para. 6). This type of educational experience is crucial to students learning the various facets and opportunities within an industry that they are passionate about. Osborne and Dyer (2000) found that most students and parents from their sample “were uncertain about their attitudes toward educational programs in agriculture” (p. 54).

It was also observed by Osborne and Dyer that most parents from the representative sample (approximately 1,140 parents) did not encourage their student to pursue a career or degree in agriculture. It is noted by Lundry et al. (2015) that Career Development Event (CDE) involvement through the FFA is a method for students to learn about careers outside of the classroom through the garnering of technical information. It was theorized by Talbert and Balschweid (2006) that a student being involved in activities that prepare them for careers may lead to a more well-informed and appropriate career selection (p. 68). Settle et al. (2012) conducted a five-day agriculture and agricultural communications workshop in four different cities that incorporated experiential learning opportunities for the students participating. Researchers' findings indicated these workshops may expand the career interest of students through exposure to a variety of career options, specifically for students without an agricultural background (p 75). Howell et al. (2019) mentioned that limited understanding, outdated perceptions, and limited awareness challenges the promotion of CTE value "while the demand for skilled workers ... continues to rise" (p. 2). Osborne and Dyer (2000) posited that agricultural science teachers should further efforts to inform parents and other community members about the variety of career opportunities within the agricultural industry.

One way this may be done is through educational programs, such as those hosted by the Texas Cattle Feeders Association. These career educational programs should allow students the opportunity to look into many aspects of the career or career field focused on during the programming. Additionally, as with the program designed by Cockle (1978), students should be able to conversate with industry professionals to gain information that they deem valuable, such as the educational requirements for that or a similar position.

Especially with the hands-on, experiential components of agricultural education, Cockle noted that their students “felt they had learned much more than they could have through books...” (p. 7).

Summary

This review of literature sought to highlight previous research done in the topic areas of career opportunities in agriculture, agricultural career education, agricultural technology, and the impact of career education programs on students. Previous research has found that there are a large number of career opportunities within the agricultural industry, but few have theorized a solid way to recruit students into those opportunities. High school Agriculture, Food, and Natural Resources programs work heavily with students, preparing them for careers and education post-secondary school and serving as a means to teach life skills (Dailey et al., 2001). However, agricultural science programs in secondary schools seem to inadequately utilize career education beyond participation in competitive events (CDEs) to educate their students in agricultural career opportunities. Finally, there is a lacking body of research on the topic of career education programs as it relates to the agricultural sciences and in-person experiences. While studies point to the use of virtual programs (Makransky et al., 2020), these are often not ideal for students interested in the agricultural sciences.

CHAPTER III

METHODOLOGY

Overview

The methodology for this study followed a mixed-methods research design to measure the impact of an in-depth career education program on participants' self-perceived knowledge of career opportunities in agriculture as a whole, as well as in specific areas of the agricultural industry. Data was collected from program participants who applied and were accepted to the "2022 Agricultural Careers, Technologies, and Leadership Program" hosted at West Texas A&M University.

A review of literature sought to establish the need for research regarding career education programs in the agricultural industry and the impact that these opportunities have on students' knowledge and planned career paths. This chapter describes the methods and procedures used to identify a sample, take the sample through an educational program, conduct a survey, conduct focus group interviews, and analyze the data. The research design sought to garner the best understanding of the topic under review.

Purpose and Research Questions

The purpose of this study is to determine whether secondary students enrolled in Agriculture, Food, and Natural Resources courses at their local high school have a higher self-perceived understanding of careers and technologies in agriculture after the completion of an immersive educational program. The study will seek to answer the following three research questions.

1. What level of knowledge do high school students have about the career opportunities available to them in the agricultural industry before the completion of an immersive program?
2. What areas of the agricultural industry are secondary AFNR students the most familiar with based upon their prior experiences?
3. Will an immersive educational program increase student knowledge of opportunities and technologies?

Research Design

This was a mixed-methods research study guided by triangulation design. This design was used out of a want to validate quantitative results with qualitative data (Creswell, 2006.). This study used quasi-experimental quantitative methods concluding with a retrospective pre-post questionnaire, and focus group phenomenological qualitative data collection. A mixed-methods design was chosen to gain numerical insight on the impact of an in-depth educational program, as well as to ascertain verbal

participant feelings and background that could not be gathered on paper alone.

Tashakkori and Teddlie (1998) state that mixed methods research studies “combine qualitative and quantitative approaches in the methodology of a study” (p. ix). Mixed-methods research is an approach whereby both quantitative and qualitative data are collected by the researcher for the same study (Shorten and Smith, 2017).

Mixed-Methods Triangulation Design

The triangulation design is one of the most common approaches to mixed-methods research. This design consists of one phase of data collection where the quantitative and qualitative data are gathered at the same time and are weighted equally (Creswell, 2006). The triangulation design of mixed-methods research aims to join the differing strengths and individual weaknesses of quantitative and qualitative methods, according to Creswell, 2006. In triangulation design, the two data sets are converged in order to compare, contrast, or validate quantitative results with qualitative data. There are four variations used in addition to the traditional triangulation design: the Convergence Model, the Data Transformation Model, the Validating Quantitative Data Model, and the Multilevel Model. Out of these, this study used the Convergence Model, which was described by Creswell (2006) as follows:

The convergence model (Figure 4.1b) represents the traditional model of a mixed methods triangulation design (Creswell, 1999). In this model, the researcher collects and analyzes quantitative and qualitative data separately on the same phenomenon and then the different results are converged (by comparing and contrasting the different results) during the interpretation. Researchers use this

model when they want to compare results or to validate, confirm, or corroborate quantitative results with qualitative findings.

Quasi-Experimental Design. According to the Office of Sponsored Programs at Winston-Salem State University (n.d.), quasi-experimental research aims to establish a cause-effect relationship between variables. Harris, et al. (2006) further described quasi-experimental research designs as those that are non-randomized and consist of a pre-post evaluation. In this type of study “an independent variable is identified but not manipulated by the experimenter, and effects of the independent variable on the dependent variable are measured” (Winston-Salem State University, n.d., “Casual-comparative/quasi-experimental research” section). According to Chiang et al. (2015), manipulating an independent variable is the act of systematically changing the level of that variable to which participants are exposed. This is the defining difference between quasi-experimental research and experimental research studies, in which “an independent variable is manipulated to determine the effects on the dependent variables” (Winston-Salem State University, n.d.). Throughout the in-depth educational experience, all participants participated in every component and were not exposed to differing levels of intervention.

Following the completion of the entire program, subjects voluntarily participated in quantitative data collection via the retrospective pre-post survey instrument, addressed in subsequent sections of this document. This type of questionnaire, as opposed to a traditional pretest-posttest, is administered only one time, and allows participants to

report actual changes in behavior or knowledge (Davis, 2003). According to Davis (2003),

When participants are asked to respond to a question about how much they know about a particular subject after they have some basic knowledge of the subject itself, they are more able to accurately reflect on the degree of change in knowledge or behavior. (“Improved Accuracy” section)

Davis (2003) continued to state that the method of retrospective questioning avoids respondents overestimating their level of knowledge on a subject, as is common with a traditional pretest-posttest design. The subjects are then allowed an opportunity to learn how much they know about the subject in question before they complete the survey (Davis, 2003).

Phenomenological Focus Group Data Collection. Phenomenology is one of the five approaches to qualitative research, according to Creswell and Poth (2018). Creswell and Poth defined a phenomenological study as a study that “describes the common meaning for several individuals of their lived experiences of a concept or phenomenon” (p. 75). This is further explained by Hoover (2021) as a model that recognizes the truth that everyone experiences things differently and that there is no singular objective reality. Creswell and Poth noted that phenomenological research is to combine and reduce individual experiences to a description of the universal essence of the phenomenon. The authors further noted that phenomenology is popularly used in the social sciences, including educational research. A key feature of phenomenological research is a small

sample size, using a heterogeneous group of anywhere from 3 to 15 individuals (Creswell & Poth, 2018).

Focus groups used in qualitative research “are small structured groups with selected participants, normally led by a moderator” (Litosseliti, 2007, p. 1). Focus groups have been defined three different ways by researchers, as noted by Smithson (2000). These ways include focus groups being in-depth interviews, carefully planned discussions, or informal discussions. In each of these methods, “focus groups explicitly use group interaction as part of the method” (Smithson, 2000, p. 104). The focus group interview was the second portion of data collection for this project.

Instrument

A survey instrument was created as a tool to gain demographic information, as well as to determine the impact of an in-depth career educational program on the self-perceived knowledge of participants toward agricultural careers and technologies via a retrospective pre-post questionnaire. Focus group questions were also created as a tool to analyze and learn from participants in the program. The focus group questions were adapted from Mount’s (2021) thesis one-on-one interview guide.

The instrument (Appendix A) consisted of 20 total questions, was divided into three sections and was completed on a voluntary basis by students who participated in the in-depth career education program. The first section of the survey identified participant demographics. High school classification, ethnicity, and gender were acquired as general demographic information from this section.

Section two of the instrument was comprised of three questions relating to the participant's family employment history and the participant's career plans. Current or past employment of either parent in agriculture, current or past employment of any grandparent in agriculture, and whether or not the student had considered an agricultural career previously were questions asked.

The third and final section of the survey instrument was the retrospective pre-post questionnaire, and was comprised of statements regarding participants' self-perceived knowledge of agricultural careers and technologies prior to and after completing the educational program. Knowledge was broken down into areas of study, or degree programs, within the agricultural industry. The areas of study used were as follows:

- Animal Science
- Plant, Soil, and Environmental Sciences
- Agricultural Business and Economics
- Agricultural Media and Communications
- Agricultural Education and Leadership
- Equine Industry and Business
- Agricultural Technologies

Participants were asked to rate their level of agreement with the statement "I know a lot about career opportunities in..." with the degree areas listed above. Likewise, participants were asked to rate their self-perceived knowledge of the technology used within the agricultural industry. The answers to these statements were on a five-point Likert scale for both the pre- and post- program statements, with descriptors as follows:

- 1- Strongly Disagree
- 2- Disagree
- 3- Neutral
- 4- Agree
- 5- Strongly Agree

An option for participants to select a neutral stance was included to account for a participant neither in agreement nor disagreement with a self-perceived knowledge question. A participant may select this if they do not perceive themselves as knowing a lot, but feel they know enough to not disagree.

Data Sources

Several data sources were used to develop a better understanding of student self-perceived knowledge about agricultural careers and technology. These sources included the participants, the survey instrument, and focus group interviews. During data collection following the conclusion of the program, participants were divided into two groups. While one group was completing the questionnaire document, the other group was participating in a focus group interview. Since the focus groups took the larger amount of time, a rotation was made following the completion of the first focus group interview.

Leading up to the day of data collection, participants had been involved with an immersive educational experience hosted by the Department of Agricultural Sciences at West Texas A&M University. This program sought to provide in-depth experiences for students within different focuses of the agricultural industry, including with crops and

research, equipment and associated technology, equine industry and business, and personal leadership development. This educational experience began on Tuesday, June 21, 2022 and ended the day of data collection.

Participants

The target audience for this research were high school students of a junior or senior classification, or who had just graduated from high school in June of 2022. Participants must have been enrolled in Agriculture, Food, and Natural Resources courses for at least the previous year at their home high schools. According to the Texas Education Agency (TEA) (2019), “The Agriculture, Food, and Natural Resources (AFNR) Career Cluster focuses on the essential elements of life—food, water, land and air.” Completion of any course within the TEA Agriculture, Food, and Natural Resources cluster qualified the student for participation in the program. This requirement was included to ensure participants had some working knowledge of the agricultural industry. There was a section in the program application for listing the completed AFNR course(s). Additionally, targeted student populations were from a non-traditional agricultural background. As defined by the researchers, this meant that students were not raised in a household that earns income from production agricultural practices. Production agriculture can be defined as “the management and use of a normal agricultural operation for the production of a farm commodity” (Law Insider, n.d.).

For the purposes of the grant which funded this study, participants were supposed to be from a three-county area within the Texas Panhandle. The CHS Foundation approved grant application “Diversity in Agricultural Careers and Technology”, which

was approved in November of 2020, assigned the counties of interest. Counties targeted were Deaf Smith, Potter, and Randall counties due to the large percentage of the populations of these three counties which are not engaged in agricultural production. The preferred student participants were to come from Canyon High School in Canyon, TX, Hereford High School in Hereford, TX, or Highland Park High School, Randall High School, River Road High School, or Tascosa High School in Amarillo, TX.

Participants were chosen based on the following criteria:

- Completed educational experience program application (Appendix B)
- Aged 16-18
- Was previously enrolled in at least one AFNR course at their high school during the 2021-2022 academic year
- Showed good academic standing and moral character as reported by a recommender on their behalf

Researchers recruited participants for this study by first introducing the project to agricultural science teachers at the high schools listed above during the spring of 2021 (Appendix C). When introduced, these educators had the option for their school to participate in the program or opt out if they so desired or felt that their program would not be a good fit for any reason. Following the decision of agricultural science instructors and their administration to participate, the researchers made visits to the schools' Agriculture, Food, and Natural Resources students to give an introductory presentation about the importance of career education in the agricultural industry. These visits were scheduled during the fall semester of 2021 and were executed early in the spring semester

of 2022. During the presentations, students were informed that there would be an opportunity for them to participate in the in-depth career education program during the coming summer and that applications would be out within a couple of months.

When applications for the summer program were ready for distribution, researchers made a second trip to visit the AFNR classrooms that had been visited previously. The second round of visits was considerably shorter, and consisted of a singular representative making a short appearance in program classrooms. This second visit occurred in the early part of April 2022. During this short visit students were reminded of the program's fundamentals, and applications were left with their agricultural science teacher for distribution to any interested students. Teachers and students were informed that there was no limit on potential application numbers, and that anybody was welcome to apply if they desired. Due to a lower-than-expected number of applications from the targeted geographical area, the researchers extended applications to other areas of the state for interested students. Targeted school programs for additional applications were various programs in Texas FFA Areas I and II (Texas FFA Association, n.d.). From the extension of applications, the program gained two students from Robert Lee High School in Robert Lee, Texas, two students from Tahoka High School in Tahoka, Texas, and one student from Grape Creek High School in San Angelo, Texas. In all, there were 11 total applications, with all 11 applicants accepted into the program.

As the dates of the educational program that would lead to data collection grew closer, the researcher sent out a reminder email to participants which included the

necessary informed consent/assent form, a packing list for the program, and a map with directions to the drop off location. This reminder email (Appendix D) was sent 6 days prior to the beginning of the program, June 16, 2022. Upon arrival at the West Texas A&M University campus, each participant was given a copy of the program schedule to keep for reference (Appendix E).

Survey Instrument

The survey instrument consisted of 20 questions, and can be broken into three short sections. Section one of the survey, the first six questions, focused on gathering demographic information such as “classification”, “ethnicity”, and “gender” from the program participants. Section two of the survey was aimed at gathering information about the participant and their family’s history with agricultural occupations. Participants were asked whether any of their parents/guardians or grandparents have ever been employed in an agricultural occupation. There was also a question asking students if they had ever considered a career within the agricultural industry prior to the completion of this program.

The third portion of the survey focused on the students’ knowledge prior to, and following completion of, the immersive educational experience. Questions 7 through 14 of the instrument focused on self-identified student knowledge about career opportunities within different agricultural fields of study prior to their completion of the program, while questions 15 through 20 encompassed students’ self-identified knowledge of careers in the same areas of the agricultural industry following program completion.

The survey was completed on a voluntary basis for each of the program participants, provided they and their parent/guardian (if applicable) completed an Informed Consent/Assent (Appendix E) that was in the possession of the researchers.

Focus Group Interviews

Focus groups are small and structured groups with selected members that use group interaction and discussion created by the researcher as the source of data (Litosseliti, 2007; Morgan, 1996; Smithson, 2000). “Phenomenological interviewing is an in-depth interview process focusing on human experiences” (Mount, 2021, pp. 38-39). Creswell and Poth (2018) stated that focus group interviews can be conducted virtually via a web-based or e-mail platform, or with members physically in the same room (Figure 7.3, p. 163). Since participants were already on campus for the in-depth educational program, the researchers opted to conduct focus group interviews with all members in the same room of the Happy State Bank Academic and Research Building on the WTAMU campus on Friday, June 21, 2022.

Participants were broken into two different groups for the data collection portion of the program. The researcher entered with the participants into the chosen conference room for the focus group interviews. Since the majority of participants were minors under the age of 18, it was agreed upon by the West Texas A&M Institutional Review Board and the researcher that a second adult would be present in the room during the completion of focus group interviews.

Using the focus group interview guide (Appendix F) adapted from Mount’s (2021) one-on-one interview guide, the researcher reminded students that the questions

asked would relate to their experiences and knowledge of agricultural careers and technology. Participants were also reminded that their involvement in the focus group interviews was completely voluntary and that they had the right to resign at any moment. The focus group interview guide consisted of a series of questions that flowed in a specific manner to facilitate conversation and interaction between interviewees, rather than feeling like a formal interview.

Both focus group interview sessions lasted approximately 60 minutes. In this time, participants not only answered pre-written questions, but also got the opportunity to have conversations that arose naturally from question answers. It is important to note that the researcher and participants had the opportunity to interact throughout the course of the immersive educational experience leading up to data collection. Due to this extended period of interaction, the researcher and participants developed a comfortable acquaintanceship which allowed for focus group interviews to feel more comfortable than if the researcher and participants had only just met for the first time. Creswell and Poth (2018) agree that it is crucial to make an interview environment that is as comfortable as possible, regardless of interview method (p. 164).

Data Collection

Data was collected during the summer of 2022. The Institutional Review Board (IRB) of West Texas A&M University approved the collection of data for this study in Research Proposal #2022.02.004. The proposal for research using human subjects was sent to the IRB for review on February 1, 2022, with final approval received on April 6. Data was collected by the researchers on June 24, 2022 in a classroom and a conference

room of the West Texas A&M University Happy State Bank Academic and Research Building (HSBARB), part of the Agricultural Sciences Complex.

When data collection was about to begin, the group of participants was split as evenly as it could be. Group one had five members, and group two consisted of four participants. These two groups would rotate through two portions of data collection, which included the 20-question survey instrument, and the focus group interviews. Before each portion of data collection started, participants were reminded that the research portion of the program was completely voluntary and were asked if they still wished to provide their feedback.

Survey instrument completion was to occur in a classroom on the second floor of the HSBARB. When the participant group was ready to complete the survey, each person received one copy of the two-page document. The researcher asked that all participants answered the questions honestly and to the best of their ability. Participants were also encouraged to ask for clarification on questions that they did not fully understand. The time required to complete the retrospective pre-post questionnaire was minimal.

Focus group interviews made up the lengthier part of the data collection process. After the participants were split into groups, the larger of the two groups was encouraged to grab the notebooks that had been kept throughout the week as a reference, and was then escorted to the David and Myrt Wilder Faculty Conference Room in the Happy State Bank Academic and Research Building. When all members of this group were seated comfortably, the researcher sought to make the environment as comfortable as possible by allowing non-research-related conversation to occur in the first several minutes that

the group was in the room. Before data collection began, the researcher read the script included in the interview guide to remind participants that the focus group was voluntary and that the subjects reserved the right to withdraw at any moment. The researcher then asked if the participants were ready to begin and received confirmation from each participant before the interview questions were asked. Though Creswell and Poth (2018) recommend around seven open-ended interview questions, this study utilized 15 questions as an attempt for the researcher to establish a complete understanding of participants' experiences with the phenomenon being studied. When deemed necessary to achieve a more complete understanding of participant experiences, the researcher asked follow-up questions or asked respondents to elaborate on their answers.

Upon completion, the survey instruments were immediately placed into a folder that only the researcher held. Focus group interviews were recorded on an audio recording device for transcription and analysis. All recordings, survey instruments, and transcriptions remained confidential and were stored on a password-protected computer or in a locked cabinet that only the researcher had access to. Consent/assent forms and demographic data of all participants were also kept in a locked cabinet until data analysis was completed, at which time these documents were destroyed. Focus group audio recordings and transcriptions were also destroyed after they had been analyzed. When all data collection procedures were complete, participants were released to eat lunch that had been purchased for them by the camp program, and were also given various WTAMU Department of Agricultural Sciences recruitment paraphernalia.

Data Analysis

Data analysis in mixed methods research, also known as mixed analysis, requires the use of both quantitative and qualitative techniques within the same research framework (Onwuegbuzie & Combs, 2011, p. 3). The analysis of data by the researcher may occur in two phases, either sequentially or concurrently. The researcher chose to analyze these data concurrently as it was not necessary for one phase of analysis to inform the other phase, like mentioned by Onwuegbuzie and Combs (2011). Conducting a mixed methods study, the researcher used both quantitative and qualitative data analysis methods on the corresponding types of data.

Validity and Reliability

After the survey was initially developed, it was reviewed and edits were suggested by the researcher's committee of advisors in the WTAMU Department of Agricultural Sciences. Changes to the survey instrument were made in accordance with these edits when received by the researcher. This survey instrument was part of the research proposal accepted by the Institutional Review Board at WTAMU on April 6, 2022.

To assess the reliability of scale questions in the questionnaire, Cronbach's alpha was calculated post hoc for all Likert-type scale questions. As stated by Reynaldo and Santos (1999), Cronbach's alpha determines reliability over repeated administration of the survey through a numerical coefficient of reliability. According to Tavakol and Dennick (2011), Cronbach's Alpha is expressed as a number between 0 and 1, with a higher number indicating higher reliability from the tested questions. The statistic (0.831)

shows the survey to be a good instrument (George & Mallery, 2003). Additionally, the result of this test also showed the Likert-type questions to have a 0.31 error variance in the cohort (Tavakol & Dennick, 2011).

Quantitative Data Analysis

Analysis of quantitative data began with the researcher transferring responses from the retrospective pre-post questionnaire into a Microsoft Excel spreadsheet. If there was a question left unanswered by a participant, that respective answer occurrence was replaced with a period for data analysis. Answer choices from the instrument were then converted to a numerical response format to be compatible with the Statistical Package for Social Sciences (SPSS). Green and Salkind (2014) state that it generally makes more sense to work with numeric variables in SPSS than string variables for most data points. Data were then uploaded into SPSS and checked for consistency by the researcher. Data were correctly identified in SPSS as nominal, ordinal, or scale data by question type. Analysis occurred using SPSS version 27 on a Windows-operating desktop computer. For the objectives of this study, frequencies and descriptive statistics were used to summarize the data, and a “changed score” value was calculated for the Likert-type questions to determine immersive educational program outcomes. The “changed score” value was calculated by subtracting the pre-program agreement score from the post-program agreement score for all nine participant responses. These values were then compiled for each subject area by SPSS, which also calculated the mean change, standard deviation (SD), minimum change, and maximum change.

Qualitative Data Analysis

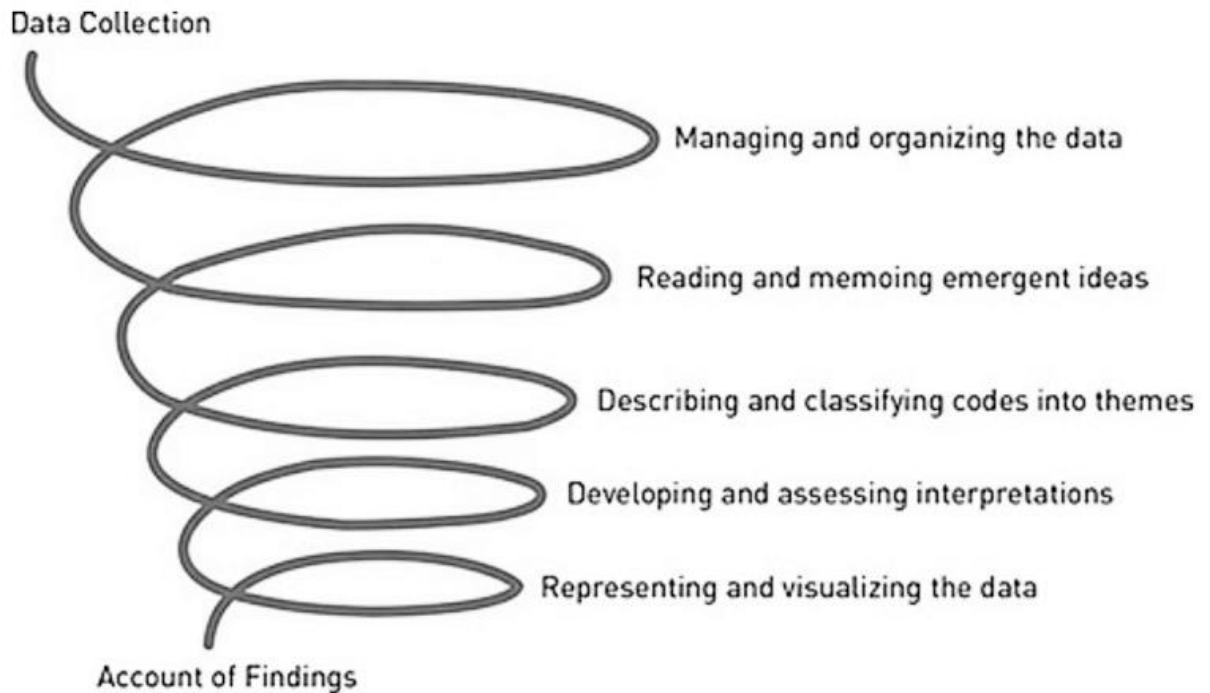
Creswell and Poth (2018) stated that phenomenological studies have some of the most detailed analysis procedures in qualitative research. It is further stated that the researcher can either choose to code interviews by hand or to use a computer during data analysis (Creswell & Poth, 2018; Mount, 2021). This study did not utilize computer programming. Rather, the researcher hand-coded the qualitative data gathered.

Following data collection, focus group interview audio recordings were transcribed verbatim into Microsoft Word by the researcher. After both focus group interviews had been transcribed into separate documents, the researcher listened to the recordings while reading the document to ensure that all words and phrases were transcribed accurately. This action was repeated two times for each interview. After accuracy was established, the researcher used a random name generator software that allowed for the de-identification of interview responses by participants (random-name-generator.info/, 2022). Once both of the focus group transcriptions had been de-identified, data analysis could begin.

The researcher followed the analytic methodology noted by Creswell and Poth (2018), the data analysis spiral (p. 186). This image (represented in Figure 2), suggests that the researcher is “moving in analytic circles rather than using a fixed linear approach [to data analysis]” (Creswell & Poth, 2018, p. 185).

Figure 2:

The Data Analysis Spiral

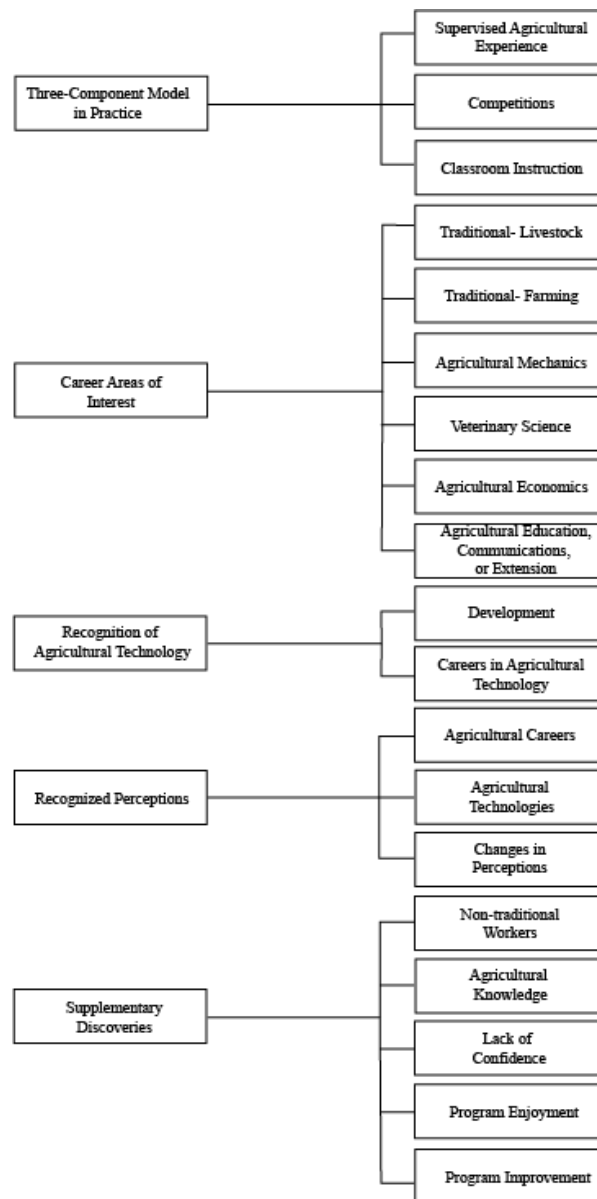


Several readings of each transcript occurred during the process of coding. After an initial read to “refresh” the researcher following a break from the interview data, the researcher began reading the transcripts to identify emergent ideas. During these next readings, the researcher began writing memos to identify possible codes or themes according to the strategy described by Creswell and Poth (2018). Following a third reading of each transcript, the researcher identified significant statements within each transcript. Significant statements were those which directly reflected the feelings and thoughts of a participant while they were answering a question asked during data collection. From these significant statements, the researcher was able to further construct memos leading to the identification of themes and codes. Once themes and codes had

been finalized, the researcher constructed a codebook in Microsoft Word (Appendix H). Codebooks contain a list of codes and definitions for the codes that the researcher uses to identify relevant information (Mihas, 2019). Figure 3 illustrates the 5 general themes and 19 codes the researcher identified in this study.

Figure 3:

Themes and Codes Discovered from Focus Group Data Collection



Creswell and Poth (2018) stated that, regardless of coding method, qualitative data will be analyzed the same. The researcher assigned codes within interview transcripts by hand. First, the researcher identified and highlighted statements with color-coordinated labels to match their best fit code. Following this, new documents were constructed with each code that contained all statements that matched the code. From this point, themes were identified within the statements and were, again, highlighted accordingly. The researcher then organized the previous documents by theme and code so that all related statements were next to each other. Notes were made as to how many occurrences of each theme and code there were within the transcripts.

Researcher Bias

This section of the methodology will acknowledge the experiences of the researcher that may have influenced their perspectives. Researchers, whether knowingly or unknowingly, bring their own assumptions, beliefs, and predispositions to the research setting. These may or may not be the same feelings as those held by the research participants (Peredaryenko & Krauss, 2013). As stated by Mount (2021), the researcher's personal values or feelings have the potential to interfere with the interpretation of observations. To allow for a better understanding of the potential bias of this study, the following is a summary of potentially influential past experiences by the researcher:

My young life was not the same as many people whom I now call some of my closest friends, as I would not say that I was the traditionally agricultural young person that many think I was. I grew up in what used to be a small tourist town in the Texas Hill Country, and the area has had a strong production agriculture presence since it was first

settled by German immigrants during the 19th century. I have always been around agriculture, yes, but I did not have any interest in the various practices of agriculture throughout the first 8 years of my life. My dad owned cattle, and cut his own hay annually. My grandparents had cattle, sheep, and various crops including grain sorghum and oats. Dad used to raise show pigs, my older brother showed pigs, and I followed in that path because our dad “made” us. Even my involvement with a local 4-H club was not done out of passion, but was something I was pushed to do.

During these early years, I did not find myself caring for or about the agricultural practices my family was involved in until I was around 12 years of age. It was around this time that I found myself wanting to be involved in the world of agriculture and starting to take pride and care in various jobs around the homeplace. From then on, I knew that my passions lie within the agricultural industry. As I got older, my chores were reflective of the progression. I found myself taking more stock in my time as a 4-H member and livestock showman, in addition to the time spent in other aspects of production at home. My freshman year of high school, I joined the National FFA Organization.

During my freshman year I found myself being as involved as I could stand with our FFA chapter, running for chapter office, volunteering to show up at every event I could, and competing on multiple teams in both the fall and the spring. This surge in activity was still coupled with the presence of market cattle, a hay crop, and show pigs at the house.

My progression through high school as a member of the 4-H, FFA, and an agricultural employee after school and during the summers led me to where I am today.

During the hundreds of hours and thousands of miles spent travelling with my high school agricultural science teacher, I felt a calling to pursue the path to be an agricultural educator myself. I had felt the impact that this person had made on my life, and sought to be able to positively impact the lives of other students the way that mine had been. Regardless of student status, I found myself wanting to help improve their life for the better. All of the experiences I'd gotten through my involvements growing up made me confident that I knew all of the opportunities that the industry held. I felt myself ready to help students build the skills needed for a successful career. I overheard a classmate of mine talking about West Texas A&M University as a place that they might judge livestock. Following some research, I found myself interested in WTAMU and began to find their booth at any event I could that summer. Texas 4-H Roundup and Texas FFA Convention found me seeking knowledge and conversation with people from this university. When I began life as a student, I found myself wanting to be involved in everything I could as an agricultural education major. I volunteered for any service-learning opportunity the instructors informed us of, and I thoroughly enjoyed every learning opportunity I got inside and outside of the classroom. My time as an undergraduate student in the Department of Agricultural Sciences always felt open and inviting. I went through my course content with a certain level of knowledge I thought I held, including thinking I knew of many agricultural career opportunities.

My time in graduate school, however, has shown me otherwise. Serving as a graduate student on the CHS Foundation grant project "Diversity in Agricultural Careers and Technology" has opened my eyes to all that I truly did not know. Even after being in Canyon, Texas for 5 full academic years and half of another one, I still find myself

learning about career opportunities available for those who want to be in agriculture. Part of this project was the immersive educational experience which led to the collection of data for this research. I've been blessed to be part of this team that designed, planned, and implemented this program for the nine participants who wanted to further their knowledge. I was excited to be able to share the opportunities that we did with those students. As I have played the role of both administrative assistant and researcher throughout the course of this project, I have found myself learning more about career opportunities regularly. From the emotional success that we experienced in putting on this camp program, I have found myself positively hoping that it was as successful as we felt it was going to be. Some of the experiences that these students got during the program were experiences I had interacted with before throughout the course of this project. Additionally, as a program director, I was around the student participants throughout the course of the camp leading up to data collection. The personal relationships developed with these students may have led to bias, as many conversations not related to research occurred throughout the four days that expressed positivity on the end of the participants.

Summary

A mixed methods approach served as the guide for this research study. Combining quasi-experimental quantitative data with phenomenological qualitative data collection, the researcher hoped to study the effects of an immersive agricultural career education program on participant knowledge of career opportunities. Participants for this study were selected via an application process. Following a three-day educational

program in which students traveled to speak with industry professionals, data was collected via a retrospective pre-post questionnaire and focus group interviews. Survey results were analyzed using SPSS Version 27, and both focus groups were transcribed and coded entirely by hand. Demographic characteristics were identified through survey results. Changes in self-perceived knowledge scores were documented and analyzed for mean changes to be reported. Identified codes from the focus group interviews were also reported during the data analysis portion of this study. The results from each set of data analysis are summarized in Chapter IV of this document.

CHAPTER IV

RESULTS AND FINDINGS

Overview

Chapters prior discussed background information on career education information and opportunities for secondary students enrolled in Agriculture, Food, and Natural Resources (AFNR) courses at their high schools. The first chapter discussed this topic historically with regard to a cited decrease in students pursuing careers in the agricultural industry, despite expressing some interest in the field. It was noted that a lack of career awareness lead to the development of this study. Chapter two reviewed literature related to career opportunities in agriculture, career education in agriculture, and the impact that immersive educational programs have had on student career knowledge and selection. A lack of literature highlighted the need for research in the area of secondary agricultural career education. The third chapter described the methodology which was used to conduct this research, including research design, developing the instrument, data collection, and the methods used analyze both the qualitative and quantitative data which came from this study. This chapter reports the results of the data analysis and information collected.

Purpose and Research Questions

The purpose of this study was to determine whether secondary students enrolled in Agriculture, Food, and Natural Resources courses at their local high school have a higher self-perceived understanding of careers and technologies in agriculture after the completion of an immersive educational program. The study seeks to answer the following research questions:

1. What level of knowledge do high school students have about the career opportunities available to them in the agricultural industry before participating in an immersive educational program?
2. What areas of the agricultural industry are secondary AFNR students the most familiar with based on their prior experiences?
3. Will an immersive educational program increase student knowledge of career opportunities and technologies?

Population and Sample

The target population for this study consisted of non-traditional students enrolled in agricultural science courses at their high school within Randall County, Potter County, and Deaf Smith County in the Panhandle of Texas. This geographical region contains high schools which are home to many students from non-agricultural backgrounds, which satisfied the target population needs for this study. The researcher used combination, or mixed, sampling via the application process for acceptance and participation into the immersive educational program (Creswell & Poth, 2018). According to Creswell and

Poth (2018), this method of sampling “meets interests and needs through triangulation, flexibility” (Table 7.3).

Participants

This study involved a combination of nine accepted Texas high school students from both agricultural and non-agricultural backgrounds. Data collection occurred following the completion of the 2021 Agricultural Careers, Technologies, and Leadership program at West Texas A&M University on June 24, 2022. Each participant in this study was unique in background and experience, but shared a love and interest in the field of agriculture. Individuals were accepted based on their self-described interests and a personal or professional recommendation on their behalf. Efforts were made by the researcher to ensure the anonymity of participants after data collection, including the use of pseudonyms. However, participant descriptions may be identifying factors.

A brief description of each participant is included below:

Helen

Helen is a Hispanic female from the Panhandle of Texas. Helen was raised in a rural community, but does not have a traditional agricultural background. She indicated being a senior in high school, part of the graduating class of 2023. Helen has an interest in pursuing a career as a veterinarian, focusing on equids. Her interest in agriculture started when she was a young girl and her family lost a pet due to birthing difficulties. Helen wanted to participate in the immersive program to expand her own knowledge of agriculture and to be able to share that knowledge with her peers.

Evan

Evan is a white male from the Panhandle of Texas. Evan was raised in an urban community, and does not have a traditional agricultural background. He indicated that he was a member of the graduating class of 2023 at his high school. Evan has not decided what career path he wants to pursue, but does want to work in agriculture. His interest in agriculture started around nine years of age when his parents first bought two horses. Evan wanted to participate in the immersive program to experience agricultural opportunities that he had not seen before.

Mae

Mae is a Hispanic female from the Lower South Plains of Texas. Mae was raised in a rural community, but does not have a traditional agricultural background. She indicated being part of the 2023 graduating class at her local high school. Mae expressed interest in pursuing a career as a veterinarian. Her agricultural interests may have begun when she was young, running around her family's business, but she did not fall in love with the industry until her freshman year of high school through the FFA. Mae wanted to participate in the immersive educational program out of curiosity for the opportunity to learn about other career paths, to meet industry professionals, and to grow as a better leader for her FFA chapter.

Joshua

Joshua is a Hispanic male from the Panhandle of Texas. Joshua was raised in an urban community, and does not have a traditional agricultural background. He indicated being a member of the graduating class of 2023 at his high school. Joshua expressed

interest in pursuing a career as a salesman or livestock auditor. His interest in agriculture began around 6 or 7 years of age when he began helping his grand-father with his cattle during the summers. Joshua wanted to participate in the immersive program to expand his horizons when it comes to agriculture.

Jennifer

Jennifer is a white female from a rural community in West Texas. Jennifer has a traditional agricultural background, and identified herself as a high school senior graduating in 2023. She is undecided in career path, but is leaning toward a career in agricultural communications. Jennifer's interest in agriculture began as a little girl who always wanted a horse, but ended up showing cattle instead. Jennifer wanted to participate in the immersive program to expand her knowledge about career opportunities in agriculture, and to help her decide which path she wanted to take.

Henry

Henry is a Hispanic male from the Panhandle of Texas. Henry was raised in an urban community, but comes from a traditional agricultural background. He identified as having just graduated high school, and beginning collegiate studies during the fall of 2022. Henry expressed interest in pursuing a career as a livestock broker, specifically for cattle. His interest in agriculture started when he was young, caring for animals, and was further ignited when he joined the FFA. Henry wanted to participate in the immersive program to begin networking with people connected to the agricultural industry.

Dennis

Dennis is a white male from the Lower South Plains of Texas. Dennis grew up in a rural community, and has a traditional agricultural background. He identified as a high school senior, a member of his high school's 2023 graduating class. Dennis has decided that he wants to become an agricultural science teacher for high school students. His interest in agriculture started when he was a kid helping his grandfather feed cattle daily. Dennis wanted to participate in the immersive program to increase his knowledge about agricultural career opportunities, and to become more comfortable interacting with others.

Curtis

Curtis is a Hispanic male from West Texas. Curtis grew up in a rural community and has a traditional agricultural background. He indicated being part of the graduating class of 2023 at his local high school. Curtis is interested in becoming an agricultural equipment technician. His interest in agriculture began when he was young, enjoying being outside and helping his grandfather farm. Curtis wanted to participate in the immersive program to learn more about the agricultural industry as a whole.

Beth

Beth is a white female from West Texas. Beth grew up in a rural community and comes from a traditional agricultural background. She indicated being a member of her high school's 2023 graduating class. Beth is undecided on career path, but knows she wants to work in agriculture. Her interest in agriculture began when she was a little girl, having been involved in agriculture her whole life. Beth wanted to participate in the

immersive program to learn more about career opportunities to help her decide what she wants to do for a living.

Participant Demographics

Participants were asked on the first page of the survey instrument to share basic demographic information for the purposes of the research study. Being able to identify the demographics of each participant, data collected would hopefully provide an insight to the impact of the program based on agricultural background, and according to high school classification, and ethnicity.

Respondents were asked to self-identify their classification, ethnicity, and gender in the first part of the retrospective pre-post questionnaire. From these responses, the researcher found that age and ethnicity-related demographics for this sample were similar to the original target population of the study. Table 1 shows that 100% ($n = 9$) of the students selected to attend the immersive educational program and participated in the research, were entering into their senior year of high school, if not older.

Table 1*Self-Reported Participant Demographics*

	n	%
Classification		
Freshman	0	0
Sophomore	0	0
Junior	0	0
Senior	9	100
Ethnicity		
Asian/Pacific Islander	0	0
Black/African American	0	0
Native American	0	0
Spanish/Hispanic/Latino	5	55.6
White	4	44.4
Gender		
Male	5	55.6
Female	4	44.4
Parents Currently or Previously in Agricultural Employment?		
Yes	6	66.7
No	3	33.3
Grandparents Currently or Previously in Agricultural Employment?		
Yes	8	88.9
No	1	11.1
Participant Previously Considered of Agricultural Career?		
Yes	9	100
No	0	0

Similarly, the second question asked of participants in the demographic portion of the questionnaire revealed that a majority (55.6%) of the program's attendants ($n = 5$) identified as Spanish/Hispanic/Latino in ethnicity (Table 1). Additionally, it was found

that the majority of participants in the immersive educational program and the research identified as male.

The second set of questions on the first page of the survey instrument aimed to gather information related to the research participant and their family's involvement and interest in agriculture. In questions 4 through 6 of the instrument, participants were asked if either of their parents are or were employed in agriculture, if their grandparents are or were employed in agriculture, and whether or not the participant themselves had previously considered pursuing a career in agriculture. As seen in Table 1, 66.7% (n = 6) of participants had at least one parent who was employed in agriculture at some time, and 88.1% (n = 8) of participants had at least one grandparent who was employed in agriculture at some time.

Participants in the immersive educational experience and research study also reported that an interest in agricultural careers was present, with 100% of the sample indicating that they had considered a career in agriculture prior to their attendance of the immersive educational experience.

Findings Related to Question One

The first question that guided this study sought to determine the level of knowledge high school students had about careers in the agricultural industry prior to the completion of an immersive educational experience. Participants were asked to answer a group of questions in the retrospective pre-post questionnaire that highlighted their self-perceived knowledge about agricultural careers and technologies prior to the beginning of the immersive educational program.

Quantitative Findings Related to Question One

There were eight Likert-type questions asked, each relating to a different segment of the agricultural industry. The first seven of these questions asked retrospectively about the participant's self-perceived knowledge of career opportunities within specific agricultural areas of study. These areas of study are listed in Chapter III. Participant answers on the retrospective pre-post questionnaire were tested individually by question, and not as a cohort of participants for every question.

Retrospectively, participants were asked if they knew a lot about careers opportunities in the Animal Sciences (ANSC) prior to program completion. The results in Table 2 show that 44.4% ($n = 4$) of participants disagreed with this statement. It is also worthwhile to note that 55.6% ($n = 5$) of participants reported that they were neutral in their agreement with this statement when thinking retrospectively.

Table 2*Participant Retrospective Self-Perceived Knowledge Level, Pre-Program*

Subject	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	n
ANSC Before	0 (0%)	4 (44.4%)	5 (55.6%)	0 (0%)	0 (0%)	9
PSES Before	5 (55.6%)	3 (33.3%)	0 (0%)	1 (11.1%)	0 (0%)	9
AGBE Before	0 (0%)	5 (55.6%)	1 (11.1%)	2 (22.2%)	0 (0%)	8
AgComm Before	2 (22.2%)	6 (66.7%)	1 (11.1%)	0 (0%)	0 (0%)	9
AgEdLd Before	0 (0%)	3 (33.3%)	3 (33.3%)	3 (33.3%)	0 (0%)	9
EQIB Before	2 (22.2%)	2 (22.2%)	3 (33.3%)	2 (22.2%)	0 (0%)	9
AgTechnology Before	5 (55.6%)	4 (44.4%)	0 (0%)	0 (0%)	0 (0%)	9

Note. Values are reported as frequencies of selection (*f*) with percentages in parentheses.

When asked in the same manner about their knowledge of career opportunities in the Plant, Soil, and Environmental Sciences (PSES), participants mostly noted that they strongly disagree ($n = 5, 55.6\%$), while one respondent agreed in this subject area.

The third question in this part of the survey asked participants about their knowledge of career opportunities in the area of Agricultural Business and Economics (AGBE). One participant did not answer this question. This table also reveals that 22.2%

($n = 2$) of the students who participated agreed that they knew a lot about career opportunities in AGBE.

Agricultural Communications (AgComm) and Agricultural Education and Leadership (AgEdLd) were the next two subject areas that participants were asked about in the retrospective questionnaire. As seen in the table, there were two participants (22.2%) who strongly disagreed when asked if they knew a lot about careers in AgComm prior to the program, and most answers ($n = 8$, 88.9%) were on the side of disagreement. However, answers for the question related to AgEdLd showed that three (33.3%) participants agreed, were neutral, and disagreed that they knew a lot about career opportunities in this area.

The next area of study participants were asked about was Equine Industry and Business (EQIB), a program area at West Texas A&M University that may go by other names at various universities. Table 2 shows the breakdown of participant responses for this question. Retrospective responses were relatively spread out, but 44.4% ($n = 4$) of participants answered on the side of disagreement or strong disagreement.

The final question on this retrospective pre-post questionnaire asked participants to rate their agreement with the statement “I know a lot about the technology used in the agricultural industry”. The table shows participant responses, with 100% being on the side of disagreement or strong disagreement.

Findings Related to Question Two

The second research question that guided this study sought to determine what areas of the agricultural industry the participants were most familiar with based on their

previous experiences. Previous experiences can include a variety of items. For the purpose of this study, the researcher restricted these previous experiences to those relating to agriculture. As part of the focus group interviews, participants were asked the question “What facets of the agricultural industry do you consider yourself the most knowledgeable about?”. Their answers to this question fell into different themes used, depending on the component of the industry they mentioned. Each of the following themes will also contain participant answers to that question.

Three-Component Model in Practice

One theme identified by the researcher was called “Three-Component Model in Practice” and consists of the elements of the Three-Component Model of Agricultural Education (National FFA Organization, 2019a). These elements make up the codes for this theme, and were identified a variety of times by the researcher.

SAE. One common example of previous experiences that can be referenced by participants are their supervised agricultural experiences (SAE). This code contains references by participants to an activity that would fall under the category of a supervised agricultural experience for an FFA chapter, and was identified 13 times.

Most of the participants in this program had some level of previous experience that falls under the category of an SAE, the majority of which revolve around livestock. Mae said “I just show pigs, and that’s through the school” (Focus Group 1). In the first focus group, Joshua also mentioned his interactions with livestock: “I work with a bunch of show goats over in [hometown],” and Curtis mentions that he also has a job in agriculture “I work on a guy’s ranch in [hometown].”

For some of the participants, their previous experiences in SAE are a family matter. Beth told the researcher “When my mom married my step dad, we started raising cattle and I just fell in love with it” (Focus Group 1). Jennifer, from the second focus group, also said “I help my dad with our ranch cattle.” Evan’s SAE-related livestock experiences started when he was relatively young. “I was around 9 when [my parents] first bought those two horses we had. I think that’s what first got me interested in ag” (Focus Group 1). For some participants, like Dennis, SAE-related experiences revolved around crops, as he mentioned “I drive a tractor for my dad on a cotton farm” (Focus Group 2).

For Henry, these previous experiences are not only a family matter, but they also work as a form of employment. He told the researcher “Me, my dad, and my brother feed out cattle and help out wheat pasture farmers” (Focus Group 2). Jennifer, when asked what first sparked her interest in agriculture, shared with us that it was a joining of her new path with something her dad used to do. “...our county extension agent, [redacted], talked to my sister and she said we were getting pigs. ... My dad grew up showing cattle and working on the ranch, so we switched to steers and I’ve loved every minute of it. It’s really what made me want to go into the ag industry” (Focus Group 2).

Competitions. For one student from both focus groups, competitions through their FFA program were cited as previous experiences that they’d encountered. Mae, from Focus Group 1, said she’s been on the vet tech team at her school for three years. In Focus Group 2, Jennifer said “Going into my freshman year, I was a super big introvert.

My ag teacher put me on our PR team and said I was going to do it.” The second part of her statement was put under the next code to be mentioned.

Classroom Instruction. The top portion of the Three-Component Model of Agricultural Education is classroom instruction, the place where knowledge begins development before being applied to the two aforementioned areas (National FFA Organization, 2019a). This code was identified four times, when students made a direct reference to their high school agricultural science classrooms.

The second part of Jennifer’s above statement related to her agricultural science teacher and the support that she was given. “Just having that support system and seeing what the ag industry had to offer outside of farming and ranching spiked my interest” (Focus Group 2).

For two other participants, their classroom instruction showed them a path for their lives. Mae said “My ag teacher told me ‘you need to show pigs’ so I did, and I have kept going... My freshman year, I didn’t even know showing was a thing. I didn’t know any of this existed. Being able to know and learn about showing, ag, everything has really brought my interest and showed me my path” (Focus Group 1). In Focus Group 2, Henry stated “When I got into high school and FFA, I realized my passion in agriculture.”

Which facets of the agricultural industry do you consider yourself the most knowledgeable about? Participant answers to this question were coded into three different codes of the “Three-Component Model in Practice” theme. Two responses were coded into “supervised agricultural experiences”, and one each was coded under “competitions” and “classroom instruction.”

When this question was asked in Focus Group 1, Evan responded “I’m mainly more educated in the show side of things”, this falling into the sub-theme that encompasses SAE. Mae, however, stated “Being on the vet tech team for three years, I’d say veterinary sciences” which was coded under competitions.

During the second focus group, Jennifer responded with “Livestock shows, like the steer world. ...I love the show industry so much. It’s where I grew up, it’s comfortable for me.” This statement was coded under supervised agricultural experiences.

Helen, during Focus Group 2, stated “Mine would have to be the science portion of it. I’ve always loved science, especially when I was given the opportunity to learn so much about science in ag.”

Career Areas of Interest

Interaction with career areas is a previous experience that many participants identified. Codes identified within this theme include traditional-livestock, traditional-farming, agricultural mechanics, veterinary science, agricultural economics, and agricultural education, communications, and extension. The researcher felt that any mention of an interaction with or an interest in these career fields was important when thinking about previous experiences.

Traditional-Livestock. This sub-theme identified participant experiences with career areas in traditional livestock production, such as ranching. The researcher identified this code eight times across both focus group interview transcripts.

Participants often identified their traditional livestock experiences either as something that helped them develop an interest in agriculture or as something that made them consider a career in agriculture. Joshua said “My granddad started raising cows when I was six or seven. I think going there every summer brought me closer to ag” (Focus Group 1). Helen said in the same focus group session “My entire family came from Mexico. We farmed and raised cattle. When we came over, we brought a lot of that with us.” In Focus Group 2, Dennis shared,

...my father figure was my grandpa. I would go out and feed cattle with him every morning, afraid to miss out. I was up at 5 every morning ready to go. That just kinda grew as I got older. I realized that this is something that means a lot to me and something I wanted to pursue.

Henry shared a sentiment about how livestock helped him to develop an interest in agriculture: “We always had animals, even when we had to move or my dad changed jobs” (Focus Group 2).

Traditional-Farming. This sub-theme identified participant experiences with traditional farming careers, including row crops or orchard-style production. The researcher identified this code three times, twice as a participant sharing what made them consider a career in agriculture.

In Focus Group 1, Curtis said “...my grandpa used to grow peaches and apples”. Dennis had a slightly different experience of farming leading him to an interest in agriculture.

My grandpa was a cattle farmer for a long time and he ran a ranch, and then went into crop adjusting. That showed me there are so many different parts of ag and how easy it is to move between them. (Focus Group 2)

Agricultural Mechanics. The sub-theme of agricultural mechanics was used when participants referred to their experience or interest in a career in the service field. This code was identified twice by the researcher, once as a sharing of what career field a participant would go into at the moment the question was asked.

Curtis told the researcher during Focus Group 1 “Maybe an ag equipment technician” and was the only participant to mention an interest in servicing agricultural equipment.

Veterinary Science. This sub-theme was used when a participant in the data collection expressed an interest in the field of veterinary medicine, or made mention of the career field in response to a focus group question. Veterinary science was coded by the researcher three times across focus groups.

Twice in the coding, participants expressed an interest in pursuing a career in veterinary science. In Focus Group 1, when asked what career field she was planning on going into, Mae said “I would probably say ‘veterinarian’.” In a response to the same question, Helen in Focus Group 2 said “I’ve just thought about veterinary sciences, animal sciences. I feel directed toward being an equine vet.”

During both focus groups, when asked about the beginnings of their interests in agriculture, participants made various statements about when they first developed this

interest. In the second focus group, Helen's statement elaborated greatly on her desire to enter the veterinary sciences:

I've been surrounded by animals since I was little. When I was young, we had a dog who'd gotten pregnant... I remember she passed away from the birth and I remember being so upset that I couldn't help her because I didn't know how. So that was when I realized I wanted to do something to help animals. (Focus Group 2)

Agricultural Economics. Agricultural economics was a sub-theme used when participants made references or statements to an interaction with or an interest in a career in agricultural economics. These career fields may include livestock brokerage, agricultural sales, or entrepreneurship. Agricultural economics was coded for three times by the researcher.

Two participants expressed an interest in pursuing a career in agricultural economics when asked what career field they were currently planning on going into, one in each focus group interview. Joshua said "I think... a salesman of some sort" (Focus Group 1). In the second focus group, Henry shared that "I'd say I'm still sticking to being a livestock broker" (Focus Group 2).

Out of the nine participants in both focus groups, Mae was the only one who told the researcher that she'd had any previous experience around a career in agricultural economics. "My uncle and grandpa own a tractor shop in the town we live in. Ever since I was little I always got to be on tractors" (Focus Group 1).

Agricultural Education, Communications, and Extension. The last sub-theme under Career Areas of Interest was more all-encompassing than others. Agricultural education, communications, and extension was used when a participant mentioned an interest or interaction with a career in these areas, or if they mentioned an agricultural career they knew about that did not fit into one of the other codes. The researcher identified this code 9 times across the two focus group interview transcripts.

Two participants expressed direct interest in pursuing a degree in agricultural education, communications, or extension when asked what their current career plans were. Dennis confidently stated “Ag teacher”, while Jennifer said “I like the public relations part of it, so I’m leaning more towards ag comm. But I’ve thought about being an ag teacher, extension agent, stuff like that” (Focus Group 1; Focus Group 2).

Participants had varying experiences in agriculture that fell into this sub-theme. Henry’s previous experiences came from family. “...we came from a very agricultural background. There are about four or five generations that have been agriculturalists in different parts of the country” was the response when asked what made him consider a career in the agricultural industry (Focus Group 2). Jennifer also expressed that her interaction with a person working as a county extension agent is part of what first developed her interest in agriculture. She said, speaking further on her interaction of getting show stock for the first time, “Well, that year we got pigs, and it was just a real eye-opener and I was like ‘Oh man, I kinda like this.’”

Dennis, on the other hand, mentioned that public opinion and media had previously dissuaded him from going into the agricultural industry. He said “...the

conflict we have with people who aren't in the ag industry and how they hear and see things differently that aren't necessarily true. But, now, I think that's why I WANT to be in the ag industry" (Focus Group 2).

Which facets of the agricultural industry do you consider yourself the most knowledgeable about? Participant answers to this question were coded under the theme "Career Areas of Interest" five times by the researcher. Three answers were coded under "Traditional-Livestock", one was coded under "Traditional-Farming", and one under "Agricultural Mechanics."

Some participants, such as Beth, Joshua, and Henry, felt that livestock was their strongest area of knowledge in the agricultural industry. Beth stated "I'm definitely more knowledgeable about ranching than farming or anything" (Focus Group 1). During the second focus group, Henry said "I'd say a bit of the horse world and the cattle world, specifically feeder cattle" (Focus Group 2).

Other participants felt their knowledge was not the strongest in the livestock portion of the industry. Dennis, for example said "I'd say, obviously, farming. But, more specifically, the process of putting a seed in the ground, making it grow, and the steps you need to take to get there" (Focus Group 2). In Focus Group 1, Curtis expressed that his most comfortable area in the agricultural industry was "Probably ag mechanics...just more the ag mechanics side like welding, cutting, all that type of stuff."

Findings Related to Question Three

The third question that guided this study sought to determine if secondary student participation in an immersive career education program would increase knowledge about

agricultural careers and technologies. The retrospective pre-post survey instrument allowed participants to identify their own self-perceived changes in knowledge pertaining to the 8 areas of the agricultural industry that were addressed in the questionnaire. Additionally, participants were given the opportunity to speak about changes in knowledge and perception of agricultural careers and technologies during focus group data collection.

Quantitative Findings Related to Question Three

Descriptive statistics were used to determine minimum, maximum, and average score changes, along with a standard deviation. Table 3 shows a frequency analysis of survey instrument answers following program completion.

Table 3

Participant Self-Perceived Knowledge Level, Post-Program

Subject	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	n
ANSC After	0 (0%)	0 (0%)	2 (22.2%)	3 (33.3%)	4 (44.4%)	9
PSES After	0 (0%)	0 (0%)	4 (44.4%)	3 (33.3%)	2 (22.2%)	9
AGBE After	0 (0%)	0 (0%)	1 (11.1%)	4 (44.4%)	3 (33.3%)	8
AgComm After	0 (0%)	0 (0%)	1 (11.1%)	5 (55.6%)	3 (33.3%)	9
AgEdLd After	0 (0%)	0 (0%)	0 (0%)	4 (44.4%)	5 (55.6%)	9
EQIB After	0 (0%)	0 (0%)	1 (11.1%)	5 (55.6%)	3 (33.3%)	9
AgTechnology After	0 (0%)	0 (0%)	2 (22.2%)	4 (44.4%)	3 (33.3%)	9

Note. Values are reported as frequencies of selection (*f*) with percentages in parentheses.

Using pre-program scores and post-program scores, a changed-score was calculated for each subject area across the cohort of participants. Industry area names were abbreviated appropriately for space. Abbreviations are as follows:

Animal Science – ANS

Plant Science – PS

Agricultural Business and Economics – AGB

Agricultural Media and Communications – AGCM

Agricultural Education and Leadership – AGEDL

Equine Industry and Business – EIB

Agricultural Technology - AGT

Changed scores (CS) values (Table 4) were the greatest for the areas of agricultural technology knowledge ($M = 2.67$, $SD = 0.71$) and agricultural communications ($M = 2.33$, $SD = 0.87$). Notably, CS values were the lowest for the area of agricultural education and leadership ($M = 1.5$, $SD = 0.53$). One participant did not answer either pre- or post-program agricultural business question, and there are only eight changed score values for the calculation of CS_AGB.

Table 4*Changed Knowledge Score Analysis by Subject Area*

Subject area	n	Minimum	Maximum	M	SD
Animal Science	9	0.00	2.00	1.67	0.71
Plant, Soil, and Environmental Science	9	1.00	4.00	2.11	0.78
Agricultural Business and Economics	8	1.00	3.00	1.63	0.74
Agricultural Media and Communications	9	1.00	4.00	2.33	0.87
Agricultural Education and Leadership	9	1.00	2.00	1.56	0.53
Equine Industry and Business	9	0.00	3.00	1.67	1.00
Agricultural Technology	9	2.00	4.00	2.67	0.71

Minimum and maximum score changes for each area of interest are worth noting as well. For at least one participant, there was no self-perceived change in knowledge for the area of animal science or for equine industry and business. Recognition should also

be paid to the fact that there are three subject areas that had a maximum change in score of the highest value possible.

Qualitative Findings Related to Question Three

Some of the findings above can also be seen through focus group data collection. Participants expressed their changes in perception or increase in knowledge at different points throughout the interview process. These findings are reflected in the themes of “Recognition of Agricultural Technology” and “Recognized Perceptions” and their respective codes.

Recognition of Agricultural Technology-Careers in Agricultural Technology.

Some participants in the focus group interviews came to a new recognition of the career opportunities and uses of agricultural technologies following completion of the program. The researcher coded careers in agricultural technology four times across the two focus group interview transcripts. These responses came from three questions asked during the interviews.

The question “Do you think this experience changed your perceptions of agricultural careers?” was asked of both focus groups. Overall, members of both focus groups mentioned a change in perceptions. Specifically, Jennifer said

I’m not good with technology. I’m the last person you want to fix your computer, but some of my friends... that’s what they do. You don’t have to be good at everything. You can be good at your one thing and still have somewhere to be.

(Focus Group 2)

Jennifer also acknowledged the depth of knowledge that she experienced at the MicroTechnologies facility in Amarillo, Texas, saying "...how in-depth it goes and how much knowledge they have in that aspect of just technology alone for the ag industry is just kind of eye-opening."

Some participants directly stated the recognition of career opportunities on the technology side of agriculture, like Helen. In a response to the same question about changed perceptions of agricultural careers, she said "I know now that there's more technology and more advancement and more of a demanding career on that side" (Focus Group 2).

Henry, from the second focus group, mentioned his surprise at one particular visit during the program, and the amount of technology used there. "What really surprised me was the technology at the Quarter Horse Museum. I never would have thought there was that much technology at AQHA."

Recognized Perceptions-Agricultural Technologies. Participants in this program encountered several careers that revolved heavily around the technology used in agriculture. As with their retrospective questionnaire results, participants noted in the focus groups that they learned more about the technology that drives agriculture. The sub-theme agricultural technologies was used to recognize evidence of a participant's perceptions of agricultural technologies during the focus group interviews and was coded seven times by the researcher.

During the first focus group, Joshua said "It's getting easier for one man to do a lot more" (Focus Group 1). This statement was related to by Henry in Focus Group 2,

when he said "...it was just cool to see how it's all still advancing... And it's cool that things can be done now in seconds instead of hours because of the advancement." Curtis also noted that his perceptions of agricultural technology prior to the program were different than when the program was completed. "I didn't realize it got into [it] that deep, like counting seeds and all the satellites" (Focus Group 1).

During the second focus group, two participants noted that they perceived some portions of agricultural technology differently prior to the program due to the perspective that they had in daily life. Jennifer said "I didn't realize how in-depth it can get and how much technology there really is because it's not part of my daily life...it's made the efficiency of anybody better. It makes their lives just a little bit easier." (Focus Group 2). Dennis also noted that his life had allowed him to be less aware than he was after the program: "I knew a good bit of the tractor side of the technology, but I didn't know there was so much in other parts of the industry. I didn't know there was so much technology in the dairy industry too" (Focus Group 2).

Recognized Perceptions-Changes in Perception. Focus group interview participants were asked about if they feel their participation in the immersive educational experience changed their perceptions about agricultural careers and also about agricultural technologies. Some participants felt their perceptions changed more about careers, and others seemed to have more changes in perception about technology. For example, Joshua said "Seeing that, now, you don't have to be 'ag based' or anything. You could be someone who only does computers and shift to something with ag" (Focus Group 1). Likewise, Evan found himself surprised at the variety of career options he

learned about throughout the program. “There’s a lot more variety than I originally thought. I figured the majority of it would directly be farms or ranches, but there’s stuff that didn’t even come close to that” (Focus Group 1). Participants from the second focus group expressed a recognition of their changes in perspective of agricultural careers also. Helen said “I’ve always known I wanted to go into some kind of ag, but it opened up my eyes to a lot of options” (Focus Group 2). Similarly, Jennifer shared that “... it was definitely an eye-opener” and she also said “This week, I’ve learned so many things that I never even thought about” (Focus Group 2).

Participants in the focus groups also noted a change in perception as it relates to the technologies we use in agriculture. Beth, for instance, said “I didn’t realize how advanced it had gotten and how in-depth you can get. Like, counting seeds and stuff” (Focus Group 1). In the second focus group, Dennis said “I’ve never been around horses. I didn’t think about how you see technology in the horse industry too.” Henry, who has been around horses for a good portion of his life, found that the presence of technology in a place he is so familiar with to be interesting.

I’ve just been raised in the old school ways. You breed a sire and a dam and you send in paperwork and you get something back. But all the technology side and the computers... I was wondering why there were so many cubicles. (Focus Group 2)

Supplementary Findings

During analysis of the focus group interview transcripts the researcher identified five additional codes. While these did not fit the other major themes, the researcher felt

that they were too important to be omitted from this study. Two of these codes will be discussed in this chapter, supplementing information participants hold about career opportunities in the agricultural industry, as well as the confidence they hold in their knowledge. Non-traditional workers and lack of confidence were the two codes that will be discussed here.

Supplemental Discoveries

There was an overarching theme for these codes identified by the researcher during data analysis. While these are believed to be important pieces of information, they were accidental discoveries. As such, a fifth theme was created for this study, Supplemental Discoveries.

Non-Traditional Workers. Several participants during the focus groups noted the fact that careers in the agricultural industry are not restricted to those who grew up involved in agriculture. These mentions were made four times across the two focus group interviews. When asked if there is anything that had dissuaded her from going into the agricultural industry, Mae looked back to her upbringing “When people say you have to come from an agricultural background, it’s really discouraging. There’s a lot more people who don’t come from an ag background and are really successful” (Focus Group 1). Evan’s response was similar: “I feel like it’s just those few people who are like ‘you have to be ag to work as ag’” (Focus Group 1).

During Focus Group 2, Jennifer and Henry expressed awareness of the opportunity for people who didn’t grow up in agriculture to be a part of the industry if they desire. When describing her perceptions of agricultural careers, Jennifer said

“...there’s a place for everyone in ag. You don’t have to grow up in the industry to be in the industry.” Similarly, Henry stated “You don’t have to have an ‘ag background’... Everybody has a spot, and you can still be part of the ag world.”

Lack of Confidence. Through qualitative data analysis, the researcher discovered that some of the participants did not feel confident in their knowledge or abilities as it relates to the agricultural industry. This code was identified four times by the researcher across the two focus group interview sessions. During Focus Group 1, when asked if he would consider himself knowledgeable about the agricultural industry as a whole, Evan simply responded with “No.” When asked to elaborate, Evan said “Everyone likes to think of themselves as the most knowledgeable. But I’ve seen all this, I met [WTAMU Agriculture faculty in meat science]. I’ve only been doing meats for two years, I’m not nearly as knowledgeable...”

During Focus Group 2, Henry found himself dissuaded from going into agriculture based more on capability, stating “...being worried that I finish a job that I’m hired for and the employer doesn’t like it. Or second-guessing if I know enough to complete the job.” In telling if he would consider himself knowledgeable, Dennis said “I’m going to say I don’t know as much as I would like. There’s always so much more you can learn from this” (Focus Group 2).

Summary

Mixed-methods data collection occurred with nine program participants during June of 2022. Participants completed a retrospective pre-post survey questionnaire, which are found to be helpful in allowing participants to assess their changes in knowledge

(Davis, 2003). Program participants also took part in two separate focus group interviews which were recorded, transcribed, and analyzed. Creswell and Poth's (2018) Data Analysis Spiral was used to guide the process of analyzing qualitative data.

Quantitative data analysis results were obtained through IBM SPSS version 27, and showed that participants had relatively low self-perceived retrospective knowledge in the eight areas of the agricultural industry that were covered throughout the course of the program. Results of a changed-score analysis showed that the program, over all, had a positive impact on the self-perceived knowledge of secondary students toward career opportunities in the agricultural sciences.

Qualitative data analysis revealed five major themes in the transcripts of focus group interviews. These five themes were broken into 19 codes. The first theme, three-component model in practice, consisted of three codes following the same names as the components of the model for which the theme was named (National FFA Organization, 2019a). These three codes were directly related to participants' previous experiences with classroom instruction, supervised agricultural experiences, and competitions.

Career areas of interest was the second major theme identified by the researcher, housing six codes. The included traditional-agriculture, traditional-farming, agricultural mechanics, veterinary sciences, agricultural economics, and agricultural education, communications, and extension.

The third major theme discovered by the researcher, recognition of agricultural technology, was divided into two codes where participants recognized an interest in

agricultural technologies. The two codes under this category were development and careers in agricultural technology.

The fourth theme identified by the researcher was recognized perceptions, which included codes the researcher concluded identified participants' previous and changed perceptions towards agricultural careers and technology. Agricultural careers, agricultural technologies, and changes in perception were the codes identified.

An additional theme encompassed findings from this study that were not intended as discoveries by the researcher. This additional theme, Supplemental Discoveries, contained five codes, of which two were discussed for data analysis. The sub-theme of non-traditional workers showed participants' awareness of the openness the agricultural industry has to people who did not come from an agricultural background. Lack of confidence recognized that some participants, though being involved in their home FFA programs, did not feel confident in their over-all knowledge of agriculture. All findings, and unmentioned codes will be discussed in detail in Chapter V of this document.

CHAPTER V

CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

Overview

This mixed-methods study was designed with intent to identify the level of knowledge that secondary students have about career opportunities and technology used in the agricultural industry. Conclusions of this study were drawn by comparing findings for the research questions to literature from a literature review. Recommendations are presented to help West Texas A&M University, other universities, and high school agricultural science teachers improve upon used methods to provide agricultural career education to secondary students. As urbanization increases, the agricultural industry must find ways of educating students on available career opportunities.

Purpose and Research Questions

The purpose of this study was to determine whether secondary students enrolled in Agriculture, Food, and Natural Resources (AFNR) courses at their local high school have a higher self-perceived understanding of careers and technologies in agriculture

after completing an immersive educational program. The study sought to answer the following three research questions.

1. What level of knowledge did high school students have about the career opportunities available to them in the agricultural industry?
2. What areas of the agricultural industry were secondary AFNR students the most familiar with based on prior experiences?
3. Will an immersive educational program increase student knowledge of career opportunities and technologies?

Participant Demographics

Prior to completing the retrospective pre-post questionnaire, participants were asked to answer a set of demographic questions for the purposes of organizing the research. Answers to this group of questions allowed the researcher to identify participant classification, ethnicity, and gender. All participants were classified as entering their senior year in high school or having just graduated high school (100%). The majority of participants (55.6%) said they were Spanish/Hispanic/Latino in ethnicity. Most participants also identified as male ($n = 5$, 55.6%).

In addition to these demographic questions, the researcher wanted to ascertain the background of participants. Participants were asked if their parents or grandparents ever worked in agriculture, or if they currently do. Six participants (66.7%) indicated that at least one parent worked in agriculture at some point. A larger percentage, 88.9% ($n = 8$), indicated that at least one grandparent worked in agriculture at some time. Participants were also asked if they had ever considered a career in agriculture prior to program

participation. 100% of participants said that they had previously considered an agricultural career.

Conclusions and Discussion

Research participants completed a retrospective pre-post questionnaire and a focus group interview. Participants were selected based on an application process and expressed an interest in an agricultural career. IBM SPSS version 27 was used to analyze results from the retrospective pre-post survey instrument. The researcher transcribed and coded focus group interviews for qualitative data analysis.

Conclusions from Research Question One

Research objective one sought to determine the level of knowledge secondary students had about career opportunities and technology in the agricultural industry. Participants were asked after completion of the educational experience to rate prior knowledge of agricultural career opportunity. Eight questions assessed self-perceived prior knowledge, as described in previous chapters. Various topic areas drew various answers, discussed briefly below.

The first topic area considered was career opportunities in the animal sciences, which includes meat and food science, reproduction, nutrition, and veterinary sciences. When asked to retrospectively rate self-perceived knowledge of career opportunities in the animal sciences, the majority of participants selected neutral ($n = 5, 55.6\%$). The other respondents answered that they disagree ($n = 4, 44.4\%$). It is clear that, prior to the program, participants did not have a strong understanding of career opportunities within the animal sciences.

Plant, soil, and environmental sciences was the second career area looked at on the questionnaire. When asked about career opportunity knowledge before the program, most participants retrospectively said they strongly disagree ($n = 5, 55.6\%$), and three participants said they disagree (33.3%). One participant (11.1%) stated they retrospectively agreed that they knew a lot about careers in the plant, soil, and environmental sciences. Mostly, it is clear that participants had a low level of knowledge regarding career opportunities in the plant, soil, and environmental sciences.

Agricultural business and economics career opportunity knowledge was the third area evaluated. Retrospectively, the majority of participants ($n = 5, 55.6\%$) disagreed they knew a lot about career opportunities in the field. Two participants (22.2%) selected that they agreed, knowing a lot about career opportunities. The answer choice with the lowest frequency was neutral ($n = 1, 11.1\%$) with the participant feeling neither confident or unconfident in their knowledge. One participant did not answer this question, so there are only eight recorded responses. Retrospectively, most participants acknowledged they did not have a high understanding of career opportunities in agricultural business.

Topic area number three was career opportunity knowledge in the field of agricultural media and communications. In retrospective self-analysis, one participant (11.1%) selected they were neutral in knowledge prior to program completion. The next most frequent selection ($n = 2, 22.2\%$) was participants strongly disagreed with the statement. Over all, most participants ($n = 6, 66.7\%$) disagreed they knew a lot about career opportunities prior to program completion.

In the topic area of agricultural education and leadership, responses were split fairly evenly. One-third of participants ($n = 3, 33.3\%$) retrospectively agreed they knew a

lot about career opportunities in agricultural education and leadership. Similarly, three participants (33.3%) said they were neutral in their knowledge of careers in this area, and the final one-third selected that they disagreed with the statement “I know a lot about career opportunities in agricultural education and leadership”.

The topic area of equine industry and business yielded similar results to most others. This is an academic study area at WTAMU that may be called by a different name at other universities. Two of the participants (22.2%) felt retrospectively they had known a lot about career opportunities in the equine industry. Three participants (33.3%) were neutral on their prior knowledge of career opportunities, with the remainder answering on the side of disagreement. Two participants (22.2%) answered that they disagreed prior to the program, and two participants answered that they strongly disagreed. Before participating in a career education program, most participants had low knowledge of career opportunities in the realm of equine industry and business.

The final topic area discussed was that of the technologies used in agriculture. When asked retrospectively to rate their prior knowledge of agricultural technologies, 100% of participants answered that they did not know a lot. Five participants (55.6%) strongly disagreed that they knew a lot about technology used in agriculture, while the rest ($n = 4$, 44.4%) answered that they disagreed.

In all, secondary student participants had little knowledge of agricultural career opportunities and the technology in agriculture prior to an educational program. Several subject areas, including the animal sciences, had 0% agreement about retrospective knowledge regarding career opportunities. Additionally, all participants responded they

disagreed or strongly disagreed when asked if they knew a lot about the technology used in agriculture prior to the program.

Across the subject areas, participants had the most self-perceived knowledge about career opportunities in agricultural education and leadership, that area having the greatest number of positive responses in the pre-test portion of the questionnaire ($n = 3$). The subject areas of agricultural business and economics and equine industry and business were the next two areas that participants felt the most confident in, as indicated by the number of responses in agreement ($n = 2, 22.2\%$) for both areas.

Subject area knowledge was relatively low across topic area and participants, showing a low level of career knowledge in secondary students. This may be due to a lack of experiences, but is also a lack of information that can be readily shared in a high school agricultural science courses.

Conclusions from Research Question Two

The second research question sought to determine what areas of the agricultural industry participants were most familiar with based on previous experiences in agriculture. During focus group analysis, several themes were identified with codes related to question three.

Three-Component Model in Practice. This theme utilized participants' previous experiences in agriculture as related to the Three-Component Model for Agricultural Education (National FFA Organization, 2019a). The codes for this theme were supervised agricultural experience (SAE), competitions, and agriculture, food, and natural resources (AFNR) courses. Participants in both focus group interviews expressed

having previous experiences in all three of these areas, and were all active members of their high school AFNR and FFA programs.

Focus group participants stated that they had been in activities similar to an SAE in their FFA program. Many of these participant experiences would fall under the categories of placement or entrepreneurship SAEs (National FFA Organization, 2019b). Most participants, like Joshua, had experiences that revolved around livestock: “I work with a bunch of show goats over in [hometown]” (Focus Group 1). Several experiences were of a farming aspect, like Dennis who said “I drive a tractor for my dad on a cotton farm” (Focus Group 2).

Participant SAE involvement led to two students, Evan and Jennifer, stating that their most knowledgeable areas of agriculture revolved around livestock for exhibition. Evan shared “I’m mainly more educated on the show side of things” when asked which facet of the agricultural industry he was most knowledgeable about.

Competitions are a common experience for many FFA members. A participant in both focus groups noted that their experiences competitive events through FFA helped them to gain knowledge about agriculture. This was especially true for Mae, who stated that her experience on the FFA veterinary science team at her school led to veterinary science being her strongest area of agricultural knowledge.

Career Areas of Interest. Prior research has shown that experience with a career field impacts career knowledge (Creed & Patton, 2003). This theme was used when participants mentioned an interaction with or interest in career fields where they had previous experiences. Several participants in this study noted their most knowledgeable area within agriculture was a career field they had interacted with.

Participants mentioned interaction or interest in career areas such as traditional-livestock and traditional-farming. Through these experiences with traditional agriculture applications, participants felt that they'd gained knowledge and said that these areas had helped them develop their interest in agriculture. Joshua's statement of "my granddad started raising cows when I was six or seven. I think going there every summer brought me closer to ag" told how these experiences can lead youth to develop agricultural interests (Focus Group 1). Similarly, Curtis shared that "my grandpa used to grow peaches and apples," another interaction that helped a participant develop their interest in agriculture (Focus Group 2).

From these experiences, four participants noted that their most knowledgeable facet of the agricultural industry was in one of these traditional career areas. Beth, Joshua, and Henry said that most of their knowledge lies in livestock production. Beth stated she is "definitely more knowledgeable about ranching than farming or anything" when the researcher asked what facet of the industry the first focus group was most knowledgeable in (Focus Group 1). In Focus Group 2 Henry echoed a knowledge base in livestock production, while Dennis said "farming. But more specifically, the process of putting a seed in the ground, making it grow, and what steps you need to take to get there" (Focus Group 2).

The career area of veterinary science was of interest for two program participants, Mae and Helen. When asked about career plans, Mae said "I would probably say 'veterinarian'" (Focus Group 1). Both participants stated that they were considering careers in veterinary science based on their past experiences with situations in that career field.

According to Herren (2015), “agricultural mechanics is one of the most widely taught courses in agricultural education programs. It is taught in all 50 states and is considered to be among the most useful courses taught” (p. xiv). Despite this, only one participant expressed interest and previous experiences in this career field. When asked about career plans, Curtis stated “maybe an ag equipment technician” (Focus Group 1). Curtis also expressed that agricultural mechanics was his most knowledgeable industry area. “That’s all I really do at our school. So just more the ag mechanics side like welding, cutting, all that type of stuff” (Focus Group 1).

Careers in agricultural economics can be lucrative for those who enter them. According to Kansas State University (2022), graduates with a degree in agricultural economics can “enter the workforce with skills and resources that lead to above-average starting salaries in a wide variety of career fields” (“What can I do with a degree in agricultural economics?” section). Participants had relatively little experience with career fields in this area. However, Joshua and Henry both expressed interest in pursuing a career in agricultural economics. During Focus Group 2, Henry said “I’m sticking to being a livestock broker.” Mae expressed that she’d been around agricultural businesses from a young age, saying “My uncle and grandpa used to own a tractor shop in the town we live in. Ever since I was little, I always got to be on tractors” (Focus Group 1).

The last career area that participants mentioned a previous experience or interest in was agricultural education, communications and extension. Eight instances of interaction with a career in this area, or unspecified agriculture, were mentioned by participants. Careers in this area combine peoples’ interests and skills in communication, education, leadership, supervision, and training (University of Illinois Urbana-

Champagne, n.d.). Despite numerous interactions participants have had with people in this career area through their experiences in AFNR courses, this career area was only mentioned by participants in the second focus group. One participant, Henry, mentioned that his interest in agriculture sparked from a family history of agricultural involvement: “we came from a very agricultural background. There are about four or five generations that have been agriculturalists in different parts of the country.”

Two participants, Dennis and Jennifer, mentioned that they were interested in pursuing careers in agricultural education, communications, and extension. Dennis mentioned his desire in answering a question about factors of dissuasion from the agricultural industry, saying

One of the big things that [made me reconsider agriculture] is the conflict we have with people who aren't in the ag industry or don't have a connection to that and how they hear and see things differently that aren't necessarily true. But, I think that's why I WANT to be in the ag industry. (Focus Group 2)

Though the number of mentions of careers in agricultural education, communications, and extension was lower than expected, one participant mentioned that their most knowledgeable facet of the agricultural industry fit under this sub-theme. Helen said “mine would have to be the science portion of it. I've always loved science, especially when I was given the opportunity to learn so much about science in ag. [And] I'd say working with the animal as a whole” (Focus Group 2).

The area of the industry that most participants felt most knowledgeable in was traditional livestock production. Three secondary students expressed that this was the facet of the industry they knew the most about. However, results for this research

question were relatively spread out. Participants each identified areas in the agricultural industry where they had gained experience. These experiences increased knowledge of the participants, and allowed for each participant to feel more confident in a different area of the agricultural industry. These high levels of confidence across areas may be greatly useful for agriculture in the future. Like Helen said during the second focus group, “I feel like agriculture can really get everyone’s skillsets and talents and incorporate it so we can make the best out of it.”

Conclusions from Research Question Three

The third question that guided this study sought to discover if participation in an immersive educational program would increase student knowledge about career opportunities and technology in agriculture. Both quantitative findings and qualitative discoveries were made in relation to this research question.

Quantitative findings were derived from a retrospective pre-post questionnaire of participant self-perceived knowledge. Changes in self-perceived knowledge scores in each subject area were analyzed using descriptive statistics to determine program impact. All subject areas showed a positive change in self-perceived knowledge, with mean changes greater than one agreement level for each subject area statement. Quantitative data shows that program participation increased secondary student knowledge.

Qualitative findings from focus group interviews were also used in answering this research question. Themes and codes identified by the researcher were analyzed find participant statements that showed verbal recognition of increases in knowledge.

The researcher concluded that participant questionnaire changes aligned with statements that showed increased knowledge after the program. This is supported by

findings of previous studies (Becker, et al., 2017; Luckey, 2012), which found that immersive educational programming increases participant knowledge about a field. Focus group participants acknowledged changes in perceptions that the program had allowed them, such as Jennifer when she stated “this past week, I’ve learned so many things that I’ve never even thought about” and “I feel like there was so much on the technology side” (Focus Group 2). Dennis also found a change in perception of agricultural careers, saying “you see agriculture as farmers, ranchers, people talking in front of people about agriculture. But there are so many other jobs behind the scenes that help everything run” (Focus Group 2). Participant increases in awareness were also apparent in Focus Group 1, when Joshua said, “I didn’t think there was as much technology as we have now.” Using both quantitative and qualitative analysis results, the researcher concluded that participation in an immersive career education program increases student knowledge of career opportunities and technologies in agriculture.

Supplementary Findings

Supplemental Discoveries. Several participants across focus groups made mention of agriculture’s opportunities for people from non-traditional backgrounds. These statements were made by both traditional and non-traditional participants. Non-traditional secondary students, such as Mae and Evan, mentioned that they had been dissuaded from pursuing an agricultural career by the closed-mindedness some people exhibit. Mae stated that her dissuasion had come from “when people say you have to come from an agricultural background, it’s really discouraging. There’s a lot more people who don’t come from an ag background and are really successful” (Focus Group 1).

Expressing similar sentiment during the first focus group, Evan said “I feel like it’s just those few people who say ‘you have to be ag to work as ag’.”

These feelings were shared by traditional participants also. During Focus Group 2, Jennifer and Henry mentioned awareness of how open the agricultural industry is to those from non-traditional backgrounds when sharing their perceptions of agricultural careers. Jennifer made the statement: “there’s a place for everyone in ag. You don’t have to grow up in the industry to be in the industry.” Henry followed with “everybody has a spot, and you can still be part of the ag world.”

Attention should be paid to non-traditional students who have an interest in pursuing an agricultural career. Though participants in this small sample recognized that the industry is open, not all may be of the same feeling. The recommendations of Baker et al. (2013) should still be thought of when educating students on agricultural opportunities. This recommendation included highlighting people in agricultural careers, specifically those from non-traditional or atypical backgrounds. This would help to demonstrate the success that non-traditional students may find in the agricultural industry (Baker et al., 2013).

During the focus groups, participants from traditional and non-traditional backgrounds expressed that they felt knowledgeable about aspects of the agricultural industry. These secondary students acknowledged that they may not be all-knowing, but that they were confident in the things they do know. This was exemplified by Mae, who said “We all know certain things. We’re all stronger in different areas of ag” (Focus Group 1). Joshua and Helen’s statements during the first and second focus groups, respectively, acknowledged that educational experiences such as programs and AFNR

coursework have allowed them to become knowledgeable in the subject of agriculture. Interactions had with others, both professionals and peers, have allowed these secondary students to gain knowledge in different aspects of an industry that they have come to enjoy. This concept is supported by research in cognitive development conducted by Lev Vygotsky, as described by Bingham (2018). The author states “From Vygotsky we have learned it is more than just thought that influences the words we use. ... From this perspective, learning occurs in a social context and private speech is indicative of thinking” (Bingham, 2018, p. 11).

Despite the knowledge that participants recognized they held, there were some instances of participants lacking confidence in either agricultural knowledge or ability. This was exhibited a little differently for each of the participants. In Focus Group 2, Dennis’ remark was that he simply doesn’t know all that he wants: “I’m going to say I don’t know as much as I would like.” During Focus Group 1, however, Evan expressed a lack of confidence in his knowledge on a deeper level. Research has found that non-traditional agricultural programs engage and teach students just as much as those in rural, more traditional areas (Yopp et al., 2018). Evan, though, found that he was not confident because of his lack of experiences. “Everyone likes to think of themselves as the most knowledgeable. ... I’ve only been doing meats for two years” (Focus Group 1).

Over all, participant knowledge was not lacking following program completion. Rather, participants showed numerical growth in knowledge via the retrospective questionnaire. As the agricultural industry begins to look toward more students from non-traditional backgrounds, instructors and mentors should make an effort to ensure these members of the industry are confident in their application of what they know.

Recommendations

Improvement Opportunities for Future Research

This study provides recommendations for future research endeavors in agricultural career education at the secondary level. These should be taken with caution, however, as this research study did not attempt to generalize results to broader populations. Future research should replicate this study with other audiences in order to ascertain the validity of results in other geographical areas of Texas and the United States to better generalize results.

Future research ventures should include aspects mentioned by participants from this study. Participants in this study were asked if there was anything that they wish the program had covered more in-depth relating to agricultural careers, technologies, or both in the hope to identify considerations for future research. In both focus groups, participants expressed the desire for more hands-on opportunities at visited locations. The researcher agrees with Curtis, who mentioned an opportunity for hands-on learning at career areas in the first focus group. “I think maybe a little group project that we could do at each place we go to. A way that everyone can get involved and something that’s hands-on would be great.” The second focus group echoed these wishes, with Dennis suggesting the desire to “just [get] more hands-on with everything. That’s how I know if I like something or not.”

The desire for hands-on learning opportunity is built into students, both developmentally and in mantra. Bingham (2018) stated many times the importance of physical activity to student learning. In agriculture, food, and natural resources courses,

the motto of the National FFA Organization becomes a way of life for students, including the statement Doing to Learn.

In addition to the opportunity for more hands-on immersion into careers, participants expressed an interest in exposure to aspects of the industry that they felt were not highlighted enough. Careers in livestock production were initially left out of the program plan, as the researcher felt this was a common enough career field that it was not needed explicitly. However, participants recommended career introductions for the animal sciences. This included veterinary sciences and confined animal feeding operation (CAFO) components. Participants expressed an interest in learning about other career opportunities outside of the animal sciences. Jennifer remarked “I wish we would have dived a little more into the ag comm stuff, like some of the different things you can do with that degree.” The researcher attempted to make the program as in-depth and informational on careers as possible despite the short amount of time allotted. In regard to technology, one participant remarked “With technology, sometimes I feel like it’s a lot of ‘here’s all this information. Do with it as you will.’ Visually, explanations and examples of certain things would have been cool.” It is recommended to hold future iterations of career education programs over longer periods of time. Instead of a program lasting roughly three business days, future plans should add another business day to explore areas needing more attention, allow for hands-on opportunities during visits, and to allow for explanation of technology in a deeper manner.

Future researchers should also opt to create base-level, probing questions for professionals who host them at visits. The group of participants in this study sometimes found it difficult to ask questions of industry professionals when they weren’t very

familiar with their career area. Program coordinators should research or be familiar with the businesses visited, and assist the question-asking process to allow participants the opportunity to build on previous questions for deeper learning.

The researcher noted a gap in quality for some businesses visited during the program. This most often occurred at facilities not accustomed to hosting tours or coordinating educational programs. However, the quality and experience of a visit was improved dramatically by having a prior working relationship with the company or individual you will be visiting. The program directors noticed that the visits with people where a relationship previously existed better covered the bases that the researcher was looking for. Establishing a positive relationship well in advance allows the business visited to have a deeper understanding of the goal and vision for the career education program. In being aware of program goals, visit hosts can maximize their resources to allow participants the best opportunity to learn. This relationship can be established through partnerships between program hosts and agricultural industry companies. The WTAMU Department of Agricultural Sciences has strong relationships with several industry representatives, including the Texas Cattle Feeders Association and Western Equipment. Industry partners have a desire to interact with youth to improve the future of agriculture. With this in mind, researchers and educators should encourage others to continue learning beyond the end of explicit educational activity.

Continued Practices in Future Research

There is always room for improvement in research methods, practices, and in carrying out a research project. However, the researcher was also able to identify successes in the career education program that future researchers should keep in mind

when recreating this study. Not only were these positive practices identified by the researcher independently, but focus group participants were also asked what their favorite place or speaker was, and what they enjoyed about the program.

Participants enjoyed getting to see and learn about different things that they previously lacked experience with. Program coordinators included a lesson in dining etiquette paired with a meal as part of the leadership aspect of the experience. Joshua said this was his favorite event and speaker. “I really liked the etiquette dinner just cause it’s not something you go over a lot, day-to-day.” Evan said that his favorite speaker was also part of the leadership programming, but an activity that revolved around how to build a conversation with someone you have just met or been introduced to. “My favorite speaker was probably [WTAMU Agricultural Education faculty] because nobody really talks about HOW to have conversations.”

Participants also enjoyed several of the careers that were explored throughout the program. Curtis remarked “I’d probably say my favorite [was] the John Deere dealership, learning about all of the technology that’s in tractors.” Mae had a similar feeling, stating “I would say the tractors was probably my favorite part.” Another participant made a positive comment about a visit to a business that is often overlooked when thinking about careers in agriculture. Beth said “My favorite place was probably the honey farm. I think that was interesting.” Future researchers should keep in mind the need for variety in educational programming. Variability is an important aspect in all teaching situations, identified as one of the top characteristics of an effective teacher by Rosenshine and Furst (1971) (Roberts et al., 2007).

The researcher identified other key components to success in educational programming, independently and with support from participant focus group responses. One important discovery was the benefits of a smaller cohort of participants. Events, such as FFA Area Leadership Conferences (ALC), bring large numbers of students together to learn and grow, but participants don't always feel they have the opportunity to bond with peers. This was highlighted by Helen, who said "I like smaller camps. ALC was really fun, but I feel like that was a big camp. There were so many people." Though the researcher initially aimed for a larger group, participants seemed to take away more from the program having fewer people. It was remarked by Joshua: "I'm glad we had a small group. I think the smaller groups really let us all have our own voice. I feel like it was a lot more engaging." The researcher recommends educational program coordinators to maintain a smaller group of participants. Groups of around 15 or 20 students allows for ample participation among all, and avoids problems that Mae seemed to have experienced previously. "This wasn't such a large group that you were falling back, your opinion got to be heard."

Bonding and socializing are important activities for learners at all stages (Bingham, 2018; Vygotsky, 1978). With this in mind, the researcher recommends allowing participants in future endeavors the opportunity to bond with one another throughout the educational program. Jennifer explained how it made her feel comfortable to have bonding experiences. "Even though we were on a schedule, there was still so much time that we bonded throughout the whole day. And we felt comfortable with everyone, and any of you guys. Whoever we [were] with, it was normal." Program coordinators and staff members made a point to bond with students in order to allow for a

comfortable learning environment. Anywhere can be a classroom, and Bingham (2018) stated “the classroom climate transcends all learning.”

With the importance of creating a positive and comfortable climate, program coordinators ensured that participants were comfortable around each other and the staff they would be with throughout the week. This came in the form of conversations, activities, and a group of people being around each other for several days. Two evenings of the program, participants got the opportunity to let loose and relax while having fun with one another. One night was a fun activity night, and the other was a free night for the participants to relax and talk amongst themselves without facilitators leading or directing. During the activity night, participants and facilitators engaged in a game of capture the flag. Both of these evenings allowed for engaging interaction between participants and facilitators, leading to a higher level of comfortability in the students. From the interactions observed these two nights, the researcher posits that these opportunities to relax and unwind from the educational components are key to successful educational programming.

The researcher found that the age of program facilitators is important to participant comfort during an educational program. The facilitators for the program were students at West Texas A&M University who functioned as group leaders, chaperones, and drivers throughout the program. These facilitators took a training course through WTAMU prior to being eligible to serve in this role. This training highlighted important information to working a program with youth participants, including safety, conduct, and standards for educational interactions with minors. Having participants be closer in age to their facilitators allowed participants to feel less intimidated by the people they were

around during the week. Facilitators were able to relate to students due to their relatively low age difference, being no more than six years. Dennis expressed his appreciation of this during the second focus group “Even though y’all are older, y’all didn’t treat us like we were little kids. Y’all just treated us as equals.” It is recommended that educational program developers keep this in mind, and employ facilitators relatively close in age to the target audience of their program.

Note-taking seems to have importance attached to it in the minds of students (Hartley & Marshall, 1974). The researcher and staff at WTAMU provided program participants with pens and note pads upon check-in. The hope was to encourage participants to take notes during their time with speakers and while at businesses visited. The researcher observed during every visit and speaker participants actively taking notes and jotting down their key take-aways from the experiences. With this in mind, it is suggested that educational program planners provide attendees with note-taking apparatuses for the retention of knowledge, and to assist during daily wrap-up and reviews.

As previously mentioned, familiarity with certain aspects of planning an educational experience are crucial to its success. Through familiarity with other educational programs, such as the TCFA Junior Fed Beef Career and Leadership Program, the researcher was able to model this program after successful programs seen and assisted with. This ability to model a program after another one known to be successful was seen as beneficial to the positive feelings surrounding this program. It is recommended that future researchers be familiar with the administration of similar educational programs to the one they design. This familiarity, and the ability to ask for

assistance from those more experienced, will lead to an altogether more successful program and better educational programming for youth.

Recommendations for AFNR Education

Recommendations for the improvement of career education for secondary agricultural science teachers are not limited to research recommendations. Agricultural science teachers (AST) and their teacher educators have the opportunity to make improvements regarding career education in the high school classroom. Teacher educators at the university level have the opportunity to inform their teacher candidates of the importance of career education at the secondary level, and to share resources for career education material.

The simplest career education material to expose students to is an educational program similar to the one used for this study. Career education programs exist in many forms, and an AST should be encouraged to have their students enroll in such programs. The TCFA programs mentioned previously in this document is one example of a program focusing on career education. Another under-utilized form of career education are excursions to local agricultural businesses. These businesses can vary greatly in size and scope, ranging from family operated gins, elevators, and ranches, to corporate-level businesses in equipment sales, chemical manufacturing, and even various associations for producers. Getting students out of the classroom for an educational visit to a local agriculturalist and learning about their careers can be a benefit to students looking toward finding a career aspiration. It is an option also for educators to incorporate these visits into their already-scheduled travelling for contests.

Internet resources are also useable tools for career education at the secondary level. The National FFA Organization (n.d.) launched a website called AgExplorer to help students identify four possible career areas based on a series of questions about their preferences regarding education, skills, and their ideal job. In addition to this resource, the project behind this research was tasked to create an internet resource for agricultural science teachers and university faculty to reference when looking into career education lesson planning. The website was created as a space where careers can be highlighted through videos and lesson plans for educator reference and use (wtagcat.com/index.html, 2022). High school AST and university-level teacher educators should make use of these resources for career education in classrooms. In-person and online resources are abundantly available to provide this level of education to secondary students.

REFERENCES

- AgAmerica Lending. (2022, June 28). (*infographic*) *the U. S. Farm Labor Shortage*.
AgAmerica Lending. Retrieved June 20, 2022, from
<https://agamerica.com/blog/the-impact-of-the-farm-labor-shortage/>
- Baker, L., Settle, Q., Chiarelli, C., & Irani, T. (2013). Recruiting strategically: Increasing enrollment in academic programs of Agriculture. *Journal of Agricultural Education, 54*(3), 54–66. <https://doi.org/10.5032/jae.2013.03054>
- Baker, M. A., Robinson, J. S., & Kolb, D. A. (2012). Aligning Kolb's experiential learning theory with a comprehensive agricultural education model. *Journal of Agricultural Education, 53*(4), 1–16. <https://doi.org/10.5032/jae.2012.04001>
- Becker, B. K., Schiller, A. M., Zucker, I. H., Eager, E. A., Bronner, L. P., & Godfrey, M. (2017). A day of immersive physiology experiments increases knowledge and excitement towards physiology and scientific careers in Native American students. *Advances in Physiology Education, 41*(1), 137–144.
<https://doi.org/10.1152/advan.00165.2016>
- Bergsteiner, H., Avery, G. C., & Neumann, R. (2010). Kolb's experiential learning model: Critique from a modelling perspective. *Studies in Continuing Education, 32*(1), 29–46. <https://doi.org/10.1080/01580370903534355>

Bingham, T. (2018). *Teaching Texas: A complete and practical approach to understanding and applying the pedagogy and professional responsibilities (PPR) TExES* (5th ed.). Kendall Hunt Publishing Company.

Burgess, A., & Glasauer, P. (2004). *Family Nutrition Guide*. Food and agriculture organization of the United Nations.

Chiang, I.-C. A., Jhangiani, R. S., & Price, P. C. (2015, October 13). *Experiment basics*. Research Methods in Psychology 2nd Canadian Edition. Retrieved September 7, 2022, from <https://opentextbc.ca/researchmethods/chapter/experiment-basics/#:~:text=sacrifice%20external%20validity,-,Manipulation%20of%20the%20Independent%20Variable,different%20levels%20at%20different%20times.>

Cockle, J. (1978) The Cashmere program-an approach to agriculture career education in Washington state. *The Agricultural Education Magazine*, 51(1), 6-7.
https://www.naae.org/profdevelopment/magazine/archive_issues/Volume51/v51i1.pdf

Colby, S. L., & Ortman, J. M. (2015, March). *Projections of the size and composition of the U. S. population: 2014 to 2060*. U. S. Census Bureau. Retrieved October 24, 2022, from <https://www.census.gov/content/dam/Census/library/publications/2015/demo/p25-1143.pdf?eml=gd>

- Conroy, C. A. (2000). Reinventing career education and recruitment in agricultural education for the 21st Century. *Journal of Agricultural Education*, 41(4), 73–84.
<https://doi.org/10.5032/jae.2000.04073>
- Creed, P. A., & Patton, W. (2003). Differences in career attitude and career knowledge for high school students with and without paid work experience. *International Journal for Educational and Vocational Guidance*, 3(1), 21–33.
<https://doi.org/10.1023/a:1022674528730>
- Creswell, J. W. (2006). *Choosing a mixed methods design*. SAGE Publishing. Retrieved September 6, 2022, from https://www.sagepub.com/sites/default/files/upm-binaries/10982_Chapter_4.pdf
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry & Research Design: Choosing among Five approaches* (4th ed.). SAGE Publishing.
- Dailey, A. L., Conroy, C. A., & Shelley-Tolbert, C. A. (2001). Using agricultural education as the context to teach life skills. *Journal of Agricultural Education*, 42(1), 11–20.
<https://doi.org/10.5032/jae.2001.01011>
- Davidson, M. A. (2020). *Developing a sequence for middle school agricultural education curriculum: A delphi study* [Master's thesis, West Texas A&M University]. WTAMU Repository. Retrieved June 27, 2022, from <https://wtamu-ir.tdl.org/bitstream/handle/11310/389/DAVIDSON-THESIS-2020.pdf?sequence=1&isAllowed=y>.

Davis, G. A. (2003). Using a retrospective pre-post questionnaire to determine program impact. *Journal of Extension*, 41(4). Retrieved September 5, 2022, from <https://archives.joe.org/joe/2003august/tt4.php>.

Esters, L. T., & Bowen, B. E. (2005). Factors influencing career choices of urban agricultural education students. *Journal of Agricultural Education*, 46(2), 26–35. <https://doi.org/10.5032/jae.2005.02024>

Fernandez, J. M., Goecker, A. D., Smith, E., Moran, E. R., & Wilson, C. A. (2020). *Employment opportunities for college graduates in food, agriculture, renewable natural resources, and the environment; 2020-2025*. USDA. Retrieved June 28, 2022, from <https://www.purdue.edu/usda/employment/>

Fizer, D. (2013). *Factors affecting career choices of college students enrolled in agriculture*. utm.edu. Retrieved August 1, 2022, from https://www.utm.edu/departments/msanr/_pdfs/fizer_research_project_final.pdf

Gaylor, L., & Nicol, J. J. (2016). Experiential High School Career Education, Self-Efficacy, and Motivation. *Canadian Journal of Education / Revue Canadienne de l'éducation*, 39(2), 1–24. <https://www.jstor.org/stable/canajeducrevucan.39.2.06>

George, D., & Mallery, P. (2003). *SPSS for windows step by step: A simple guide and reference, 11.0 update* (4th ed.). Allyn & Bacon.

Green, S. B., & Salkind, N. J. (2014). *Using Spss for Windows and Macintosh: Analyzing and understanding data* (7th ed.). Pearson.

- Harris, A. D., McGregor, J. C., Perencevich, E. N., Furuno, J. P., Zhu, J., Peterson, D. E., & Finkelstein, J. (2006). The use and interpretation of quasi-experimental studies in medical informatics. *Journal of the American Medical Informatics Association: JAMIA*. Retrieved September 7, 2022, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1380192/#:~:text=Quasi%2Dexperiments%20are%20studies%20that,an%20intervention%20and%20an%20outcome.>
- Hartley, J., & Marshall, S. (1974). On notes and note-taking. *Higher Education Quarterly*, 28(2), 225–235. <https://doi.org/10.1111/j.1468-2273.1974.tb00467.x>
- Herren, R. V. (2015). *Agricultural mechanics: Fundamentals & applications* (7th ed.). Delmar Cengage Learning.
- Hoover, L. (2021, November 3). *5 qualitative research designs and research methods*. Grand Canyon University. Retrieved July 5, 2022, from <https://www.gcu.edu/blog/doctoral-journey/5-qualitative-research-designs-and-research-methods>
- Howell, D., Serignese, M., Anderson, S., Dodson, R., McDowell, J., Miller, J., Newcomer, D., Sanders, R., & Shehan, B. (2019). Promoting the Value of Career Education Programs. *Inquiry: The Journal of the Virginia Community Colleges*, 22 (1). Retrieved from <https://commons.vccs.edu/inquiry/vol22/iss1/10>
- Hoyt, K. B. (2001). Career Education and education reform: Time for a rebirth. *Phi Delta Kappan*, 83(4), 327–331. <https://doi.org/10.1177/003172170108300413>

The Institute for Agriculture and Horticulture. (2022, April 26). *Do you need a farming background to work in agriculture?* TIAH. Retrieved August 22, 2022, from <https://tiah.org/do-you-need-a-farming-background-to-work-in-agriculture/>

Jones, W. A., & Larke, Jr., A. (2001). Factors influencing career choice of African American and Hispanic graduates of a land-grant college of agriculture. *Journal of Agricultural Education*, 42(1), 39–49. <https://doi.org/10.5032/jae.2001.01039>

Jones, W. A., & Larke, A. (2003). Factors influencing career choices of ethnic minorities in agriculture. *NACTA Journal*, 47(3), 11–17. Retrieved August 1, 2022, from <https://www.jstor.org/stable/pdf/43765774>.

Kansas State University. (2022, March 2). *Bachelor's degree in agricultural economics*. Kansas State University Academics. Retrieved October 5, 2022, from <https://www.k-state.edu/academics/majors-programs/agricultural-economics-degree/>

Kassel, K., & Martin, A. (2022, February 24). *Ag and food sectors and the economy*. USDA ERS. Retrieved June 28, 2022, from <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy/>

Kirshenbaum, S., & Buhler, D. (2018, March 9). *Americans are confused about food and unsure where to turn for answers, study shows*. Alliance for Science. Retrieved August 1, 2022, from

<https://allianceforscience.cornell.edu/blog/2018/03/americans-confused-food-unsure-turn-answers/#:~:text=Our%20survey%20revealed%20that%2048,or%20how%20it%20was%20produced.>

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.

Kolb, D. A., & Plovnick, M. S. (1974). *The Experiential Learning Theory of Career Development*. M.I.T.

Kotrlik, J. W., & Harrison, B. C. (1987). Factors related to the career decisions of seniors who have taken vocational agriculture. *Journal of the American Association of Teacher Educators in Agriculture*, 28(4), 50–56.
<https://doi.org/10.5032/jaatea.1987.04050>

Krumboltz, J. D., & Nichols, C. W. (1990). Integrating the Social Learning Theory of Career Decision Making. In W. B. Walsh & S. H. Osipow (Eds.), *Career counseling: Contemporary topics in vocational psychology* (pp. 159–192). essay, Erlbaum.

Krumboltz, J. D., Mitchell, A. M., & Jones, G. B. (1976). A social learning theory of career selection. *The Counseling Psychologist*, 6(1), 71–81.
<https://doi.org/10.1177/001100007600600117>

Law Insider. (n.d). *Production agriculture*. In lawinsider.com dictionary. Retrieved July 7, 2021, from <https://www.lawinsider.com/dictionary/production-agriculture>

Litosseliti, L. (2007). *Using focus groups in research*. Google Books. Continuum. Retrieved September 8, 2022, from <https://books.google.com/books?hl=en&lr=&id=GwLbQSIRtQAC&oi=fnd&pg=PR5&dq=using+focus+groups+in+research&ots=tTMLDukp5l&sig=rAGUMyO-XdkadVR1W9frdLUfKhI#v=onepage&q=using%20focus%20groups%20in%20research&f=false>.

Luckey, A. N. (2012). *Assessing youth perceptions and knowledge of agriculture: The impact of participating in an AGVENTURE program* [Master's thesis, Texas A&M University]. Core. <https://core.ac.uk/download/pdf/9069345.pdf>

Lundry, J., Ramsey, J. W., Edwards, M. C., & Robinson, J. S. (2015). Benefits of career development events as perceived by school-based, Agricultural Education Teachers. *Journal of Agricultural Education*, 56(1), 43–57. <https://doi.org/10.5032/jae.2015.01043>

Makransky, G., Petersen, G. B., & Klingenberg, S. (2020). Can an immersive virtual reality simulation increase students' interest and career aspirations in science? *British Journal of Educational Technology*, 51(6), 2079–2097. <https://doi.org/10.1111/bjet.12954>

Maslow, A. H. (1968). *Toward a psychology of being*. Van Nostrand Reinhold Company.

- Mihas, P. (2019). *Learn to build a codebook for a generic qualitative study*. SAGE Publications. <https://dx.doi.org/10.4135/9781526496058>
- Morgan, D. L. (1996). Focus Groups. *Annual Review of Sociology*, 22(1), 129–152. <https://doi.org/10.1146/annurev.soc.22.1.129>
- Morris, T. H. (2019). Experiential learning – A systematic review and revision of Kolb’s model. *Interactive Learning Environments*, 28(8), 1064–1077. <https://doi.org/10.1080/10494820.2019.1570279>
- Mount, W. A. (2021). *Recruitment of non-traditional students to agricultural degrees* [Master's thesis, West Texas A&M University]. WTAMU Repository. Retrieved June 27, 2022, from <https://wtamu-ir.tdl.org/bitstream/handle/11310/3997/MOUNT-THESIS-2021.pdf?sequence=1>.
- Moyer, K. (2022, April 29). *Choosing a career in agriculture: Benefits, tips and career paths*. AgHires Blog. Retrieved July 7, 2022, from <https://blog.aghires.com/choosing-a-career-in-agriculture#agriculture>
- National FFA Organization. (2019, January 14). *Agricultural Education*. National FFA Organization. Retrieved August 26, 2022, from <https://www.ffa.org/agricultural-education/>
- National FFA Organization. (2019, September 27). *SAE for all program*. SAE For All. Retrieved August 28, 2022, from <https://saeforall.org/sae-for-all-program/?wizard>

- National FFA Organization. (n.d.). *Find your future in agriculture*. AgExplorer. Retrieved October 8, 2022, from <https://agexplorer.ffa.org/>
- National Research Council. (2009). *Transforming agricultural education for a changing world*. The National Academies Press. <http://doi.org/10.17226/12602>
- Onwuegbuzie, A. J., & Combs, J. P. (2011). Data analysis in mixed research: A primer. *International Journal of Education*, 3(1). <https://doi.org/10.5296/ije.v3i1.618>
- Osborne, E., & Dyer, J. (2000). Attitudes of Illinois agriscience students and their parents toward agriculture and agricultural education programs. *Journal of Agricultural Education*, 41(3), 50–59. <https://doi.org/10.5032/jae.2000.03050>
- Overbay, A., & Broyles, T. (2008). Career values and perceptions of agriculture: What these gifted high school students thought. *NACTA Journal*, 52(2), 2–7. Retrieved August 1, 2022, from <https://www.jstor.org/stable/43766958>.
- Peredaryenko, M., & Krauss, S. (2013). Calibrating the human instrument: Understanding the interviewing experience of novice qualitative researchers. *The Qualitative Report*, 18, 1–17. <https://doi.org/10.46743/2160-3715/2013.1449>
- Rana, N., Agnihotri, M. K., Chetti, M. B., & Rathore, N. S. (2018). Career opportunities in agriculture and allied sciences. *Indian Farming*, 68(6), 41–48. Retrieved August 1, 2022, from https://www.researchgate.net/profile/Neeraj-Rana/publication/329608992_Career_Opportunities_in_Agriculture_and_Allied_Sc

iences/links/5c11df524585157ac1be2b8a/Career-Opportunities-in-Agriculture-and-Allied-Sciences.pdf.

Random name generator. (n.d.). Retrieved August 7, 2022, from <http://random-name-generator.info/>

Rayfield, J., Murphy, T., Briers, G., & Lewis, L. (2012). Identifying Innovative Agricultural Education Programs. *Journal of Career and Technical Education*, 27(2), 38–50. <https://doi.org/10.21061/jcte.v27i2.558>

Reddan, G., & Rauchle, M. (2012). Student perceptions of the value of career development learning to a work-integrated learning course in exercise science. *Australian Journal of Career Development*, 21(1), 38–48. <https://doi.org/10.1177/103841621202100106>

Reynaldo, J., & Santos, A. (1999). Cronbach's alpha: A tool for assessing the reliability of scales. *Journal of Extension*, 37(2). Retrieved October 25, 2022, from <https://archives.joe.org/joe/1999april/tt3.php>.

Roberts, T. G., Dooley, K. E., Harlin, J. F., & Murphrey, T. P. (2007). Competencies and traits of successful agricultural science teachers. *Journal of Career and Technical Education*, 22(2). <https://doi.org/10.21061/jcte.v22i2.429>

Rosenshine, B., & Furst, N. (1971). Research on Teacher Performance Criteria. In B. O. Smith (Ed.), *Research in teacher education: A symposium* (pp. 37–72). essay, Prentice-Hall.

- Schmidt, A. (2016, May 26). *Groupthink*. Encyclopædia Britannica. Retrieved August 1, 2022, from <https://www.britannica.com/science/groupthink>
- Settle, Q., Doerfert, D. L., Irlbeck, E., Akers, C., Burris, S., Wingenbach, G., & Rutherford, T. (2012). The Effects of an Agricultural Communications Workshop on Self-Efficacy and Career Interest: A Comparison between Agriculture and Non-Agriculture Students. *NACTA Journal*, 56(4), 71–77.
<http://www.jstor.org/stable/nactajournal.56.4.71>
- Shorten, A., & Smith, J. (2017). Mixed methods research: Expanding the evidence base. *Evidence Based Nursing*, 20(3), 74–75. <https://doi.org/10.1136/eb-2017-102699>
- Smithson, J. (2000). Using and analysing focus groups: Limitations and possibilities. *International Journal of Social Research Methodology*, 3(2), 103–119.
<https://doi.org/10.1080/136455700405172>
- Talbert, B. A., & Balschweid, M. A. (2006). Career Aspirations of selected FFA members. *Journal of Agricultural Education*, 47(2), 67–80.
<https://doi.org/10.5032/jae.2006.02067>
- Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches*. Sage.
- Tavakol, M., & Dennick, R. (2011). Making sense of cronbach's alpha. *International Journal of Medical Education*, 2, 53–55. <https://doi.org/10.5116/ijme.4dfb.8dfd>

Texas Cattle Feeders Association. (2018). *About TCFA*. Texas Cattle Feeders Association. Retrieved August 29, 2022, from <https://www.tcfa.org/about-us.html>

Texas Cattle Feeders Association. (2018). *Youth programs*. Texas Cattle Feeders Association. Retrieved August 29, 2022, from <https://www.tcfa.org/youth-programs.html>

Texas Education Agency. (2019). *The agriculture, food, and natural resources career cluster*. Texas Education Agency. Retrieved July 7, 2022, from <https://tea.texas.gov/sites/default/files/Ag%20Cluster%20Level%2010.7.19.pdf>

Texas Education Agency. (2022, July 6). *Approved statewide CTE programs of study*. Texas Education Agency. Retrieved August 29, 2022, from <https://tea.texas.gov/academics/college-career-and-military-prep/career-and-technical-education/approved-statewide-cte-programs-of-study>

Texas FFA Association. (n.d.). *Texas FFA Areas*. Texas FFA. Retrieved September 9, 2022, from <https://www.texasffa.org/texas-areas>

U. S. Bureau of Labor Statistics. (2022, April 18). *Agricultural workers: Occupational outlook handbook*. U. S. Bureau of Labor Statistics. Retrieved August 22, 2022, from <https://www.bls.gov/ooh/farming-fishing-and-forestry/agricultural-workers.htm>

- United States Census Bureau. (2021, October 8). *Urban Areas Facts*. Census.gov. Retrieved August 1, 2022, from <https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural/ua-facts.html>
- United States Department of Agriculture. (2020, December 9). *Employment outlook is promising for new college graduates in agriculture*. National Institute of Food and Agriculture. Retrieved June 27, 2022, from <https://www.nifa.usda.gov/about-nifa/press-releases/employment-outlook-promising-new-college-graduates-agriculture>
- United States Department of Commerce. (n.d.). *U. S. and World Population Clock*. United States Census Bureau. Retrieved June 27, 2022, from <https://www.census.gov/popclock/>
- University of Illinois Urbana-Champaign. (n.d.). *Agricultural leadership, education & communications*. Career Possibilities | Agricultural Leadership, Education & Communications | UIUC. Retrieved October 6, 2022, from <https://alec.illinois.edu/future-students/career-possibilities>
- Vygotsky, L. S. (1978). *Mind in society*. Harvard University Press.
- White, C. D., Stewart, B. R., & Lindhardt, R. E. (1991). Career opportunities in agriculture as perceived by inner city high school students. *Journal of Agricultural Education*, 32(1), 30–34. <https://doi.org/10.5032/jae.1991.01030>

Wildman, M., & Torres, R. M. (2001). Factors identified when selecting a major in agriculture. *Journal of Agricultural Education*, 42(2), 46-55.

<http://doi.org/10.5032/jae.2001.02046>

Winston-Salem State University. (n.d.). *Key Elements of a Research Proposal -*

Quantitative Design. Office of Sponsored Programs. Retrieved July 2, 2022, from

https://www.wssu.edu/about/offices-and-departments/office-of-sponsored-programs/pre-award/_Files/documents/develop-quantitative.pdf

Yopp, A. M., McKim, B. R., & Homeyer, M. M. (2018). Flipped programs: Traditional agricultural education in non-traditional programs. *Journal of Agricultural*

Education, 59(2), 16–31. <https://doi.org/10.5032/jae.2018.02016>

APPENDIX A: Survey Instrument

Agricultural Careers, Technologies, and Leadership Program Questionnaire

Please answer the following multiple-choice questions honestly and to the best of your ability.

1. Classification:
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior

2. Ethnicity:
 - a. Asian/Pacific Islander
 - b. Black/African American
 - c. Native American
 - d. Spanish/Hispanic/Latino
 - e. White
 - f. Other, please specify: _____

3. Gender:

a. Male

b. Female

4. Are/were either of your parents/guardians employed in the agriculture industry, either directly or indirectly?

a. Yes

b. No

5. Are/were any of your grandparents employed in the agriculture industry, either directly or indirectly?

a. Yes

b. No

6. Have you ever considered pursuing a career in the agricultural industry prior to this program?

a. Yes

b. No

Please rate your agreement with the following statements. (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree)

Item At the beginning of the Program After the Program

I know a lot about career opportunities in Animal Science	1 2 3 4 5	1 2 3 4 5
I know a lot about careers in Plant, Soil, and Environmental Science	1 2 3 4 5	1 2 3 4 5
I know a lot about careers in Agricultural Business and Economics	1 2 3 4 5	1 2 3 4 5
I know a lot about careers in Agricultural Media and Communication	1 2 3 4 5	1 2 3 4 5
I know a lot about careers in Agricultural Education and Leadership	1 2 3 4 5	1 2 3 4 5
I know a lot about careers in Equine Industry and Business	1 2 3 4 5	1 2 3 4 5
I know a lot about the technology used in the Agricultural Industry	1 2 3 4 5	1 2 3 4 5

APPENDIX B: Application for Program Participation



2022 Agricultural Careers, Technologies, & Leadership Program June 21-24, 2022

The Agricultural Careers, Technologies, & Leadership Program is designed for youth who have demonstrated a desire to pursue a career tied to the agricultural industry. This camp program is designed to educate participants on career opportunities and technology in the agricultural industry. Students will participate in various industry tours and leadership development activities alongside agricultural industry leaders and professionals. Applicants may be of any classification to apply for program, with first preference given to 2022-2023 Juniors and Seniors.

Objectives

1. Introduce aspects of the agricultural industry with an emphasis on diverse career and technology paths for students to follow;
2. Build cognitive thinking skills through problem solving and leadership activities;
3. Allow participants the opportunity to interact with leading industry representatives; and
4. Option for participants to return to their local communities and participate in a job shadow program with a local business and share new knowledge through local, county and/or regional programs.

Criteria for Acceptance

- FFA membership or enrollment in an AFNR course.
- Any current student who has just graduated or is still in high school may apply. First preference will be given to incoming Junior and Senior students. Any applicant should be no older than 18 years of age at the time of the program.
- Applicants should have an interest in exploring career opportunities in various agricultural fields.
- Selected participants will be required to document that they will be able to participate for the entire 4 days. There will be no exceptions.
- Participants will have the opportunity to participate in a job shadow with an agricultural business following the conclusion of the program. This will give the participant additional real-world experience in daily industry operations.
- Applicants must demonstrate ability to actively participate in educational seminars, work in teams to reach outlined objectives, display self-motivation to implement and carry out educational programs, and complete assignments.
- Applicants **MUST** be willing to conduct themselves in a professional manner and abide by the code of conduct of the program. Applicants must be willing to accept consequences of misbehavior.
- Applicants will be reviewed for the following qualities:
 - Leadership Integrity
 - Communication Skills
 - Extra-Curricular Activities
 - Potential for Growth
 - Commitment to Participate
 - Ability to Self-Motivate

Participants

The selection committee shall select 15-20 participants from the qualified applicants; however, the selection committee reserves the right to determine the number of students selected. Participants will be selected without regard to gender, race, disability, religion or ethnic origin. Applicants who meet the eligibility requirements will be evaluated on the information obtained from the application form and references.

Important Dates

March 2022

Program information distributed to FFA advisors; applications made available

May 1, 2022

Applications due to West Texas A&M University

May 15, 2022

Students will be notified

June 21 – June 24, 2022

Program Dates

Expectations

The program participants will be expected to actively participate in all required dates and activities with:

- An open and inquiring mind;
- A willingness to learn;
- A respect for opinions of those not in agreement with their own; and
- A commitment to communicate their activities and experiences.

Attendance Requirements

The participant will be required to attend the entire program. The only exceptions will be for a family emergency, illness, natural disaster or legal requirements. If you know you have another obligation during the proposed dates, please do not apply.

Expenses

Financial Obligation

This program has no registration fee or financial obligation. This program is sponsored by The CHS Foundation and West Texas A&M University.

Incidentals

All incidental expenses (snacks, souvenirs, etc.) incurred by the participants will be paid by the participants.

Meals

All meals will be provided throughout the program, thanks to our sponsors. Participants will only be financially responsible for snacks and additional food they may desire.

Transportation

Participants will be responsible for providing transportation to/from West Texas A&M University. We will provide all other transportation.

Dress Code

As with any distinguished program, participants should always present themselves in a professional manner. There will be relaxation time; however, there will be no t-shirts that market, advertise or insinuate anything that would be deemed inappropriate (if you have to ask, then it is probably not acceptable). Most appropriate wear will be nice casual. This is defined as young men wearing nice, pressed jeans with no holes, with a collared shirt. Young ladies required casual wear is defined as pressed jeans with no holes, with a blouse that is long enough to be tucked in. Also, for safety reasons, boots or closed toe shoes will be required for all program activities. More direct information on proper dress code will be defined once the itinerary is finalized.

2022 Agricultural Careers, Technologies, & Leadership Program

Code of Conduct

1. I am expected to attend all sessions that are part of the planned program for all activities. I will inform staff if I am not feeling well or have a personal issue arise.
2. I will dress appropriately to the occasion and adhere to any attire requirements stipulated for the program. I am expected to be courteous and clean and possess good manners.
3. I will use controlled, appropriate and professional language. I will not use language that is socially offensive.
4. Except for planned tours and outings, I will not leave an activity or facility at any time without permission of the chaperone and/or staff responsible for the event.
5. I will not smoke or use tobacco products during this program.
6. I will not use alcohol or drugs (except those directed by a doctor), or be associated with or remain in the presence of others when they are being used.
7. I will not carry a weapon or threaten another person with a weapon, bodily force or language.
8. I will respect the rights of privacy of those attending an activity and those with whom I may be rooming.
9. I will observe hours established by the staff and be in my room. No boys in girls' rooms, no girls in boys' rooms.
10. I will avoid unnecessary roughness to room furnishings, furniture, equipment, etc. Occupants of a room or conveyance are financially responsible for any damage or results of misconduct.

COVID-19 Disclaimer

I expressly acknowledge the health risks and dangers associated with the transmission of the COVID-19 virus, and other communicable diseases, and recognize that exposure to the COVID-19 virus, or other communicable diseases, could occur while my child is in the care of sponsor.



2022 Agricultural Careers, Technologies, & Leadership Program

Application Agreement

The Application Agreement refers to pages 3-6 which outline:

Participation Requirements, Expectations and Responsibility of Selected Tour Participants

I have read, understand and agree to abide by these requirements. Furthermore, I agree that this is a commitment I will not break, since I have been given an opportunity that could have gone to another deserving participant.

Applicant's Signature

Date

Parent / Guardian's Signature

Date

Agricultural Science Teacher
Signature

Date

Application to Participate 2022 Agricultural Careers, Technologies, & Leadership Program

Deadline for Application is May 1, 2022

Complete the application in type, or print clearly with ink. Use only the space provided.

If you have just graduated high school, please mark "Senior" below

Experiences

1. Career and Job Interests: *What are your future career interests? What jobs would you consider after school? Use only the space provided, and do not include additional pages.*

2. Extra-Curricular Activities: *List all activities in which you have been involved including school, sports, church, work, etc. Use only the space provided, and do not include additional pages.*

3. Community Service: *What have you done to help others? Use only the space provided, and do not include additional pages.*

4. Why do you want to participate in this program?: *Please tell the selection committee why you wish to attend and why you should be selected. Use only the space provided, and do not include additional pages.*

Please read before signing:

I certify that all the statements made in this application are true, complete and correct.

I understand that the number of applicants may be greater than the number of positions. I give permission for this application, including all attachments, to be shared and/or copied for selection purposes. I understand that the final selection of participants is the sole responsibility of Agricultural Careers and Technology and the appointed selection committee.

If selected, I give permission for photos of my child to be taken and used in promotional materials including but not limited to the AgCAT or WT websites, bulletin boards, brochures, videos and slide shows.

If selected, I will attend the entire program.

Applicant's Signature

Date

Parent / Guardian's Signature

Date

Agricultural Science Teacher
Signature

Date

Deadline: Application and requested materials must be received NO LATER
 than May 1, 2022.

Your application cannot be considered until all requested information and attachments have been received.

Please mail or email application and recommendations to:

West Texas A&M University
Dr. Kevin Williams
WT Box 60998
Canyon, TX 79016

kwilliams@wtamu.edu
(806) 651-2505

All applicants will be notified of the Selection Committee's decision by May 15, 2022.

Recommendation - 2022 Agricultural Careers, Technologies, & Leadership Program

Name of applicant: _____

TO THE RECOMMENDER: The individual forwarding this recommendation form is applying to the 2022 Agricultural Careers, Technologies, & Leadership Program. Your recommendation is helpful in our selection process in assessing the applicant's qualifications.

How long have you known the applicant? _____

In what capacity do you know the applicant? _____

Please respond to the following:

	N/A	Average	Very	Good	Exceptional
Potential to provide leadership					
Communication skills, oral / written					
Maturity level					
Ability to relate to and work with others					

APPENDIX C: Email to High School Ag-Science Teachers

Good morning,

My name is Eric Koennecke, and I am a Graduate Assistant under Dr. Kevin Williams at West Texas A&M University. Recently, the Department of Agricultural Sciences has received a grant through the CHS Foundation for a program titled “Diversity and Inclusion in Agricultural Careers and Technologies”. This grant aims to educate high school students in Randall, Potter, and Deaf Smith Counties on the variety of career options available to them in the agricultural industry. The implementation of this program will begin in fall 2021.

At this time, we wanted to reach out and see if you and your school might be interested in meeting with us to visit about the objective of this program. This meeting, would be held via Zoom and should last no more than 30 to 45 minutes. In this meeting, we would like to hear from you as to what types of career and technology based curriculum and/or educational experiences would be of the most use to you as an educator.

As part of this project myself and fellow Graduate Assistant, Courtney Coffman, will be working with a group of undergraduate students from the Department of Agricultural Sciences to develop curriculum and programs to share with high school AFNR instructors and their classes. The curriculum and programs might include visits to your campus, field-based experiences for selected students, and possible online resources. Additionally, we have budgeted money to be spent on participating schools for technology that can be utilized within your Agri-Science program.

Again, the focus of this grant program is to educate area students about careers and technologies in agriculture. If you and your school are interested in learning more about this project, please reply to this email to let us know of your interest. If interested, we will follow up with you about possible times to meet in the coming weeks.

Thank you,

APPENDIX D: 6-Day Out Email to Participants

Subject: Agricultural Careers, Technologies, and Leadership Program NEXT
WEEK

Attachments: Informed Consent/Assent Forms, Packing List, Directions to Shirley
Hall for check-in/out

Good afternoon,

With our Agricultural Careers, Technologies, and Leadership Program starting next Tuesday evening, we wanted to reach out to you all for a reminder and to share some additional information.

First of all, I hope you are all still as excited as we on the program committee are for this event! This week will be full of visits to places that few people get to experience as in-depth as we will. We have some great tours and visits planned at places such as American Quarter Horse Association and Museum, the Western Equipment store in Plainview, and the meat lab on WTAMU's campus. Each of the visits we make are sure to expand your knowledge of the agricultural industry, help you make amazing networking connections, and hopefully lead you to find your passion within the industry.

Along with our visits and travels, we will also have activities on the West Texas A&M University campus that include some small workshops for personal and professional development, as well as some activities that will take place in the evenings.

For the duration of the program, students will be housed on-campus at West Texas A&M. Check-in will take place Tuesday evening from 4:00-5:00 p.m. at Shirley Hall (directions attached) on the WT campus. All meals and transportation will be provided by West Texas A&M University for the program, though students may consider bringing a little bit of cash if they want to purchase an item from a store that we visit while traveling. At the conclusion of the program, students will check out from Shirley Hall, starting at 1:00 p.m. Please be sure that the proper transportation measures are in place so that the student does not have to wait outside in the heat to be picked up. Lunch will be provided prior to check-out on this day.

Attached to this email is also a packing list that specifies some other things that students should pack for this program. This includes items that will be needed in the residence hall during your stay. Please review this packing list carefully to ensure that you will have everything you need for this week.

As mentioned above, all meals will be provided for participants throughout the program. However, we do need to be aware of any food allergies or intolerances that our participants may have so that we can plan accordingly. If you are allergic to any food item or are intolerant to any food component, such as gluten or lactose, PLEASE let us know as soon as you possibly can so that we can finish planning meals accordingly. Please also reach out to us very soon if you are no longer able to make it to the program and will not be attending.

Lastly, you may recall that I sent an information sheet and consent form for the optional research portion of this program. Remember, participation in the research

portion is 100% optional and not a requirement of attendance. If you choose to participate you will complete a short questionnaire, as well as take part in a small focus group interview covering the information you learned and your overall experience with the program. The attached consent form and information sheet must be returned during check-in if you choose to participate in this portion of the program.

APPENDIX E: Program Schedule

Tuesday, June 21

4:00-5:00 p.m.	Arrival at WTAMU - Check into dorm, Safety meeting
5:30 p.m.	Dinner at WT
6:10 p.m.	Camp expectations/Relationship Building (AGS 102)
7:30 p.m.	Orientation Communications/Media Training (WTAMU Agricultural Communications Faculty)
9:00 p.m.	Team building/leadership exercises (WTAMU Agricultural Education Faculty)
10:15 p.m.	Camp Wrap & Review (Participant key takeaways, guiding questions, overview of tomorrow)
11:00 p.m.	Lights out

Wednesday, June 22

7:30 a.m.	Breakfast
8:00 a.m.	Depart Shirley Hall for Research Tour: AgriLife Research Station, Bushland, TX (WTAMU Plant Science Faculty)
11:00 a.m.	Depart Bushland for District Research and Extension Office, Amarillo, TX
11:20 a.m.	Arrive at District Research and Extension Office
12:30p.m.	Lunch
2:00 p.m.	Arrive at American Quarter Horse Association and Museum, Amarillo, TX
4:00 p.m.	Depart AQHA for AGS
5:00 p.m.	Etiquette Training and Dinner (WTAMU Agricultural Education Faculty)
6:00 p.m.	Dorm time for students to change into Fun Activity Clothes
6:15 p.m.	Fun Activity (Escape Room and Capture the Flag/Hide-and-Seek at AGS)
9:30 p.m.	Wrap-up & arrive back to dorm (Participant key takeaways, guiding questions, overview of tomorrow)
11:00 p.m.	Lights Out

Thursday, June 23

7:45 a.m.	Depart WT for Dealership Tour: Western Equipment, Plainview, TX (Integrated Solutions Manager)
11:30 a.m.	Lunch at Western Equipment
12:15 p.m.	Depart for MicroTechnologies
1:45 p.m.	Arrive for Tour: MicroTechnologies Shop Tour, Amarillo, TX
3:30 p.m.	Depart MicroTechnologies for Creek House Honey Farm
4:00 p.m.	Arrive at Creek House Honey Farm (Owners)
5:45 p.m.	Depart Creek House for AGS
5:50 p.m.	Dinner at AGS
6:00 p.m.	Carcass Anatomy and Fabrication (WTAMU Animal Science Faculty)
8:00 p.m.	Wrap-up
8:15 p.m.	Depart Ag Science Complex for Dorms
11:00 p.m.	Lights Out

Friday, July 24

7:30 a.m.	Breakfast
8:00 a.m.	Arrive at WTAMU Ag Complex
8:05 a.m.	Post-Secondary Education Work Shop (WTAMU Agricultural Internship/Scholarship Coordinator)
9:10 a.m.	Personality Profile/Soft Skills Activity (WTAMU Agricultural Education Faculty)
10:30 a.m.	Begin Rotations (Questionnaire, Focus Group) <ol style="list-style-type: none">1. Questionnaire2. Focus Group
12:00 p.m.	Lunch
12:30 p.m.	Camp Wrap Up
	Program Evaluation and Closing
1:00 p.m.	Program Adjourns/Dorm Walk Through and Check out

APPENDIX F: Informed Consent

What is this research project studying?

This project will be studying an immersive career and technology education program to determine its value in teaching students about the variety of careers available to them within the agricultural industry. This will be focused on a group of 15-20 high school-aged participants.

What would I do if I participate?

In this study you would participate in an immersive educational program on agricultural careers and technology. This will include a camp-style program taking place over 3 to 4 days hosted at West Texas A&M University. Throughout the program, we will visit businesses such as Western Equipment, the American Quarter Horse Association, and others within the Amarillo and Canyon area. Should you choose to participate in the research portion following the camp, you will be given a survey with a series of questions designed to identify your self-perceived knowledge of different agricultural opportunities and how that knowledge changed because of participation in the program. In addition to this, we will conduct small focus group interviews of 3-5 student participants at a time to ask verbally how your knowledge may have changed. Your signed consent form and participation constitutes your choosing to participate in research and permission to use your anonymous survey and de-identified interview responses as part of this research project. Further, should you choose to withdraw from the research portion of this program you may do so at any time.

Why would I want to participate?

This program and the optional research activity that follows will help students identify different agricultural industry career paths and may help a student find a path which they would like to pursue. Participants will be participating in an experience to further your knowledge and understanding of various careers and technologies within the agricultural industry, as well as networking with fellow students and industry professionals. Additionally, you will be receiving promotional materials and be provided meals during the program.

Why would I not want to participate?

A student may not want to participate in the research portion of this program if they will not be able to participate in the camp program for its entirety, as this will be essential for the research portion after the camp's conclusion.

Can I quit if I become uncomfortable?

As there are no experimental components to this research, there is no foreseen reason that anybody would be uncomfortable at any point during these experiences. Additionally, there is not expected to be any risk greater than those encountered in everyday life. However, you are free to step away from the experience at any moment should you be uncomfortable with any part of the experience.

How long will participation take?

The optional pre-/post-test following the educational portions of camp should take about 10 minutes, and the optional participant focus group interview at the conclusion of camp should take no longer than 15-20 minutes.

How are you protecting privacy?

Your name will not be linked to any data or documentation used at any point in this study. Survey responses will be completed anonymously, focus group interviews will be recorded via audio only, and any name will be replaced with a pseudonym to protect the confidentiality of participants. Additionally, your name will not be available in any publication or presentation made based on this research without consent. Nobody other than the researchers on this project will have access to the raw data. All related documentation will be stored either in a locked file cabinet in the researcher's office or on a password-protected computer that only the researcher can access.

I have some questions about this study. Who can I ask?

- The study is being run by Dr. Williams from the Department of Agricultural Sciences at West Texas A&M University. If you have any questions, you can call him at 806-651-2505.

- WTAMU also has a Board that protects the rights of people who participate in research. You can contact them at AR-EHS@wtamu.edu.

I have some questions about this study. Who can I ask?

- The study is being run by Dr. Williams from the Department at Agricultural Sciences at West Texas A&M University. If you have questions, please reach out to the Dean of the Graduate School, Dr. Angela Spaulding at 806-651-2731.

Parent/Guardian Signature and Date

Student Signature and Date

APPENDIX G: Focus Group Interview Guide

Script: “This will be the interview of the research portion of this educational program. The following questions will be related to your experiences and knowledge of agricultural careers and technology. If you choose not to participate in the interview portion of this research, you have the right to withdraw at any moment. Are you ready to begin?”

1. Are you currently involved in agriculture outside of your high school’s Agriculture, Food and Natural Resources (AFNR) program?
2. What other activities are you involved in outside of your school’s AFNR program?
3. Have you considered a career in the agricultural industry?
4. What, if anything, has made you consider a career in the agricultural industry?
5. What, if anything, has dissuaded you from considering a career in the agricultural industry?
6. What career or career field are you planning on going into?
7. Why did you choose this career/field?
8. Describe your perception of agricultural careers.
9. Describe your perception of agricultural technologies.
10. When did you first develop an interest in agriculture?

11. Was there any person or any event in particular that sparked this interest?
12. Would you consider yourself knowledgeable about the agricultural industry?
13. Which facets of the agricultural industry do you consider yourself the most knowledgeable about?
14. What is something you wish this program covered more in-depth relating to agricultural careers?
15. What is something you wish this program covered more in-depth relating to agricultural technologies?

APPENDIX H: Codebook

Theme 1	Code Name	Definition	When to use	When not to use	Example of use in text from the study
Three-Component Model in Practice	Supervised Agricultural Experience	Evidence referring to participants' interactions with an activity that could be considered an "SAE" as part of an FFA program	Use when agricultural activities are mentioned in a positive manner by the participant	When referring to agricultural activities negatively impacting knowledge	"I drive a tractor for my dad on a cotton farm" (Focus Group 2)
	Competitions	Evidence of competitions affecting knowledge or interest in ag	Use when competitions are mentioned in a positive manner by the participant	When competitions have negatively impacted student knowledge	"Being on the vet tech team for three years, I'd say veterinary sciences. It's a cool thing to know... not a lot of people do." (Focus Group 1)
	Classroom Instruction	Any evidence recognizing agricultural science classes (or extension professionals) as increasing participant knowledge or interest	Use when AFNR courses increased student knowledge	When AFNR courses did not increase student knowledge	"My freshman year, I didn't know any of this existed. Being able to learn about showing, ag, everything has really brought my interest and showed me my path." (Focus Group 1)

Theme 2	Code Name	Definition	When to use	When not to use	Example of use in text from the study
Career Areas of Interest	Traditional-Livestock	Evidence of a career interest mentioned that involves livestock production. (ex. ranching)	Use when traditional livestock careers are mentioned as a career option the participant is familiar with	When referring to a traditional career in livestock production as a non-valid option	“My granddad started raising cows when I was six or seven. Going there every summer brought me closer to ag.” (Focus Group 1)
	Traditional-Farming	Evidence of a career interest mentioned that involves crop production (ex. cotton)	Use when traditional farming careers are mentioned as a career option the participant is familiar with	When referring to a traditional career in crop production as a non-valid option	“My grandpa used to grow peaches and apples” (Focus Group 1)
	Agricultural Mechanics	Evidence of a career interest mentioned in agricultural mechanics	Use when agricultural mechanics careers are mentioned as a career option.	When referring to careers in agricultural technical service as a non-valid option	“Just more the ag mechanics side like welding, cutting.” (Focus Group 1)
	Veterinary Science	Evidence of a participant’s interaction or interest in the area of veterinary science	Use when as career in veterinary sciences is mentioned as an option.	When referring to careers in veterinary science as a non-valid career option	“I’ve just thought about veterinary science...” (Focus Group 2)
	Agricultural Economics	Evidence of a participant’s interaction or interest in the area of agricultural economics	Use when careers in agricultural economics are mentioned as a career option.	When referring to careers in agricultural economics as a non-valid career option	“My uncle and grandpa own a tractor shop in the town we live in.” (Focus Group 1)
	Agricultural Education, Communications, or Extension	Evidence of a participant’s interaction or interest in the area of agricultural education, communications, extension, or non-specific agriculture	Use when careers in agricultural education, communications, extension, or general agriculture are mentioned as a career option.	When referring to careers in agricultural education, communications, extension, or general agriculture as a non-valid career option	“...I’ve thought about being an ag teacher, extension agent, stuff like that.” (Focus Group 2)

Theme 3	Code Name	Definition	When to use	When not to use	Example of use in text from the study
Recognition of Agricultural Technology	Development	Evidence that a participant showed interest in the development of agricultural technology	Use when a participant mentions that they wanted to learn about the development of agricultural technology	When participants refer to ag technology development not being of interest	“Maybe talk about what they’re working on now... They talked about what they have, so talk about what they’re trying to get.” (Focus Group 1, p. 9)
	Careers in Agricultural Technology	Evidence that a participant recognizes the opportunity for a career in ag technology	Use when a participant mentions the possibility of a career in agricultural technology	When ag technology is mentioned, but a career is not	“I know now that there’s more technology and more advancement and more of a demanding career on that side.” (Focus Group 2, p. 8)

Theme 4	Code Name	Definition	When to use	When not to use	Example of use in text from the study
Recognized Perceptions	Agricultural Careers	Evidence recognizing a student’s perceptions of agricultural careers	Use anytime a participant mentions their positive perception of agricultural careers	When negative mentions are made of perceptions toward agricultural careers	“Without this field, no other fields would be able to exist, or at least function.” (Focus Group 1)
	Agricultural Technologies	Evidence recognizing a student’s perceptions of agricultural technologies	Use anytime a participant mentions their positive perceptions of agricultural technologies	When negative mentions are made of perceptions toward agricultural technologies	“I didn’t realize how in-depth it can get and how much technology there really is because it’s not part of my daily life.” (Focus Group 2)
	Changes in Perception	Evidence suggesting that a participant’s perceptions changed due to the program	Use when a student mentions their perception toward careers or technologies changed or shifted	When participants mention a perception, but not that it changed	“I didn’t think there was as much technology as we have now.” (Focus Group 1)

Theme 5	Code Name	Definition	When to use	When not to use	Example of use in text from the study
Supplementary Discoveries	Non-traditional workers	Evidence where a participant mentions that non-traditional employees can work in agriculture	Use when people from non-agricultural backgrounds are mentioned as working in agriculture	When participants refer to agriculture as being purely for those from traditional backgrounds	“And there’s a place for everyone in ag. You don’t have to grow up in the industry to be in the industry.” (Focus Group 2)
	Agricultural Knowledge	Evidence of a participant feeling confident in their knowledge of agriculture	Use when a participant mentions that they feel knowledgeable about agriculture	When participants don’t feel confident in their agricultural knowledge	“I think all of us are more knowledgeable than the average person.” (Focus Group 1)
	Lack of Confidence	Evidence of a participant lacking confidence in their agricultural knowledge	Use when a participant mentions that they do not feel confident in their knowledge pertaining to agriculture	When a participant feels confident about their knowledge in agriculture	“Everyone likes to think of themselves as the most knowledgeable. But...I’ve only been doing meats for two years, I’m not nearly as knowledgeable...” (Focus Group 1)
	Program Enjoyment	Evidence of participants enjoying their time in the immersive program	Use when participants speak positively about their experience in the immersive program	When participants mention their experience with the program was negative	“I really liked the etiquette dinner just cause it’s not something you go over a lot, day-to-day.” (Focus Group 1)
	Program Improvement	Evidence that a participant wished a part of the program had been altered or changed for the better	Use when a participant mentions that the program could be improved in some way	When participants do not mention the need for a change to the program	“...just getting more hands-on with everything. That’s how I know if I like something or not.” (Focus Group 2)