Examining secondary talented and gifted and agricultural education experiences relative to college major and career choice

by

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A.A.S., Southeast Community College, 2016
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A THESIS

submitted in partial fulfillment of the requirement for the degree

MASTER OF SCIENCE

Department of Communication and Agricultural Education
College of Agriculture

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2019

Approved by:

Major Professor
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Abstract

The purpose of this study was to describe the role of secondary talented and gifted and agricultural education experiences in college major and related career choice. This descriptive study sought out how institutions may go about recruiting and training individuals based upon characteristic and involvement information, perceptions of past academic experiences, and expectations of a future career. Results indicated that there is not a direct correlation between talented and gifted program involvement with a major and or career choice in agriculture, food, and natural resources, but there is potential to reach this dynamic group.

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Chapter 1 - Introduction

Background and Setting

In recent decades, the agriculture industry has become technologically advanced and increasingly complex (Cannon, Broyles, & Hillison, 2006; Cannon, Broyles, & Anderson, 2009). The National Institute of Food and Agriculture (NIFA) 2015 report, sponsored by the United States Department of Agriculture (USDA), stated the technology advancements and complexity was due to the agriculture system being driven by macroeconomic conditions and retirement, consumer preferences for nutritious and safe food, public policy, and global market shifts in population (Goecker, et. al.). Nonetheless, the rapid growth within the four identified sectors (macroeconomic conditions and retirement, consumer preferences, public policy, and global market shifts) is not subject to change any time soon.

The shift in agriculture results in a change of requirements for employability in college graduates. The USDA (2015) estimates there would be 57,900 average annual openings for graduates with bachelor's or higher degrees between 2015 and 2020. College institutions in the United States with the capabilities to produce graduates with expertise in food, agriculture, renewable resources, or environment will be expected to fill approximately 61% of the 57,900 annual jobs (Goecker, et. al., 2015). As a result, 39% of the openings would either remain unfilled or occupied by a graduate from another specialty. Within the total 57,900 annual openings, 46% would be in the field of management and business, 27% will be in the field of science, technology, engineering, and mathematics (STEM), and 15% would be in careers regarding sustainable food and biomaterials production. The remaining 12% will continue to be in education, communication, and governmental services (Goecker, et. al., 2015).

The USDA 2012 Census on Agriculture provides more insight on the agriculture

industry. As published, two-fifths of all land in the United States was farmland and accounts for a total of 915 million acres. Of the 915 million acres, 45.4% was in permanent pasture, 42.6% was cropland, and 8.4% was woodland. The remaining 3.6% was land used for farmsteads, buildings, and livestock facilities (USDA Census on Agriculture, 2012). The Midwestern states (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin) represented one of the most intense areas of agriculture production in the world with more than 127 million acres in production (USDA Agriculture in the Midwest, 2017). Midwestern agriculture encompassed diversity by customarily raising corn, soybeans, livestock, vegetables, fruits, tree nuts, berries, nursery and greenhouse plants. Consequently, this area of production affects the global economy (Hatfield, 2012).

There are numerous studies completed to compare post-secondary education opportunities. The website niche.com analyzes academic, admissions, financial, and student life data from the United States Department of Education, along with self-reported reviews as their analysis method for research. Most recently, niche.com completed a study titled "2019 Best Colleges for Agricultural Sciences in America." Twelve out of the top 25 schools were four-year institutions in the Midwest with degrees such as animal sciences, horticulture, aquaculture, agronomy, crop science, and turf management (niche.com, 2018).

While identified statistics have proven that there is a need for agriculture graduates and Midwestern four-year universities have the ability to foster this field of study, the debate of finding qualified students arises. As a result, non-traditional and diverse student populations have to be sought out. An example of a non-traditional and diverse student population is the talented and gifted (TAG) individuals. TAG individuals have peculiar abilities and are categorized by sophistication of the intellectual repertoire (or general intelligence) and among verbal, numerical,

and spatial abilities (Boatman, 1997). Once a gifted individual's abilities are fostered, they are more prevalent to demonstrate outstanding performance or potential for superior performance in academic, creative, artistic, and leadership domains (Renzulli & Reis, 2003). Superior performance may lead to "global leadership in providing sustainable food systems, adequate water resources, and renewable energy in a world with climate change and immense population growth" (Goecker, et. al., 2015, para 8).

Theoretical Framework

In studying factors and influences on a student's career choice, Dick and Rallis (1991) developed a model of analyzing a student's aptitude based upon socializers and past experiences. This tool is also an expansion of Meece et. al.'s 1982 comprehensive model. Dick and Rallis' 1991 model includes socializers as attitudes and behaviors of a mother, father, teacher, counselor, friend, or other influential person in their life. Past experiences are feelings in regards to grades, test scores, and other related academic experiences such as clubs, programs, and organizations (Dick & Rallis, 1991). For the persistence of this study, the focus is going to be on the interpretation of past experiences. After an individual fully understands the specified experiences, self-concept and career values are developed and a future career can be chosen. To sustain this point of view, Overbay (2006) stated, "Life is full of choices, and choices require observations and speculation into realities that exist in our lives" (p. 11).

Statement of the Problem

The agriculture sector is changing and therefore there is a need to recruit talented individuals into the industry. Contrary to popular belief, agriculture in today's world includes specializations that have a wide appeal (Beyl, Adams, & Smith, 2016). The National Agricultural Human Resources Roundtable also recognized the need to recruit gifted and talented people into

agriculture (Overbay, 2006)

Purpose of the Study

The purpose of this study was to describe the role of secondary talented and gifted and agricultural education experiences in college major and related career choice.

To facilitate this study, the following research objectives were developed:

1. Determine characteristics of the participants used in this study.
2. Describe the participant's level of involvement in secondary talented and gifted programs, secondary agriculture programs, or a combination of both.
3. Examine how a student's past experiences influenced their major choice in agriculture and natural resources by involvement in talented and gifted programs, agriculture programs, or a combination of both.
4. Determine how self-concept factors pertain to the participants' expectations of a career in agriculture, food, and natural resources.

Definition of Terms

Agriculture: The science of providing people with food and fiber. This includes all areas of food and biomaterials production, management and business, science and engineering, and education, communication, and government services (Goecker, et. al., 2015).

Agriculture graduate*:* An individual who has obtained a post-secondary degree after completing an agriculture program of study. This knowledge and skill set is to either work in the agricultural business, communication, education, journalism, sales, production, or processing sectors, some of which may overlap. The length of education may include all levels of education (technical/certificate through doctorate level).

Career values: The subset of your beliefs and ideas related to a job or occupation

(Overbay, 2006).

Cultural milieu: The setting and environment in which a person lives, including social and cultural aspects of life (U.S. Health in International Perspective: Shorter Lives, Poorer Health, 2013).

Differentiated curriculum: The need to tailor instructional environments and practices to create appropriately different learning experiences for students with different needs (Olinghouse, 2008).

Diverse student populations: Students who are not recognized by educators as a separate entity.

Giftedness: "Biological rooted concept that serves as a label for a high level of intelligence and indicates an advanced and accelerated development of functions within the brain" (Clark, 2008, p. 26).

Intelligence: "Combination of an individual's cognitive, affective, physical, and intuitive functioning" (Clark, 2008, p. 26)

Self-concept: The knowledge that contains our beliefs about our personality traits, physical characteristics, abilities, values, goals, and roles in a career.

Talent development: "The deliberate and planned effort to provide students with an enriched and responsive learning environment" (Clark, 2008, p. 26).

Talented and Gifted Students: "Students, children, or youth who give evidence of high achievement capability in areas such as intellectual, creative, artistic, or leadership capacity, on in specific academic fields, and who need services and activities not ordinarily provided by the school in order to fully develop those capabilities" (Elementary and Secondary Education Act, Title IX, Part A, Definition 22, 2002).

Limitations of the Study

The researcher recognized several limitations in this study. The federal Elementary and Secondary Education Act (2002) defines gifted and talented students in Title IX, Part A, Definition 22. While the National Association for Gifted Children (NAGC) (2014) recognizes this as the national definition, individual states and local levels are not required to do the same. Efforts from the NAGC are working to change this; the Council of State Directors of Programs for the Gifted (CSDPG) conduct a biennial survey of how states regulate and support efforts for advanced students (NAGC, 2014).

Another limitation of this study is that identifying students with exceptional abilities may be hard to identify. Giftedness is representative across all gender, racial, ethnic, and socio-economic groups. The similarities between these groups are exhibited through characteristics, traits, and ways of expressing themselves. There is not a singular objective (quantifiable) or subjective (personally observed) identification instrument that solves this problem. Examples of objective and subjective identifications include, but are not limited to, formal tests and assessments, student cumulative records, nominations among personal advocates, teacher observations, and profiles.

According to the Office of Civil Rights within the United States Department of Education, in 2011-2012 there were approximately 3.2 million identified students in public schools in talented and gifted programs. A large amount of educators are needed to satisfy this large amount of students. At most, the educators who foster the unique abilities of gifted students do not concurrently have standard training plans. The largest portion of their training comes from professional development, mentorship, and experience.

Gifted programs are not universal in all school systems due to inadequate funding at the

local and state levels. As stated in Spanilo-Dewpow's (2013) work, the NAGC found that in 2007, only .026% of the federal K-12 education budget went to gifted and talented students. This is compared with 3% to the Reading First Program, 1.59% to Drug Prevention, 1.10% to Education of Migrant Children, 1.85% to English Language Acquisition, 64% to the NCLB programs, and 32% to children with disabilities through the Individuals with Disabilities Education Act (IDEA). As the programs are not universal, neither is the curriculum. Due to the economic conditions at the local and federal levels, districts have to work to utilize their resources the best that they can.

The last limitation of this study became apparent upon analyzing the final results. In the characteristic section of objective one, participants were asked if he or she had a secondary major. The wording of this question was vague and would have been better addressed with differentiating a secondary major from a dual degree or a dual major. At Kansas State University, there are four secondary majors that supplement the choice of a primary major, secondary majors are intended to examine complex topics from an arrangement of views (Kansas State University, 2017). Relevant agriculture secondary majors may include International Studies, Natural Resources and Environmental Sciences, and Global Food Systems.

Undergraduate students at Kansas State University have the opportunity to earn dual bachelor's degree, if the degrees are separate programs from different disciplines. Within the College of Agriculture, most of the majors receive a Bachelor's of Science (B.S.) in Agriculture. The major specific areas are awarded in Agribusiness, Bakery Science and Management, Milling Science and Management, Feed Science and Management, Food Science and Industry and Wildlife and Outdoor Enterprise Management. In comparison, dual majors may be earned by completing requirements in two separate B.S. Agriculture programs. To earn a dual major,

student must complete all requirements for both major but only one degree will be awarded. Notion of the courses completed will be available upon graduation on a student's transcript (Kansas State University, 2019).

Basic Assumptions

Due to the scope and complexity of this study, research cannot reach all of the intended populations or population. Instead, key findings are categorized and interpreted accordingly. The instrument and methodology basis chosen for this study stand as a reliable source to elicit responses. Inclusion criterion was determined based on the participants answering honestly. As these participants were active in a talented and gifted program, they undoubtedly had a sincere interest in participating in this study. Simply put, if a university can foster the TAG students' skills, then the more qualified graduates they may construct

Need for the Study

The Genetic Studies of the Genius (Terman, et. al, 1925, 1947) is a classic longitudinal study, in which states that intellectually talented individuals succeed at high rates in vocational environments (Boatman, 1997). Nichols and Davis (1964) completed a cross-sectional study where they examined occupational choices of the 1956 through 1963 National Merit Scholars. The populations combined had career choices in high status and professional areas. The longitudinal study and cross-sectional studies from the 20th Century laid the groundwork for more research in educational and vocational decision making among the intellectually talented (Boatman, 1997).

Numerous studies have been completed to examine what influences an undergraduate student's choice of major (Edmonds, 2012). Research related to the choice of major within colleges of agriculture is also deficient (Parks, 2014). Additionally, Howley, Rhodes, and Beall

(2009) stated that agriculture careers have the capacity to fit the needs of talented and gifted students. Academia across all levels may address the needs of gifted students and emphasize the college experience, through career development.

Chapter 2 - Literature Review

The areas of literature review in this section include the theoretical framework of interpretation of past experiences, self-concept, career values, and a future career. Additionally, a clear conceptualization of gifted students is added to strengthen the theoretical framework. A summary of these areas completes this chapter.

Theoretical Framework

The beginning of the vocational psychology movement is an appropriate rationale to describe the position of the theoretical framework of this study. Career development research dates back to the early 20th Century (Overbay, 2006). Early researchers received scrutiny from psychology and psychiatry scholars in the formation of a theoretical framework for a career choice. Parsons (1909) was among the first in the vocational psychology movement. He used the work as a way to describe the matching of one's self to one's job traits (Flanigan, 2011). With scientific assessments, occupations can be matched, measured, and predicted. Continually, Parsons followed this ideal throughout the rest of his career and left the renowned *Choosing a Vocation* (Parsons, 1909) publication behind.

Another vocational education pioneer was Holland (1966), who focused his mid-century research on vocational choice as a variable; it is neither linear nor regressive. Vocational needs continue throughout one's life and perceptions of the person are continually changing (Overbay, 2006). "Assessing vocational interest is socially valuable and positive, not distorted like a personal question" (Holland, 1966, p. 7).

Transitioning into the late 20th Century, Dick and Rallis (1991) adapted their model from Meece et. al.'s 1982 comprehensive model of career choice. At the first level of Dick and Rallis's model, there is Student Aptitudes in its own category. Aptitudes are a qualitatively

distinctive combination of abilities on which the possibility of achieving success through performance varies (Teplov, 1986). From this definition, aptitude does not singularly guarantee success in one activity but allows for the building blocks of achievement (Shatunova & Sterz, 2018). Furthermore, predispositions and abilities to a particular activity come with time. If a gifted child does not recognize his or her developed abilities, one will not be able to achieve outstanding results (Merzon, et.al., 2013).

Upon the next level, there is past Educational Experiences. These experiences are both intrinsic and extrinsic values of academic task. Academic Tasks are exemplified as grades, test scores, and related learning experiences. For this study, Past Educational Experiences are going to be the driving factor and explained in the literature review because there is a direct correlation in a student's academic choices, performance, and persistence (Dick & Rallis, 1991).

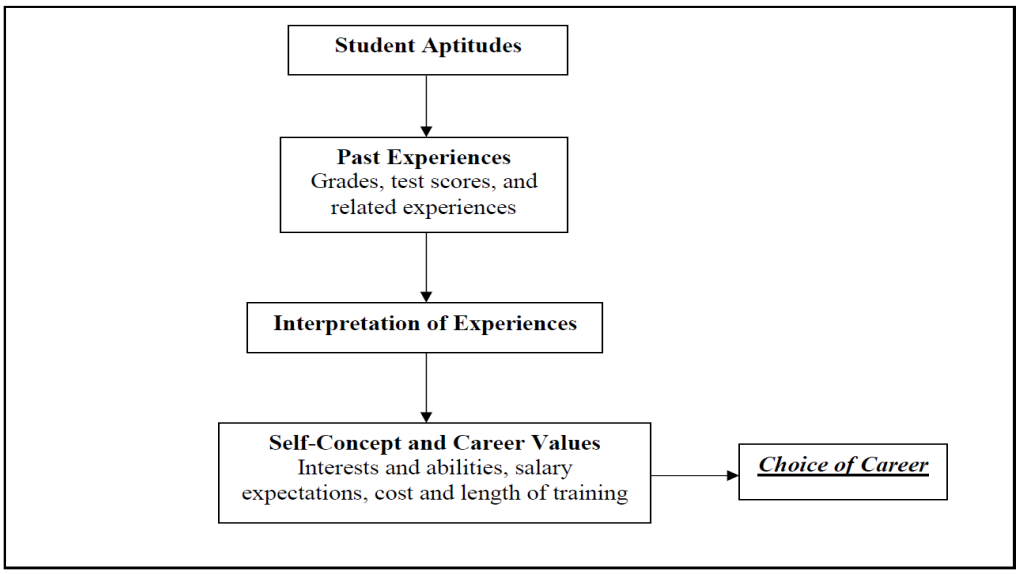

Figure 2.1. Model of career choice. Adapted from "Factors and influences on high school students' career choices," by T.P. Dick and S.F. Rallis, 1991, *Journal for Research in Mathematics Education,* 22(4), 281-292.

Interpretation of Past Experiences

Education has the ability to shape the mind at a young age. The experiences of adolescents in the educational setting often determine the trajectory of their academic success (Schneider, Broda, Judy, & Burkander, 2014). Among the most important experiences are curriculum availability, receiving grades, test scores, and involvement in extracurricular and intracurricular activities like clubs, programs, and organizations.

An important component of educating a gifted child is the environment provided by the educator and their willingness to differentiate the curriculum (Cardwell, 2012). In ordinary general education schools, teachers are not readily prepared to use the strategy of differentiated education for gifted learners (Cardwell). Therefore, it is especially important to accentuate unique abilities that the TAG learners have and provide them with an optimal learning environment.

According to Super's (1957) work, curriculum is seen as a source of self-expression and the use of skills and knowledge is seen as help to make activities more interesting. When transferred to receiving grades on an assignment, self-expression is how much effort students put towards a given assignment. If the given assignment is interesting, students put more effort towards that assignment. If completed well, then grades reward the effort. The similar concept works for exams, when extra effort and time are spent on studying for an exam, grades display the work.

Cumulative grade point average (GPA) is one of the most common ways of predicting retention from provided curriculum (Garton, Ball, & Dyer, 2002; Parks, 2014). An individual's GPA is not a sole variable for academic success; determining factors are a multi-faceted construct. Reason (2009) stated that personal traits such as aspirations and motivation tend to

guide a student through education. All in all, when an individual interprets his or her ability to work at a given task to succeed, success is more common.

In addition to the traditional classroom setting, there are other opportunities that can promote a student's success (Ebede, 2015; Patterson, 2012). Harper and Quaye (2007) revealed that student organizations develop communication skills and foster the ability to learn from others. Hall (2012) found that with participation, students can develop stronger mentoring relationships, are able to think critically, plan appropriately, and make enhanced decisions. In the end, the more students participate in organizations, the more likely they are to transfer those skills to the real-world setting.

In 2001, a study was completed by Astroth and Haynes to assess involvement in 4-H and their likelihood to succeed in school and community, be looked at as role models, and help others in their community (Overbay, 2006). Results showed that participants were less likely to steal or engage in reckless behavior (Astroth & Haynes, 2001, p. 9). The National FFA Organization provides similar experiences to youth as the 4-H organization does. The FFA's mission "makes a positive difference in the lives of students by developing their potential for premier leadership, personal growth, and career success through agricultural education" (National FFA Organization, 2018, p. 8). The agricultural education program has three integral, intra-curricular components: classroom and laboratory instruction, experiential learning through supervised experiences (SAE), and leadership and personal development through membership in the National FFA Organization (Dailey, Conroy, & Shelley-Tolbert, 2001; Talbert & Balschweid, 2006).

The field of gifted education is based on the "almost universally accepted reality that some learners exhibit outstanding performance or potential for outstanding performance (Renzulli, 2012, p. 150). The most common way of fostering outstanding performance is through

differentiated curriculum and problem-based learning (PBL) (Cooper, 2012). In effect, PBL permits students with authentic problem solving experiences, hands-on learning, and self-directed learning.

Self-Concept and Career Values

Defining the factors behind motivation is an important goal because motivation-related self-concepts are a critical component of career aspirations (Robnett & Leaper, 2012). Previous research clearly indicates that achievement and aspirations begin in childhood and follow through adolescence and adulthood. This is a stair-step process through one's life and can be modeled with a near universal architectural structure like a pyramid. Steward (1980) placed career development with a similar pyramid model. This model depicts the "synergistic relations of career choice factors, life-style, self-concept, and the specific job" (Steward, 1980, p. 531). All of the relationships are directly linked to possible careers, job performance, and social interactions.

Achievement movement theorists Eccles and Wigfield dedicated their research to explain people's choice of achievement, persistence, and vigor with the Expectancy Value Theory (2002). According to the Expectancy Value Theory, students are motivated by the way they are expected to succeed. A student is able to refer back to their choice, persistence through an activity, and overall performance (Robnett & Leaper, 2012). The extent of how well one does on an activity determines the level of how much the activity is valued (Atkinson, 1957; Eccles et al., 1983; Wigfield, 1994; Wigfield & Eccles, 1992).

Other achievement theories include Bandura's (1997) Self-Efficacy in Social Cognitive Theory and Harper's (1992) Subjective Task Theory. Bandura (1997) included expectancies along with self-efficacy. One's interest and belief that he or she can accomplish a task will lead

to a given outcome (Wigfield & Eccles, 1999). This process relies heavily on self-regulation and reflection. Perceived self-efficacy includes but is not limited to a course of action, how much effort to put forth, and how accomplishments are recognized (Landreth, 2016). All in all, efficacy expectations are a strong predictor of performance and choice (Wigfield & Eccles, 1999).

The Subjective Task Theory (Harper, 1992) is heavily influenced by the work of Norm Feather (1992). Like Feather's work, Subjective Task Theory emphasized task value and the probability that an individual will select a given task (Eccles, 2005). Subcomponents of defining the quality of task include attainment value, intrinsic or interest values, utility value of the task, and the cost of engaging in a task. Attainment value is defined as personal importance in a given task (Battle, 1966). Intrinsic or interest value referred to the anticipated enjoyment while pursuing a given task and is a holistic approach. Utility highlights personal goals and the usefulness of how a task fits into future goals. Lastly, the cost of engaging in a task unfortunately is influenced by extraneous variables. Factors such as anxiety, fear of failure, fear of social consequences, or discrimination from others come at a cost for completing a task (Eccles, 2005).

Choice of a Career

Like toddlers taking their first steps, adolescents are expected to explore new environments and place themselves where they deem to fit in society. This transitional period in one's life can be dubbed "emerging adulthood" (Larkin, LaPort, & Pines, 2007). Gifted individuals often have multiple interests and abilities and as a result, there is an attraction among several educational and occupational areas (Leung, 2008). This is wonderful for some gifted students and detrimental to others because negative impacts come from conflicts in developing vocational identities and being able to prioritize goals.

The widely prevalent belief that talented and gifted students require little to no career

guidance is a myth noted in gifted education literature (Muratori & Smith, 2015). In fact, career planning is an enduring process that should be approached systematically since it is a continuous process. Gottfredson's (2004) theory of circumscription and compromise can be used as an approach to help with the continuous process of career planning (Muratori & Smith, 2015). In Gottfredson's theory, there are four developmental processes: cognitive growth, self-creation, and both circumscription and compromise.

Cognitive growth refers to recognizing one's cognitive abilities. Cognitive abilities are directly related to the "Student Aptitude" section provided in the theoretical framework. In essence, the innate process of recognizing cognitive abilities leads to aptitudes, or the natural ability of willingness to complete something. The second process, self-creation, gives validation to the quote "we are not passive products of either nature or nurture, but active agents in our own creation" (Gottfredson, 2004, p. 74). Leung (2008) suggested that career development is a process of self-creation and relies on interpretation of past experiences. The last two processes, circumscription and compromise also rely on interpretations.

Additionally, providing a gifted student with optimal learning challenges, experiences, and open-minded career guidance allows for internal growth. When a student does not face challenge early in his or her education, the internal message is that the real-world setting is easy (Muratori & Smith-Klose, 2015). Learning to experience setback and challenges is an essential skillset if an individual wants to succeed in a career.

Talented and Gifted Definition

As cited by Spaniolo-DePouw (2013), the term "gifted" was first used in the 20th Century. The 1972 Marland Report to Congress first introduced a nationally recognized definition of gifted students. Since this federal movement, the definition has been modified

several times. The current definition states: “Students, children, or youth who give evidence of high achievement capability in areas such as intellectual, creative, artistic, or leadership capacity, in specific academic fields, and who need services and activities not ordinarily provided by the school in order to fully develop those capabilities” (Title IX, Part A, Definition 22, 2002).

States and independent districts in the United States are not required to use the federal definition of talented and gifted. The Kansas State Department of Education (KSDE) defines talented and gifted as “performing or demonstrating the potential for performing at significantly higher levels of accomplishment in one or more academic fields due to intellectual ability, when compared to others of similar age, experience and environment” (Kansas Special Education Regulations 90-40-1, 2008). For the purpose of this study, the State of Kansas’ definition is used.

Characteristics of Talented and Gifted Students

From the beginning of formal education, students have always been grouped together based upon similarities. The idea that talented and gifted students share many characteristics is not any different. More importantly, though, is how talented and gifted students are differentiated from other learners (Renzulli, 1986). Understanding each student’s characteristics and traits specific to them is what allows for differentiated learning experiences. Clarks (2008) text, “Growing up Gifted,” breaks the lists of attributes into cognitive, affective, intuitive, and physical characteristics.

Cognitive (Thinking) Characteristics:

- Retention of large quantities of information and unusual capacity for processing information
- Advanced comprehension and synthesis of ideas
- Varied interests and high curiosity

- High level of language development and verbal ability
- Flexible and accelerated pace of thought processes
- Ability to see unusual relationships across disciplines
- Persistent and goal-directed behavior and intensity

Affective (Feeling) Characteristics:

- Large accumulation of information about emotions
- Unusual sensitivity to the feelings of others
- Keen sense of humor
- Heightened self-awareness and feelings of being different
- Unusual emotional depth and intensity
- High expectations of self and others; perfectionism
- Advanced levels of moral judgment, idealism, and justice

Physical (Sensation) Characteristics:

- Heightened sensory awareness
- Unusual discrepancy between physical and intellectual development
- Low tolerance for lag between their standards and their athletic skills

Intuitive Characteristics:

- Early involvement and concern for intuitive knowing
- Open to intuitive experiences
- Creativity in all areas of endeavor
- Ability to predict and an interest in the future. (Clark, 2008, p. 32)

Differentiated Curriculum in Talented and Gifted Education

The rationale for differentiated curriculum for talented and gifted students is that these

students' experiences must be qualitatively different from the other classroom curriculum. Tomlinson and Allan (2000) defined curriculum differentiation as "reacting responsively to a learner's needs" (para 9). The best way to differentiate curriculum is to both be planned and spontaneous; plan traditional types of lessons but seize opportunities as they come.

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Lesson 1: "Gifted and talented learners need daily challenge in their specific areas of talent" (Rogers, 2007, p. 383).

Lesson 2: "Opportunities should be provided on a regular basis for gifted learners to be unique and to work independently in their areas of passion and talent" (p. 385).

Lesson 3: Schools should "provide various forms of subject-based and grade-based acceleration to gifted learners as their educational needs require" (p. 386).

Lesson 4: Schools should "provide opportunities for gifted learners to socialize and to learn with like-ability peers" (p. 388).

Lesson 5: "For specific curriculum areas, instructional delivery must be differentiated in pace, amount of review and practice, and organization of content presentation" (p. 390).

Agricultural Education

Agriculture programs were formally part of the public education system in 1917 when the

United States Congress passes the Smith-Hughes Act (Moore, 2017). This act recognized vocational agriculture, home economics, and trade industry fields that could not be supported by earlier congressional movements. More specifically, the following areas were among major provisions with the Smith-Hughes Act:

1. The purpose of vocational education was to prepare individuals for useful employment.
2. Before states could accept money for specific vocational programs, they had to have plans for preparing teachers.
3. Individuals enrolled in vocational education had to be at least 14 years of age. This was designed to encourage students to continue their education and prevent the use of vocation dollars for funding elementary school programs.
4. State boards of vocational education were to be established. In some states the state board of education also functioned as the state board of vocational education, while in other states a separate board was created. The state board of vocational education was required to develop a detailed plan on how Smith-Hughes funds were to be used.
5. A federal board for vocational education was created. This federal board set rules and regulations concerning the implementation of vocational education programs. National and regional supervisors, who wielded immense power, were appointed by the board to oversee the implementation and operation of vocational education programs.
6. States had to match federal funds dollar for dollar.
7. Schools that received Smith-Hughes funding had to be under public control.
8. Students in the trades, home economics and the industries were required to spend half their school time in practical hands-on activities. Agricultural students were required to

have a farming project (e.g., growing a crop or raising livestock) for at least six months of the year. (Moore, 2017, para 29).

Currently, the curriculum is available to students to learn about science, business, technology of plant and animal production, and environmental and natural systems (National FFA Organization, 2016). Agriculture is systematic approach to implementing a wide variety of skills, including science, math, communications, leadership, management, and technology. The National Association for Agricultural Educators (2019) estimate that there are over 800,000 student participating in a formal program across all 50 states and three United States territories.

Summary

The review of literature in this section elaborated on the importance and legitimacy of this study. Dick and Rallis's (1991) model of Choice of Career is the best theoretical framework for this study because it is a comprehensive model. Bias is removed with a comprehensive approach to the main purpose of this study. Likewise, talented and gifted learners are unique in how they plan for a future career; they require optimal learning challenges, experiences, and open-minded career guidance. Once approached correctly, this enduring task of choosing a career will lead to a capacious and professional work-force.

Chapter 3 - Methodology

Purpose of the Study

The purpose of this study was to describe the role of secondary talented and gifted and agricultural education experiences in college major and related career choice.

To facilitate this study, the following research objectives were developed:

1. Determine characteristics of the participants used in this study.
2. Describe the population's level of involvement in secondary talented and gifted programs, secondary agriculture programs, or a combination of both.
3. Examine how a student's past experiences influenced their major choice in agriculture, food, and natural resources by involvement in talented and gifted programs, agriculture programs, or a combination of both.
4. Determine how self-concept factors pertain to the participants' expectations of a career in agriculture, food, and natural resources.

Research Design

This research design is under the conditions of a quantitative, descriptive study. Quantitative research was defined by Rossman and Rallis (2003) as "predictive statements grounded in theory or speculation about how two or more variables are related" (p. 8). The instrument used in this study consisted of Likert-type items, check-off, and open-ended fill in the blank questions.

Population

Burns (2000) defined population as "an entire group of people or objects which all have at least one characteristic in common" (p. 83). The target population of this study consisted of undergraduate students enrolled in agriculture majors at Kansas State University during the

spring 2019 semester. Majors within the College of Agriculture included Agribusiness, Agricultural Communications and Journalism, Agricultural Economics, Agricultural Education, Agricultural Technology Management, Agronomy, Animal Science and Industry, Bakery Science and Management, Feed Science and Management, Food Science and Industry, General Agriculture, Horticulture, Milling Science and Management, Pre-Veterinary Medicine, Wildlife and Outdoor Enterprise Management. Minors included Agribusiness, Agricultural Economics, Agronomy, Animal Sciences and Industry, Agricultural Technology Management, Applied Genomics and Biotechnology, Bakery Science, Cereal Chemistry, Entomology, Feed Science, Food Science, Horticulture, International Agriculture, and Plant Pathology ("College of Ag Academics," 2018).

Upon contacting the College of Agriculture personnel, emails for the undergraduate students were provided. There was no personal or identifying information attached to the email list. The accessible population for this study consisted of 2,193 students. The responding sample consisted of 378 participants with a 17.23% response rate.

Instrumentation

A single questionnaire (Appendix A) was adapted and developed for this study in October of 2018. The researcher based the instrument on a review of the literature provided by Dick & Rallis (1991), Overbay (2006), and Nevill & Super (1989). The original *Values Scale* (VS) was developed by Dorothy D. Nevill and Donald E. Super. Their instrument was 105 questions, consisted of several decades' worth of work, and was incorporated within the multinational Work Importance Study (Nevill & Kruse, 1996). The VS established validity by "(a) reviewing the values of literature of each participating country, (b) studying the lists of values thus developed, (c) equating categories with similar meanings and eliminating item

meaning duplication, (d) writing definitions in small cross national working groups and (e) reviewing the definitions in the general meeting of project directors" (Overbay, 2006, p. 26). Overbay used the instrument in his formal dissertation manuscript focusing on gifted and talented students in the Virginia Governor's School for Agriculture.

The questionnaires were administered to the population in February and March 2019. Likert-type scale questions were used, where applicable, to determine influence of question criteria (Parks, 2014). Check-off format was used for the participants to make elicit judgement responses. Open-responses provided participants with flexibility if using a mobile device (Dillman, Smyth, & Christian, 2014). Student variables on the questionnaire identified: characteristics of the participants, level of involvement in a talented and gifted program, agriculture program, or a combination of both programs, and student perceptions of past experiences in relation to a future career.

Joppe (2000) defined reliability as "the extent to which results are consistent over time and an accurate representation of the total population" (p. 1). Validity can be defined as the extent to which a concept is accurately measured in a quantitative study (Heale & Twycross, 2015). To test content validity of the questionnaire, the questionnaire was reviewed by a panel of faculty at Kansas State University within the Department of Communications and Agricultural Education in December 2018. Using provided feedback, corrections were made following the panel's suggestions. The final product consisted of 23 questions. The selection of seven items evaluated in objective three proved to have an alpha coefficient reliability of 0.82 and the selection of 18 items evaluated in objective four proved to have an alpha coefficient reliability of 0.88.

Kansas State University's Institutional Review Board (IRB) is "committed to providing a

comprehensive and compliant Research and Human Subjects program for researchers, students, and potential human subjects" (Kansas State University, 2018). Therefore, an application was completed (Appendix C) and submitted on November 12, 2018. The IRB approved the questionnaire on December 17, 2018 and the survey proceeded on February 20, 2019.

Data Collection

There was not an ideal meeting time for the population sample to complete the questionnaire. Therefore, the most practical way to implement the survey instrument was through the Qualtrics® comprehensive survey software. The Qualtrics® system provides a mobile device feature and the survey was adapted to meet the requirements.

The participants were asked to access the questionnaire electronically via an invitation in K-State Today and email. K-State Today is a daily publication sent to university emails with campus news; participation in the survey was categorized as a "volunteer opportunity." The primary method to contact the population was a series of three emails initiated by the Qualtrics® system (invitation, follow-up, and thank-you). Email format was written based on the research completed by Dillman, Smyth, & Christian (2014) (Appendix B). Students were encouraged to complete the study based on their information remaining confidential.

Data Analysis

This study's survey results were analyzed using descriptive statistics, comparisons, and t-tests using the software IBM SPSS Statistics, version 25. The significance level was determined at 0.05. Descriptive statistics consists of means and standard deviations. A t-test analysis was used when the variables were categorical.

Lidner, Murphy, & Briers (2001) concluded that nonresponse error in social science research requires a systematic application of statistically and sound procedures. To assist in

controlling for non-response error, the researcher followed up with an early to late respondent comparison by sorting out the respondents in two distinct groups (first half respondents and second half respondents). The reason behind sorting the two groups in half was to accommodate for the short timeframe that the respondents had to answer the survey. The groups were compared on their responses to the Likert scale questions using t-tests. No differences were found between the responses of early and late respondents and results are generalizable to the target population (Lidner, Murphy, & Briers). Furthermore, it should be noted that improving research in agricultural education or social science "requires periodically examination of nonresponse methods and techniques" (Lidner, Murphy, & Briers, p. 44).

Timeline and Budget

The overall timeline for this research study was from August 1, 2018 to March 29, 2019. Literature review for this research began in August 2018. Upon starting reviewing literature, it became apparent that a study similar to this was needed in both fields of agriculture and talented and gifted education. Kansas State University is located in the Midwest and the Midwest is a pertinent place of completion based upon the regional agriculture influence.

Following the literature review, Dick and Rallis's Model of Career Choice (1991) (Figure 2.1) was the theoretical framework for this study. The questionnaire was completed in October 2018 to complement the theoretical framework. The IRB application was completed and submitted on November 12, 2018. The IRB application was compliant to standards and the researcher was notified on December 17, 2018. The survey was sent out February 8, 2019 after a faculty panel review. The participants had from February 8 until March 7 to complete the survey. The data received were analyzed on March 8, 2019. Funding for this research project was internally sourced by Kansas State University's Department of Communication and Agricultural

Education.

Summary

This quantitative, descriptive study was conducted online using a single questionnaire. The instrument was assembled based upon a review of literature and assessed by a panel of faculty at Kansas State University. The population received the instrument via K-State Today and email. Questions were available in Likert-type format, check-off format, and fill in the blank response to ensure flexibility for response. The overall timeframe for the study was August 2018 to March 2019.

Chapter 4 - Results & Findings

Purpose of the Study

The purpose of this study was to describe the role of secondary talented and gifted and agricultural education experiences in major and related career choice. Students in the College of Agriculture at Kansas State University were surveyed during the spring 2019 semester to better understand the current situation of this study. Characteristics of the participants that were analyzed included gender, year in college, primary major, and if applicable, secondary major, minor, and how many minors students were pursing. Other collaborative information included involvement in a talented and gifted program, agriculture program, or a combination of both at the secondary level. Likewise, reflection upon educational experiences were examined and noted for a student's perceptions and expectations of a career in an agriculture field.

Research Objective One

The first objective was to determine characteristics of the participants used in this study. This included an analysis of all the respondents and the groups of those who identified having experiences with secondary talented and gifted programs, agriculture programs, or a combination of both programs. Data collected from the questionnaire regarded the gender, year in college, primary major, and if applicable secondary major, minor, and how many minors pursing. The accessible population for this study consisted of 2,193 students. The responding sample consisted of 378 participants with a 17.23% response rate.

All Respondents.

Gender from the participants was self-reported as either male (n=113) or female (n=265). As noted, there was a large difference among the number of male and female respondents in this study (Table 4.1). Males comprised 29.9% of the total and female comprised 70.1% of the total

respondents.

Table 4.1

Gender self-reported by all respondents (*N*=378)

Gender	f	%
Male	113	29.9
Female	265	70.1

The next characteristic reported was how many years the student had been enrolled in college (Table 4.2). The participants simply had to check if they were in their first year, second year, third year, fourth year, or have been enrolled in more than four years. Eighty-four students indicated they were in their first year of college (22.2%). Seventy-two students indicated they were in their second year of college (19.0%). One hundred and fourteen students indicated they were in their third year of college (30.1%). The third year contained the largest portion of respondents. Eighty-six students indicated they were in their fourth year of college (22.7%). Lastly, 22 (5.8%) students indicated that they have been enrolled for more than four years.

Table 4.2

Number of years enrolled in college (*N*=378)

Number of years	f	%
First year	84	22.2
Second year	72	19.0
Third year	114	30.2
Fourth year	86	22.8
More than four years	22	5.8

Students at Kansas State University have the availability to choose from 16 different primary majors within the College of Agriculture (Table 4.3). Majors available to the students included Agribusiness, Agricultural Communications and Journalism, Agricultural Economics, Agricultural Education, Agricultural Technology Management, Agronomy, Animal Science and Industry, Bakery Science and Management, Feed Science and Management, Food Science and Industry, General Agriculture, Horticulture, Milling Science and Management, Pre-Veterinary Medicine, Wildlife and Outdoor Enterprise Management. Table 4.3 has the majors listed by an abbreviated version of their complete title. Out of the total 378 respondents, the largest number of students (*n*=115) indicated Animal Science and Industry as their major (30.3%). In contrast, there was only one student (0.3%) that indicated they had General Agriculture as their primary major. The General Agriculture degree is considered to be an "undecided program" by the College of Agriculture because it is a non-degree seeking major.

Table 4.3

Primary major enrolled in College of Agriculture (N=378)

Major	f	%
Animal Science and Industry	115	30.4
Pre-veterinary Medicine	40	10.6
Agribusiness	38	10.1
Agricultural Education	33	8.7
Agricultural Economics	31	8.2
Agronomy	21	5.6
Food Science and Industry	18	4.8
Park Management and Conservation	18	4.8
Horticulture	14	3.7
Ag Communications and Journalism	12	3.2
Milling Science and Management	12	3.2
Agricultural Technology and Management	9	2.4
Bakery Science and Management	6	1.6
Feed Science and Industry	6	1.6
Wildlife and Outdoor Enterprise Management	4	1.1
General Agriculture	1	0.3

Students have the potential to select a secondary major in addition to their primary major, at Kansas State University. As listed in Table 4.4, there was 44 individuals (11.6%) who indicated they were pursuing a secondary major. The largest portion, 334 individuals (88.1%) indicated that they were not pursuing a secondary major.

Table 4.4

Number of respondents enrolled in a secondary major (*N*=378)

Answer	f	%
Yes	44	11.6
No	334	88.1

There are 14 minors available to students within the College of Agriculture: Agribusiness, Agricultural Economics, Agronomy, Animal Sciences and Industry, Agricultural Technology Management, Applied Genomics and Biotechnology, Bakery Science, Cereal Chemistry, Entomology, Feed Science, Food Science, Horticulture, International Agriculture, and Plant Pathology. Students also have the option to study more than one minor. Forty-seven percent of participants (*n*=117) reported they were pursuing at least one minor, compared to 53.0% of the participants (*n*=201) who reported they were not pursuing a minor (Table 4.5).

Table 4.5

Number of respondents pursuing a minor (*N*=378)

Answer	f	%
Yes	177	46.8
No	201	53.2

Students can choose to pursue more than one minor. There were 177 participants (46.7%) who indicated that they were pursuing a minor. After the participants indicated "yes" they were pursuing a minor, the questionnaire prompted them to provide a number in numerical form for how many. Five students responded with the specific name of the minor and was interpreted to pursing one minor. Total, there were 145 individuals (83.3%) who indicated they were pursuing only one minor. Twenty-eight individuals (16.0%) indicated they were pursing two minors and only one individual (0.7%) indicated he or she were pursing three minors (Table 4.6).

Table 4.6

Number of minors that respondents indicated they were pursuing (*n*=173)

Answer	f	%
One	144	83.3
Two	28	16.0
Three	1	0.7

Group Comparisons.

Gender from each group is provided in Table 4.7. The agricultural education experience respondents had the largest number of respondents (*n*=202) among the three groups. Females

comprised the largest portion of each group; talented and gifted females had the largest percentage with 73.6% (*n*=95). Males from the talented and gifted subgroup had the smallest percentage with 26.4% (*n*=34).

Table 4.7

Gender self-reported by groups

	Talented and Gifted (*n*=129)		Agriculture (*n*=202)		Both Programs (*n*=71)	
Gender	f	%	f	%	f	%
Male	34	26.4	65	32.2	23	32.4
Female	95	73.6	137	67.8	48	67.6
Total	129	100.0	202	100.0	71	100.0

The second group analyzed was how many years they had been enrolled in college (Table 4.8). The participants simply had to check if they were in their first year, second year, third year, fourth year, or have been enrolled in more than four years. The talented and gifted third year students had 45 respondents (34.9%), the third year agriculture students had 70 respondents with 34.7 %, and third year students for both programs had 27 respondents (38.0%). Those who indicated they were in their third year of college encompassed the largest portion.

Table 4.8

Number of years enrolled in college by group

	Talented and Gifted (*n*=123)		Agriculture (*n*=196)		Both Programs (*n*=71)	
Number of years	f	%	f	%	f	%
First year	31	24.0	40	19.8	16	25.5
Second year	19	14.7	43	21.3	12	16.9
Third year	45	34.9	70	34.7	27	38.0
Fourth year	25	19.4	40	19.8	13	18.3
More than four years	9	7.0	9	4.5	3	4.2

Table 4.9 provided an in-depth analysis of the primary majors chosen by each group. The Animal Science and Industry major was the largest portion of all three of the groups. The TAG individuals had 48 respondents (37.2%), agriculture had 60 respondents (29.7%), and both programs had 27 respondents (38.0%).

Table 4.9

Primary major by each group

	Talented and Gifted (*n*=129)		Agriculture (*n*=196)		Both Programs (*n*=71)	
Major	f	%	f	%	f	%
Agribusiness	9	7.0	24	11.9	7	9.9
Agricultural Communications and Journalism	4	3.1	7	3.5	1	1.4
Agricultural Economics	11	8.5	26	12.9	9	12.7
Agricultural Education	9	7.0	30	14.9	8	11.3
Agricultural Technology and Management	3	2.3	6	3.0	2	2.8
Agronomy	10	7.8	12	5.9	6	8.5
Animal Science and Industry	48	37.2	60	29.7	27	38.0
Bakery Science and Management	3	2.3	0	0	0	0
Feed Science and Industry	0	0	3	1.5	0	0
Food Science and Industry	6	4.7	7	3.5	2	2.8
General Agriculture	0	0	1	0.5	0	0
Horticulture	2	1.6	3	1.5	0	0
Milling Science and Management	3	2.3	3	1.5	1	1.4
Park Management and Conservation	4	3.1	4	2.0	1	1.4
Pre-veterinary Medicine	15	11.6	15	7.4	6	8.5
Wildlife and Outdoor Enterprise Management	2	1.6	1	0.5	1	1.4

The following questions were asked, if applicable to the specific individual. The talented and gifted group (*n=20*) had the largest percentage that indicated they were pursuing a secondary degree with 15.5%. Agriculture had the lowest percentage that indicated they were pursuing a secondary degree with 10.9% (*n*=22). In comparison, the majority of students from all three groups are not pursuing a secondary major (Table 4.10).

Table 4.10

Respondents by group who indicated they were enrolled in a secondary major

	Talented and Gifted (*n*=129)		Agriculture (*n*=196)		Both Programs (*n*=71)	
	f	%	f	%	f	%
Yes	20	15.5	22	10.9	9	12.7
No	109	84.5	180	89.1	62	87.3
Total	129	100.0	202	100.0	70	100.0

Participants were asked if they were pursuing a minor, in addition to the primary major or secondary major (Table 4.11). A larger portion from all three groups are pursuing a minor than a secondary major. Fifty-nine respondents (45.7%) of the talented and gifted only group are pursuing a minor, ninety-eight respondents (48.5%) from only agriculture are pursuing a minor, and thirty-four respondents (47.9%) from the both program groups are pursuing a minor.

Table 4.11

Respondents pursuing a minor by group

	Talented and Gifted (*n*=129)		Agriculture (*n*=196)		Both Programs (*n*=71)	
Answer	f	%	f	%	f	%
Yes	59	45.7	98	48.5	34	47.9
No	70	54.3	104	51.5	37	52.1
Total	129	100.0	202	100.0	71	100.0

If the students indicated they were pursuing a minor, there was an open-ended response section in which the students could answer how many minors they were pursuing (Table 4.12). The students were prompted to provide an answer in numerical form and as followed there were only one, two, or three minors listed. The vast majority of students indicated they were only pursuing one minor with percentages ranging from 77.9% to 82.3%. The least common number of minors that the groups were pursuing was three minors, 1.6% to 2.9%.

Table 4.12

Number of minor respondents who indicated they were pursuing by group

	Talented and Gifted (*n*=59)		Agriculture (*n*=98)		Both Programs (*n*=34)	
Number of minors	f	%	f	%	f	%
One	46	77.9	81	82.6	28	82.3
Two	12	20.3	16	16.3	5	14.7
Three	1	1.6	1	1.1	1	2.9

Research Objective Two

The second research objective was to describe the population's involvement in a secondary talented and gifted program, secondary agriculture program, or a combination of both. Data collected from the questionnaire included the number of semesters enrolled in each program and agriculture course specific information (SAE program and National FFA Organization membership).

Talented and Gifted Involvement.

The descriptive statistical analysis in the first objective section determined that 129 respondents in this study were involved with a talented and gifted program at the secondary level. Talented and gifted education does not have a standardized curriculum to follow and therefore to gauge the level of involvement, the individuals were asked how many semesters they were enrolled. The questionnaire prompted the individuals to provide an answer in numerical form. Two were left unanswered and 127 responses remained valid. One response included "four years" and was interpreted as eight semesters.

The range of responses was from one semester to eight semesters (Table 4.13). The largest number of responses came from the seventy individuals who indicated they were enrolled in a talented and gifted program for eight semesters (55.1%). This would have allowed them to be enrolled the duration of their secondary education (freshmen-senior years).

Table 4.13

Number of semesters enrolled in a talented and gifted program (*n*=127)

Number of semesters	f	%
Eight	70	55.1
Four	24	18.8
Two	15	11.8
Three	7	5.5
Six	6	4.7
One	4	3.1
Seven	1	0.7

Agriculture Involvement.

Agricultural education prepare students for successful careers and a lifetime of informed choices in the global agriculture, food, and natural resources systems (National FFA Organization, 2016). Students are provided with opportunities through the three main components of classroom/laboratory instruction, Supervised Agricultural Education (SAE) experiences, and student-led organizations like the National FFA Organization. There were 202 participants in this study who indicated they were involved in an agriculture program at the secondary level.

Number of semesters.

The questionnaire was kept in consistent format to ask how many semesters the participants were enrolled in an agriculture program (Table 4.14). Responses had a range from one semester to eight semesters. Two responses were left unanswered and eight responses could not be interpreted. There was a total of 194 valid responses. One hundred thirty-three participants (68.5%) indicated they were enrolled in an agriculture program for eight semesters. Two participants (1.3%) indicated they were enrolled in an agriculture program for five semesters.

Table 4.14

Number of semesters enrolled in an agriculture program (*n*=194)

Numbers of semesters	f	%
Eight	133	68.5
Four	27	13.9
Six	13	6.7
Two	7	3.6
Three	6	3
Seven	3	1.5
One	3	1.5
Five	2	1.3

Note. There were 194 valid responses uses for the number of semesters enrolled in an agriculture program.

SAE program.

A SAE program provides students with work-based learning. The participants had to simply check “yes” if they had a SAE program or “no” if they did not have a SAE program at the secondary level. Two responses were determined by SPSS missing within the system and a total

of 200 responses were considered valid. There were 159 participants from the agriculture respondents (79.5%) who indicated he or she had experience with a SAE program. Forty-one participants (20.5%) indicated they did not have experiences with an SAE program (Table 4.15).

Table 4.15

Number of respondents involved with a SAE program (n=200)

	f	%
Yes	159	79.5
No	41	20.5
Total	200	100.0

FFA membership

The National FFA Organization promotes leadership through personal growth. The questionnaire addressed FFA membership in a similar format to SAE program experiences, excluding alumni chapter participation. There were 169 respondents, 84.5% who indicated they had been members of the National FFA Organization. Thirty-one respondents (15.5%) indicated they had not members of the National FFA Organization (Table 4.16).

Table 4.16

FFA members (n=200)

	f	%
Yes	169	84.5
No	31	15.5
Total	200	100.0

Both Programs.

Seventy-one participants indicated he or she had experience with a talented and gifted program and an agriculture program at the secondary level. Table 4.17 shows how many semesters the 71 participants were involved in a talented and gifted and agriculture program. Eight semesters was the most common response for both groups while talented and gifted had a frequency of 44 (61.9%) and agriculture had a frequency of 45 (63.4%). The least common response was for agriculture with one semester and talented and gifted with seven semesters (1.4%).

Table 4.17

Semesters enrolled in both programs (n=71)

	Talented and Gifted		Agriculture	
Numbers of semesters	f	%	f	%
One	2	2.8	0	0
Two	7	9.8	3	4.2
Three	4	5.6	4	5.6
Four	10	14.0	13	18.3
Six	3	4.2	4	5.6
Seven	1	1.4	2	2.8
Eight	44	61.9	45	63.4

Out of 71 participants who indicated they had been involved with a talented and gifted and an agriculture program, 56 participants indicated they were involved with a SAE program (78.9%) (Table 4.18). Fifteen participants from both programs indicated they were not involved

with a SAE program (21.1%).

Table 4.18

Number of respondents from both program involved with a SAE (n=71)

	f	%
Yes	56	78.9
No	15	21.1
Total	71	100.0

The last section analyzed among the both groups, if there was membership within the National FFA Organization (Table 4.19). Membership excluded alumni participation. Once again, the largest portion of participants (*n*=63) indicated they were members of the National FFA Organization (88.7%).

Table 4.19

Number of respondents who were FFA members (n=71)

	f	%
Yes	63	88.7
No	8	11.3
Total	71	100.0

Research Objective Three

The third objective was to examine how a students' past experiences influenced his or her major choice in agriculture, food, and natural resources by involvement in talented and gifted programs, agriculture programs, or a combination of both. Comparisons among each subgroup

included talented and gifted to non-talented and gifted, agriculture to non-agriculture, and both programs to those not involved with both programs. A five-point Likert-type scale was used to indicate the level of influence each factor had on a future career choice. The rating "5" indicated "Extremely Important," a rating of "3" indicated "Moderately Important," and 1 indicated "Not at all Important." Each experience with a mean score of 3.0 or greater was considered influential based upon consistency from the survey tool given in earlier research. From the listed influences, talented and gifted, agriculture, and those from both programs were able to rank the experiences in order of importance. The rating was "1" for "Most Important" and "7" as "Least Important."

Talented and Gifted, Agriculture, and Both Programs.

Means, standard deviations, and ranks are reported in Table 4.20. This table compares the experiences of those who were in a talented and gifted programs (*n*=123), in an agriculture program, (*n*=196), and for those who were in both programs (*n*=70). The talented and gifted respondents indicated that the curriculum factor (M=2.92) did not impact their major of study choice. The agriculture and both programs groups indicated that all seven of the factors were influential with means greater than 3.0. Work experiences across all three groups was the most influential. The least influential factor differed among the groups.

Table 4.20

Influence of past educational experiences by each group

	Talented and Gifted (*n*=123)			Agriculture (*n*=196)			Both Programs (*n*=70)		
Factor	M	SD	Rank	M	SD	Rank	M	SD	Rank
Curriculum	2.92	1.27	7	3.30	1.17	6	3.24	1.12	5
Extracurricular activities	3.83	1.23	2	4.13	1.03	2	4.24	0.97	2
Intracurricular activities	3.20	1.27	4	3.61	1.12	4	3.67	1.07	4
Receiving grades	3.12	1.24	5	3.31	1.11	5	3.24	1.16	6
Student organizations	3.30	1.47	3	3.87	1.14	3	4.03	1.16	3
Test scores	3.04	1.27	6	3.16	1.14	7	3.13	1.23	7
Work experiences	4.08	1.12	1	4.26	0.90	1	4.37	0.90	1

Note. Evaluations on a 5-point scale (5=Extremely Important, 3=Moderately Important, 1=Not at all Important)
Factors with a mean score of 3.0 or greater were considered influential

Talented and Gifted and Non-Talented and Gifted.

The talented and gifted and non-talented and gifted respondents' reflections of past academic experiences are displayed in Table 4.21. There were 123 respondents in the talented and gifted group and 236 in the non-talented and gifted group. Curriculum was the only factor among the talented and gifted and non-talented and gifted that was not influential, as it did not have a mean greater than 3.0.

The null hypothesis states that there is no different in influence among past academic experiences between those involved in talented and gifted and those who were not involved in talented and gifted. The alternate hypothesis states that there is a difference in influence among

past academic experiences between those involved in talented and gifted and those not involved in talented and gifted. Independent *t*-tests were conducted on the data based off of each factor. The results are displayed in Table 4.21. As shown, there was a significant difference in influence of past academic experiences from work experiences between those who were involved in talented and gifted and those who were not involved in talented and gifted. Therefore, the null hypothesis was rejected.

Table 4.21

Talented and gifted and non-talented and gifted influence factors

Factor	Student	n	M	SD	t	p
Curriculum	TAG	123	2.92	1.27	-0.15	0.88
	Non-TAG	236	2.94	1.33		
Extracurricular activities	TAG	123	3.12	1.24	0.70	0.48
	Non-TAG	236	3.25	1.18		
Intracurricular activities	TAG	123	3.04	1.27	0.39	0.70
	Non-TAG	236	3.10	1.20		
Receiving grades	TAG	123	3.83	1.23	-0.92	0.36
	Non-TAG	236	3.73	1.31		
Student organizations	TAG	123	3.20	1.27	0.81	0.42
	Non-TAG	236	3.14	1.27		
Test scores	TAG	123	4.08	1.28	-0.45	0.66
	Non-TAG	236	3.82	1.22		
Work experiences	TAG	123	3.30	1.47	1.95	0.05*
	Non-TAG	236	3.17	1.36		

*$p \leq .05$

Agriculture and Non-Agriculture.

There were 196 respondents who indicated they were involved in an agriculture program, compared to 163 respondents who indicated they were not involved in an agriculture program (Table 4.22). All seven of the means for the academic experiences for the agriculture group were larger than the seven means for the non-agriculture group.

The null hypothesis states there is no relationship among the designated past academic

experiences for agriculture respondents and non-agriculture respondents. The alternate hypothesis states that there is a relationship among the designated past academic experiences for agriculture respondents and the non-agriculture respondents. Table 4.22 describes the difference of mean scores between all factors. A statistically significant difference existed for the following factors: curriculum (ag M=3.30, non-ag M=2.49, *t*=6.03), extracurricular activities (ag M=4.13, non-ag M=3.32, *t*=6.11) intracurricular activities (ag M=3.31, non-ag M=2.62, *t*=7.87), student organizations (ag M=3.87, non-ag M=2.44, *t*=11.05), and work experiences (ag M=4.26, non-ag M=3.50, *t*=6.05), Thus, the null hypothesis was rejected and it was concluded that the alternate hypothesis was accepted based upon the listed factors: curriculum, extracurricular activities, intracurricular activities, student organizations, and work experiences.

Table 4.22

Agriculture and non-agriculture influence factors

Factor	Student	n	M	SD	t	p
Curriculum	Ag	196	3.30	1.17	6.03	0.01*
	Non-Ag	163	2.49	1.34		
Extracurricular activities	Ag	196	4.13	1.03	6.11	0.01*
	Non-Ag	163	3.32	1.41		
Intracurricular activities	Ag	196	3.31	1.12	7.87	0.01*
	Non-Ag	163	2.62	1.23		
Receiving grades	Ag	196	3.31	1.12	1.78	0.08
	Non-Ag	163	3.08	1.29		
Student organizations	Ag	196	3.87	1.14	11.05	0.01*
	Non-Ag	163	2.44	1.28		
Test scores	Ag	196	3.16	1.14	1.40	0.16
	Non-Ag	163	2.98	1.30		
Work experiences	Ag	196	4.26	0.90	6.05	0.01*
	Non-Ag	163	3.50	1.36		

*$p \leq .05$

Both Programs and Not in Both Programs.

Means and standard deviations for those who were involved in both programs or not involved in both programs are reported in Table 4.23. There was a larger number of respondents who were not involved with both programs (*n*=289) than those who were involved in both programs (*n*=70). Both of the groups indicated that work experiences were the most important factor for choosing a major in agriculture. Yet, those involved in both programs indicated that

test scores was the least contributing factor (M=3.13, SD=1.23) and those of not involved in both programs indicated that curriculum was the least contributing factor (M=2.86, SD=1.34).

The null hypothesis states there is no relationship among the designated past academic experiences for those who were involved in both programs and for those who were not involved in both programs. The alternate hypothesis states that there is a relationship among designated past academic experiences for those who were involved in both programs and for those who were not involved in both programs. Independent *t*-tests were conducted on the data. A statistically significant difference existed for the following factors: curriculum (both M=3.24, not both M=2.86, *t*=2.47), extracurricular activities (both M=4.24, not both M=3.65, *t*=4.26), intracurricular activities (both M=3.67, not both M=3.03, *t*=3.83), student organizations (both M=4.03, not both M=3.02, *t*=6.23), and work experiences (both M=4.30, not both M=3.02, *t*=6.23), Thus, the null hypothesis was rejected and it was concluded that there was a significant difference among the curriculum, extracurricular activities, intracurricular activities, student organizations, and work experiences for respondents from both programs and not involved in both programs.

Table 4.23

Both programs and not both programs influence factors

Factor	Student	n	M	SD	t	p
Curriculum	Both Programs	70	3.24	1.12	2.47	0.02*
	Not both programs	289	2.86	1.34		
Extracurricular activities	Both Programs	70	4.24	0.97	4.26	0.01*
	Not both programs	289	3.65	1.32		
Intracurricular activities	Both Programs	70	3.67	1.07	3.83	0.01*
	Not both programs	289	3.03	1.28		
Receiving grades	Both Programs	70	3.24	1.16	0.31	0.76
	Not both programs	289	3.19	1.21		
Student organizations	Both Programs	70	4.03	1.16	6.23	0.01*
	Not both programs	289	3.02	1.38		
Test scores	Both Programs	70	3.13	1.23	0.36	0.72
	Not both programs	289	3.07	1.22		
Work experiences	Both Programs	70	4.37	0.90	6.23	0.00*
	Not both programs	289	3.80	1.23		

*p<.05

Research Objective Four

The fourth objective was to determine how self-concept factors pertain to the participants' expectations of a career in agriculture, food, and natural resources. More specifically, the respondents had to choose "yes" they had chosen their career in the field of agriculture and natural resources to be included in the last analysis. An open-response question

regarded their specific choice of career. A five-point Likert-type scale was used to determine the likeliness of changing minds about the specific career. The rating "1" indicated "Extremely Likely," a rating of "3" indicated "Neither Likely nor Unlikely," and the rating of "5" indicated "Not Likely at All." A series of 18 questions with a five-point Likert-type scale was utilized to indicate the level of expectation one had with a future career. The rating "5" indicated "Extremely Important," a rating of "3" indicated "Moderately Important," and 1 indicated "Not at all Important."

Talented and Gifted and Non-Talented and Gifted Career Expectations.

The talented and gifted and non-talented and gifted respondents' expectations of a future career are included in Table 4.24. There were 89 respondents in the talented and gifted group and 159 in the non-talented and gifted group that had selected that he or she had chosen a future career in agriculture, food, and natural resources. The talented and gifted group indicated that "use all my skills and knowledge" was the most important factor for a future career (M=4.45, SD=0.63) and "do risky things" (M=2.60, SD=1.07) was the least important. The non-talented and gifted group indicated that "develop as a person" was the most important factor for a future career (M=4.32, SD=0.79) and "tell others what to do" (M=2.83, SD=1.10) was the least important.

The null hypothesis states that there is no difference in influence among career expectations between those involved in talented and gifted and those who were not talented and gifted. The alternate hypothesis states that there is a difference in career expectations between those involved in talented and gifted and those not involved in talented and gifted. Descriptive statistics and independent *t*-tests were conducted on the data based off of each factor. As shown, there was no difference in any of the 18 listed factors and the null hypothesis was accepted.

Table 4.24

Talented and gifted and non-talented and gifted career expectations

Factor	Student	n	M	SD	t	p
Use all my skills	TAG	86	4.45	0.68	1.36	0.17
	Non-TAG	159	4.32	0.81		
Develop as a person	TAG	86	4.43	0.66	0.61	0.54
	Non-TAG	159	4.37	0.79		
Help people with problems	TAG	86	4.27	0.76	1.32	0.18
	Non-TAG	159	4.11	0.92		
Have results	TAG	86	4.14	0.87	0.17	0.85
	Non-TAG	159	4.12	0.83		
Interact with others	TAG	86	4.08	1.02	0.28	0.78
	Non-TAG	159	4.04	0.97		
Act on my own	TAG	86	3.81	1.01	-0.16	0.87
	Non-TAG	159	3.84	0.99		
Every day be different	TAG	86	3.80	1.02	0.68	0.49
	Non-TAG	159	3.70	1.09		
Have a good space work in	TAG	86	3.79	1.06	-0.67	0.50
	Non-TAG	159	3.88	0.97		
Make life beautiful	TAG	86	3.78	1.08	0.03	0.97
	Non-TAG	159	3.77	1.09		
Live according to my own ideas	TAG	86	3.77	0.93	0.04	0.96
	Non-TAG	159	3.76	0.99		
Get ahead	TAG	86	3.64	1.05	-0.54	0.59
	Non-TAG	159	3.71	0.95		
Discover, develop, design	TAG	86	3.58	1.00	0.19	0.85
	Non-TAG	159	3.55	1.17		
High standard of living	TAG	86	3.45	1.07	0.39	0.69
	Non-TAG	159	3.40	1.10		
Be with friends	TAG	86	3.31	1.14	-1.53	0.13
	Non-TAG	159	3.54	1.08		
Be admired	TAG	86	3.28	1.25	-1.09	0.27
	Non-TAG	159	3.46	1.21		
Get a lot of exercise	TAG	86	3.27	1.05	-1.92	0.06
	Non-TAG	159	3.53	1.03		
Tell others what to do	TAG	86	2.62	1.06	-1.46	0.14
	Non-TAG	159	2.83	1.10		
Do risky things	TAG	86	2.60	1.07	-1.17	0.24
	Non-TAG	159	2.79	1.19		

Agriculture and Non-Agriculture Career Expectations.

The agriculture and non-agriculture respondents' expectations of a future career are included in Table 4.25. There were 148 respondents in the agriculture group and 97 in the non-agriculture group that had selected that he or she had chosen a future career in agriculture, food, and natural resources. The agriculture group indicated that "develop as a person" was the most important factor for a future career (M=4.44, SD=0.66) and "do risky things" (M=2.76, SD=1.22) was the least important. The non-agriculture group indicated that "develop as a person" was the most important factor for a future career (M=4.32, SD=0.79) and "tell others what to do" (M=2.71, SD=1.13) was the least important.

The null hypothesis states that there is no difference in influence among career expectations between those involved in an agriculture program and those who were not in an agriculture program. The alternate hypothesis states that there is a difference in career expectations in those who were in an agriculture program and those who were not in an agriculture program. As shown, there was a significant difference among the "Act on my Own" factor and the alternative hypothesis was accepted.

Table 4.25

Agriculture and non-agriculture career expectations

Factor	Student	n	M	SD	t	p
Use all my skills	Ag	148	4.40	0.68	0.83	0.41
	Non-Ag	97	4.32	0.81		
Develop as a person	Ag	148	4.44	0.80	1.28	0.20
	Non-Ag	97	4.32	0.84		
Help people with problems	Ag	148	4.20	0.91	0.78	0.43
	Non-Ag	97	4.11	0.83		
Have results	Ag	148	4.16	0.83	0.81	0.41
	Non-Ag	97	4.07	0.87		
Interact with others	Ag	148	4.13	0.96	1.40	0.16
	Non-Ag	97	3.95	1.02		
Act on my own	Ag	148	4.00	0.95	3.37	0.00*
	Non-Ag	97	3.57	1.03		
Every day be different	Ag	148	3.77	1.01	0.57	0.57
	Non-Ag	97	3.69	1.02		
Have a good space work in	Ag	148	3.89	0.98	0.83	0.41
	Non-Ag	97	3.78	1.04		
Make life beautiful	Ag	148	3.71	1.09	-0.18	0.24
	Non-Ag	97	3.88	1.07		
Live according to my own ideas	Ag	148	3.78	0.96	0.27	0.79
	Non-Ag	97	3.74	0.98		
Get ahead	Ag	148	3.72	0.92	0.73	0.46
	Non-Ag	97	3.63	1.08		
Discover, develop, design	Ag	148	3.58	1.12	0.31	0.76
	Non-Ag	97	3.54	1.12		
High standard of living	Ag	148	3.45	1.10	0.52	0.60
	Non-Ag	97	3.37	1.07		
Be with friends	Ag	148	3.45	1.08	-0.15	0.88
	Non-Ag	97	3.47	1.14		
Be admired	Ag	148	3.41	1.21	0.26	0.79
	Non-Ag	97	3.37	1.25		
Get a lot of exercise	Ag	148	3.45	1.05	0.95	0.93
	Non-Ag	97	3.43	1.05		
Tell others what to do	Ag	148	2.78	1.07	0.50	0.61
	Non-Ag	97	2.71	1.14		
Do risky things	Ag	148	2.70	1.11	-0.44	0.66
	Non-Ag	97	2.76	1.22		

$p \leq .05$

Both Programs and Not of Both Programs Career Expectations.

Table 4.25 lists career expectations from respondents involved in both of the programs and for those not involved in both programs. There were 55 respondents in the both programs group and 190 not in both programs group that selected that he or she had chosen a future career in agriculture, food, and natural resources. Both group respondents indicated that "use all my skills and knowledge" was the most important factor for a future career (M=4.49, SD=0.61) and "do risky things" (M=2.53, SD=0.96) was the least important. The not in both programs group indicated that "develop as a person" was the most important factor for a future career (M=4.39, SD=0.75) and "do risky things" (M=2.78, SD=1.20) was the least important.

The null hypothesis states that there is no difference in influence among career expectations between those involved in both programs and for those of not in both programs. The alternate hypothesis states that there is a difference in career expectations in those who were involved in both program and for those of not in both programs. As shown, there was a significant difference among the "Act on my Own" factor and the alternative hypothesis was accepted.

Table 4.26

Both programs and not of both programs career expectations

Factor	Student	n	M	SD	t	p
Use all my skills	Both programs	55	4.49	0.61	0.83	0.41
	Not both programs	190	4.33	0.76		
Develop as a person	Both programs	55	4.40	0.60	1.28	0.20
	Not both programs	190	4.39	0.75		
Help people with problems	Both programs	55	4.24	0.74	0.78	0.43
	Not both programs	190	4.15	0.90		
Have results	Both programs	55	4.20	0.85	0.81	0.41
	Not both programs	190	4.11	0.84		
Interact with others	Both programs	55	4.05	1.04	1.40	0.16
	Not both programs	190	4.06	0.97		
Act on my own	Both programs	55	4.07	0.94	3.37	0.00*
	Not both programs	190	3.76	1.01		
Every day be different	Both programs	55	3.85	0.99	0.57	0.57
	Not both programs	190	3.71	1.08		
Have a good space work in	Both programs	55	3.80	1.03	0.83	0.41
	Not both programs	190	3.86	0.99		
Make life beautiful	Both programs	55	3.85	1.04	-0.18	0.24
	Not both programs	190	3.75	1.10		
Live according to my own ideas	Both programs	55	3.78	0.85	0.27	0.79
	Not both programs	190	3.76	1.00		
Get ahead	Both programs	55	3.80	0.95	0.73	0.46
	Not both programs	190	3.65	0.99		
Discover, develop, design	Both programs	55	3.47	0.98	0.31	0.76
	Not both programs	190	3.59	1.14		
High standard of living	Both programs	55	3.56	1.01	0.52	0.60
	Not both programs	190	3.37	1.11		
Be with friends	Both programs	55	3.33	1.12	-0.15	0.88
	Not both programs	190	3.50	1.10		
Be admired	Both programs	55	3.20	1.22	0.26	0.79
	Not both programs	190	3.45	1.22		
Get a lot of exercise	Both programs	55	3.29	1.03	0.95	0.93
	Not both programs	190	3.48	1.05		
Tell others what to do	Both programs	55	2.64	1.08	0.50	0.61
	Not both programs	190	2.79	1.10		
Do risky things	Both programs	55	2.53	0.96	-0.44	0.66
	Not both programs	190	2.78	1.20		

p≤.05

Career Choices.

The respondents were prompted to provide their specific career choice with an open response to provide additional legitimacy of a career choice. The results are displayed in collaborative fashion as the responses were interpreted to the best ability (Table 4.26). It should be noted that some of the careers were very specific, with job title names and specific companies. Other careers were general with daily functions or career area.

Table 4.27

Careers provided by respondents

Career	Career
Ag Production/Operations Management	Grain Operations Manager/Supervisor
Agribusiness - Commodity Trader	Grain Origination
Agricultural Communications	Greenhouse Production
Agricultural Insurance	High School Agriculture Teacher/FFA advisor
Agricultural Law & Policy	Integrated Solutions Specialist
Agricultural Professor	International Agriculture Development
Agriculture Advertising and Marketing	International Business Development
Agriculture Finance	Landscape Management
Agriculture Lawyer	Management Trainee
Agronomist	Milling
Animal Behaviorist	Mixed Veterinarian
Animal Health Research	Molecular Biology Research
Animal Science R&D	Monogastric Nutrition consultant
Animal Trainer	Nutritionist
Banking	Operations Management at ADM
Bioinformatics/Computational Biology	Pet Food Product Research and Development
Brewing/Distilling	Plant Genetics
Chemical Sales Representative	Public Lands Administration
Communications Leadership Development	Rangeland Management
Crop Consultant	Research & Development (R&D)
Equine Nutrition	R&D for a Confectionary or Pastry Company
Extension (4-H Agent)	Stock Show Administration
Farming and Ranching	Superintendent at a Country Club/Sports Field
Federal Grain Inspector	Sustainable Agriculture Development
Feed Sales	Theriogenologist
Feedlot Manager	Urban Agriculture
Flour Milling	Veterinarian
Food and Beverage Industry	Work for Machinery Dealership
Game Warden/Conservation officer	Work for state or federal government
Golf Course Management	Work with BLM
Grain Merchandiser	Zookeeper

Chapter 5 -Discussion, Conclusions, and Recommendations

This chapter contains conclusions and discussion of the findings of this study and recommendations for practice. The agriculture sector is changing and therefore there is a need to recruit talented and gifted individuals into the industry. Students in the College of Agriculture at Kansas State University were used in this study in order to understand how the statement problem could be better assessed in the future.

Discussion and Conclusions

Objective One.

The respondents of this study were predominately females. The female to male ratio was nearly a two to one margin as there were 265 females and 113 males who participated. One hundred fourteen respondents indicated they were in their third year of college for this study. One hundred fifteen respondents indicated that they were majoring in Animal Science and Industry. Only 44 respondents (11.6%) indicated they were pursuing a secondary major. Some majors within the College of Agriculture require a student to study a minor and 147 respondents indicated that they were pursing at least one minor. Additionally, 28 respondents indicated they were pursuing two minors and one respondent indicated they were pursing three minors.

Traditionally, gender roles in the work force have been uneven (Bronsetin & Farnsworth, 1998). The findings in objective one concluded that females comprised the largest portion of this study. During the 2019 spring semester, there were 1,183 females (53.94%) pursing an agriculture degree at Kansas State University. Likewise, there were 897 students pursuing an Animal Science degree and 665 (74.13%) of those students were female (College of Agriculture Academic Programs, 2019). This conclusion is a reflection of how the number of females pursing an agriculture degree nationwide is increasing (Hopkins, 2016). Females will continue to

make important contributions to the agricultural and rural economies of all regions with hierarchical styles of thinking (SOFA Team & Doss, 2011; Mihyeon, 2009).

Kansas has a strong agricultural tradition that "predates its statehood and continues to be a significant contributor to the state's economic well-being" (Kansas Department of Agriculture, 2016, para 1). In the top 10 agriculture employment areas in Kansas, beef cattle ranching and farming (including feedlots and dual-purpose ranching and farming) is the top employer with 42,501 employees (Kansas Department of Agriculture). As the world population grows and as demand for animal protein increases, Kansas farmers and ranchers will play a critical role in feeding Kansas families and families around the world. Therefore, the largest number of students majoring in Animal Science and Industry is a reflection of the agriculture economy and work force in Kansas.

Most recently, an article completed by the website WayUp addressed why students may not seek out a secondary major; areas of emphasis included additional time spent studying, missing out on extracurricular activities, and increased cost of tuition (n.d.). Students have to complete general education courses, along with major-specific courses to graduate with a degree. If there are more than one degrees being sought out and if a student plans to graduate on-track, he or she must complete an intense course load. Extracurricular activities at the post-secondary level have the potential to be equally as influential as curriculum provided to a student and can be considered value added endeavors in the long-term (Buckley & Lee, 2018). Yet, the extracurricular activities require more time and effort put forth of a student and a student must choose their efforts wisely. Data form the National Council on Education Statistics estimates that a degree at a public four-year institution can exceed $30,000 (2014). This large cost can easily deter one from pursuing a secondary major.

Objective Two.

Among the groups analyzed, those who indicated that they had agriculture experiences at the secondary level had the largest number of respondents. There was a smaller number of respondents who indicated that they had talented and gifted education experiences at the secondary level. The results from objective two conclude that the vast majority of respondents who indicated they were involved in talented and gifted, agriculture, or a combination of both programs were able to participate throughout their entire secondary education. Seventy-seven percent (*n*=159) participants indicated that they had experience with a SAE program. Eighty-five percent (*n*=169) of respondents indicated they were members of the National FFA Organization.

Identifying students as talented and gifted is an in-depth process that requires both quantitative and qualitative examination (Clark, 2008). Conceptualizing a gifted students' abilities includes cognitive, affective, physical, and intuitive analysis and may be identified in one or several of the areas. The abilities can be transferred to intellectual capital, which is the driving force of the economy that results in highly values materials, wealth production, and professional advancement (Renzulli, 2002).

Having access to a talented and gifted program depends on the school district, what the district has funding for, and having a qualified educator. School districts, especially districts located in rural areas do not always have access to the necessary resources to implement an effective program. In 2017, the Javits program dispersed $12 million in federal funds for talented and gifted programs. Yet, funding available at the state level is not mandated, nor consistent.

It is estimated that less than 61% of educators have any training in gifted interventions and needs (The Kansas Associated for the Gifted, Talented, and Creative, 2019). Almost everyone agrees that the teacher has the most significant impact on a classroom learning

environment (Clark, 2008). Pre-service development, in-service training, professional development, and intervention are a series of steps that can attribute to support of the educator. Continually, students may not be active in a talented and gifted program due to parental reasons, personal goals, and curriculum interests. Educators should take note of this when differentiating individual needs of the student in the other classrooms.

According to the National Association for Agricultural Educators (NAAE) there are approximately 800,000 students currently enrolled in a formal agriculture program. The students that participated for eight semesters were allowed to experience the mission of agricultural education to the fullest. As listed, the mission of agricultural education is to "prepare students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber and natural resources system" (Kansas Department of Agriculture, 2016, para 2).

The origin of a SAE program can be traced to the early 1900's. Rufus W. Stimson is known as the "father of agricultural education" as he is credited for developing the project method of teaching and implementation of SAE programs. (Lewis, Rayfield, & Moore, 2012). The National FFA Organization (2012) lists SAE programs in the areas of exploratory, experimentation and research, entrepreneurship, and placement. Tangible criteria for a project are a mixture of hands-on activities, practicality, leadership, and management. The broad spectrum of SAE areas allow students to explore multiple careers and occupations, develop and apply industry-specific and occupational skills, and learn professional workplace behavior (Swafford, 2018; National FFA Organization, 2017).

The last component is student leadership organizations. The National FFA Organization is a dynamic youth organization that "changes lives and prepares members for premier leadership, personal growth, and career success through agricultural education" (National FFA

Organization, 2019). Having a large number of participants in the organization is a reflection of the discipline-specific competencies that are needed in a growing field full of diversity and new opportunities (Bunshaft et.al., 2015).

Objective Three.

The findings of this study, can conclude that a student's past experiences have the potential to influence their major of study in college. The experiences were evaluated by involvement in talented and gifted, agriculture, and both programs. Work experiences among all three groups was the most influential. There was a significant difference in the talented and gifted and non-talented and gifted groups among work experiences. Curriculum, extracurricular activities, intracurricular activities, student organizations, and work experiences had significant difference from the agriculture and non-agriculture groups and from the both programs and not of both program groups.

Dewey (1938) believed there was a connection between education and personal experiences that had an impact on further choices and experiences (Swafford, 2018; Retallick & Martin, 2008). Researchers have dedicated their lives to exploring various styles of individuals to explain students' success in school and real-world performance (Sternberg et. al., 1995). Work experiences, the most influential factor from past academic experiences, allows students to match an individual with interest based on job characteristics, major attributes, and psychological and social benefits of a given major (Beggs et. al., 2008). Likewise, past experiences with curriculum, extracurricular activities, intracurricular activities, and student organizations are directly correlated with the theoretical framework for this study. Past academic experiences develop one's thinking and ability to transfer skill to the work force with vocational training.

The goal of education should be to find an appropriate academic environment which

fosters a student's learning environment and allows he or she to succeed (Levy, 2017). Talented and gifted students cannot be left behind in the education to fend for themselves. The first step to change includes structuring a program for the distinct needs of the learners (Clark, 2008). The influential educational learning experiences will come from this environment. Continually, many of the past educational experience factors that were evaluated are either related or influencers on agricultural education. Utilizing similar curriculum influences on talented and gifted programs will likely develop interests or to pursue a potential career path in agriculture (Kim, 2011).

Objective Four.

To satisfy objective four, statistical analysis was ran based on the 18 Likert-type questions. More specifically, the respondents needed to indicate that he or she had chosen a future career in agriculture, food, and natural resources to be included in this analysis. The most important factors among each group varied with "use all my skills and knowledge" and "develop as a person." The least important factors also varied among the groups as "do risky things" and "tell others what to do."

Career success is a subjective concept. Driver (1982) concluded that what some individuals value are characterized as a continuing process of growth and fulfillment and once again can change throughout the duration of one's lifetime. In 1986, Derr emphasized career orientations with five categories but emphasized the changes of fulfillment through career success. The most important factors "use all my skills and knowledge" and "develop as a person" closely related to Derr's fourth category with having a career that demands excitement and constant challenge.

While the respondents in this study have similar experiences at a university like Kansas State, he or she's age may vary greatly. The early work of Super (1957) indicated that talented

and gifted students tend to make career decisions earlier than their peers (Overbay, 2006). The majority of respondents in this study were in their third year of college and more likely to be at an advanced stage of career development. This response concludes yet another concept in the theoretical framework that career development is a stair-step process through one's life and can be modeled with a near universal architectural structure like a pyramid.

When asked what the respondents' future career choice was, it became apparent that there was a difference among a specific job title or company to work with, rather than in a general field. While students come from diverse backgrounds, this finding declared that there is a broad spectrum of careers available in the field of agriculture, food, and natural resources. Agriculture companies must educate students and recruit prospective employees as soon as possible in order to attract a high-quality work-force. Lastly, the differences among specific job title or company to work with, rather than in a general field reassures that successful recruiting is possible.

Recommendations

Areas of Research.

Due to the complexity of this study and the lack of quantifiable information within the talented and gifted realm of education, it should be noted that further research in this field would be beneficial. One recommendation of this study is to formulate and incorporate a value assessment specific to talented and gifted individual's vocational beliefs of the agriculture field. Clark's (2008) cognitive, affective, intuitive, and physical characteristics would be a sanctioned place to start when formulating a tool. Scholarly research in areas of agriculture involvement across all levels of education could serve as secondary resources.

Research completed by educators in the secondary classroom is tough to implement. The educators are already daunted by attention needed from students, curriculum planning, and or

balancing a successful FFA chapter and SAE programs. Yet, agricultural education pedagogy would benefit from case study scenarios. Case studies would have the potential to provide a natural educating scenario for the teacher without disrupting classroom instruction. While there is little to no research completed in this area, publication must start somewhere.

In contrast, a longitudinal study emphasizing professional development opportunities for teachers could track the effectiveness of disseminating instructional practices. The opportunities could include formal workshops, webinars, and collaboration among other participants. Pre-service teacher and currently licensed teachers from all disciplines could approach the professional development opportunities.

Other factors that prevent a student from being involved in a talented and gifted program include low socioeconomic status, stereotypes, lack of cultural diversity, and parental reasoning. Students that come from a household with a low socioeconomic household tend to have family patterns where education is of lesser value (Clark, 2008). Stereotypes and the lack of cultural diversity work hand in hand together. Talented and gifted individuals have numerous varying attributes (physical and cognitive) and breaking the narrow-mind mindsets of what giftedness entails is critical. Parents themselves also have their own reasons of why they do not want their child to participate in a talented and gifted program. This may include putting a "label" on their child and believing that their child is different than others. Even when this is the case, further research would help educate parents to meet the needs of their children.

Areas of Practice.

Conceivable change comes from those who believe it is possible. As a proactive educator, making quick decisions and living in the moment continually will advance the learning environment for a student. Generally speaking, the listed strategies are simple steps for educators

to follow: focus on the learning process, know individual differences in pedagogy, aim to develop new constructs and concepts of learning styles, enhance learning achievement, and construct assessment as a foundation for the exposition of theory (Riding & Rayner, 1998, p. 50).

More specifically in the talented and gifted and agriculture classrooms, educational programming for students with exceptional abilities is currently driven by acceleration, ability grouping, and enrichment (Feldhusen, 1989). Acceleration is a misunderstood concept and the goal of acceleration is curricular flexibility/access, regardless of age or level (Boatman, 1997). Acceleration in the classroom provides opportunity to work self-paced through the standard curriculum. Teachers facilitate and intervene as necessary and it is very important to emphasize social and emotional development. The second method is ability grouping and is collected based on a student's mastery level of instruction. The last method is enrichment and can be broadly defined as any activity outside of the regular curriculum that is provided in the formal educational setting. A wide range of activities include field trips, independent projects, and science projects.

Another recommendation is for school districts at the secondary level to address vocational counseling for talented and gifted individuals in a holistic manner. Administrators, teachers, and counselors need to be able to address multipotentiality (interests, needs, and values) of gifted learners and how their career planning differs based on this factor. interests, needs, and values of each individual student (Davidson Institute, 1990). When a gifted student commits to a task, in this case a career, they need to be reassured that a career is a value-based activity, will provide them satisfaction, and use their skills and knowledge (Kurt & Chenault, 2016). Many gifted students also regard their work as self-expression and endure the mission put in front of them.

Summary

The findings of this study concluded that talented and gifted programs did not have a large effect on students choosing agriculture as their major. While the field of research continues to grow in all areas of agriculture, including recruitment and retention, post-secondary institutions can work towards recognizing the opportunity to recruit talented and gifted students into their agriculture programs. Institutions like Kansas State University can recognize the opportunity to recruit, train, and accentuate skills of the talented and gifted individuals. The talented and gifted population withholds some of the most capable and magnificent people that our society has. Their perceptions of the work-force will be increasingly important as the agriculture, food, and natural resources industry continues to develop. Societal values and understanding educational experiences will determine how young people decide their career fate.

Appendices

Appendix A-Questionnaire

Effectiveness of Talented and Gifted Education in College of Agriculture Major of Choice

Start of Block: Introduction

Thank-you for assisting in the "Effectiveness of Talented and Gifted Education in College of Agriculture Major of Choice study". This study is being completed by a graduate student in the Department of Communications and Agricultural Education as a requirement for graduation. Your participation will provide more insight on the influence of secondary talented and gifted (TAG) programs and choice of major, more specifically agriculture majors.

Please complete each section and submit the instrument.

End of Block: Introduction

Start of Block: Characteristic Information

This section of the survey will collect characteristic data. The data will be characterized in a collaborative fashion, it will **not** be reported independently. Please answer each question.

3 Are you 18 years of age or older?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Survey If Are you 18 years of age or older? = No

4 Are you:

- ○ Male (1)
- ○ Female (2)

---

5 What year in your college education are you?

- ○ First year (1)
- ○ Second year (2)
- ○ Third year (3)
- ○ Fourth year (4)
- ○ More than four years (5)

---

6 Please select the primary major in which you are currently enrolled at Kansas State University:

- ○ Agribusiness (1)
- ○ Agricultural Communications and Journalism (2)
- ○ Agricultural Economics (3)
- ○ Agricultural Education (4)
- ○ Agricultural Technology and Management (5)
- ○ Agronomy (6)
- ○ Animal Science and Industry (7)
- ○ Bakery Science and Management (8)
- ○ Feed Science and Industry (9)
- ○ Food Science and Industry (10)
- ○ General Agriculture (11)
- ○ Global Food Systems Leadership (12)
- ○ Horticulture (13)
- ○ Milling Science and Management (14)
- ○ Park Management and Conservation (15)
- ○ Pre-veterinary Medicine (16)
- ○ Wildlife and Outdoor Enterprise Management (17)

7 Do you have a secondary major?

- ○ Yes (1)
- ○ No (2)

8 Are you pursing a minor?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Block If Are you pursing a minor? = No

9 How many minors are you currently pursuing? Please provide a number.

_____

End of Block: Characteristic Information

Start of Block: Program Involvement

10 Were you involved in a talented and gifted program in high school?

- ○ Yes (1)
- ○ No (2)

Skip To: 12 If Were you involved in a talented and gifted program in high school? = No

11 How many semesters were you enrolled in the talented and gifted program during high school? Please provide an answer in numerical form.

_____

12 Where you involved in an agriculture program in high school?

- Yes (1)
- No (2)

Skip To: End of Block If Where you involved in an agriculture program in high school? = No

13 How many semesters were you enrolled in the agriculture program during high school? Please provide an answer in numerical form.

_____

14 While enrolled in an agriculture course, did you participate in a Supervised Agricultural Experience (SAE) program?

- Yes (1)
- No (2)

15 Were or are you a current member of the National FFA Organization? (Exclude alumni chapter participation)

- ○ Yes (1)
- ○ No (2)

End of Block: Program Involvement

Start of Block: Perceptions of Past Academic Experiences

16 How important were the following experiences in helping you decide your major of study?

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Curriculum provided at your school (1)	○	○	○	○	○
Receiving grades (2)	○	○	○	○	○
Test scores (3)	○	○	○	○	○
Extracurricular activities (Outside of class) (4)	○	○	○	○	○
Intracurricular activities (Completed during class) (5)	○	○	○	○	○
Work experiences (SAE, Job shadowing, etc.) (6)	○	○	○	○	○
Student Organizations (7)	○	○	○	○	○

17
From the listed influences, please rank in their order of importance. Note that number **one is most important** and number **seven is least important**.

_____ Curriculum provided at your school (1)
_____ Receiving grades (2)
_____ Test scores (3)
_____ Extracurricular activities (4)
_____ Intracurricular activities (5)
_____ Work experiences (6)
_____ Student organizations (7)

End of Block: Perceptions of Past Academic Experiences

Start of Block: Self-Concept Related to Career Values

18 Have you decided your future career goals?

- Yes (1)
- No (2)

Skip To: 22 If Have you decided your future career goals? = No

19 Is your career choice in the field of agriculture and natural resources?

- Yes (1)
- No (2)

20 What is your specific career choice?

_____

21 How likely are you to change your mind?

- Extremely likely (1)
- Likely (2)
- Neither likely nor unlikely (3)
- Somewhat unlikely (4)
- Not likely at all (5)

22 For this section, the main focus is on expectations of a future career.

In a career, it is now or will in the future being important for me to...

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Use all my skills and knowledge (1)	○	○	○	○	○
Have results which show that I have done well (2)	○	○	○	○	○
Get ahead (3)	○	○	○	○	○
Make life more beautiful (4)	○	○	○	○	○
Help people with problems (5)	○	○	○	○	○
Tell others what to do (6)	○	○	○	○	○
Act on my own (7)	○	○	○	○	○
Discover, develop, or design new things (8)	○	○	○	○	○
Have a high standard of living (9)	○	○	○	○	○
Live according to my own ideas (10)	○	○	○	○	○
Develop as a person (11)	○	○	○	○	○
Get a lot of exercise (12)	○	○	○	○	○
Be admired for my knowledge and skills (13)	○	○	○	○	○
Do risky things (14)	○	○	○	○	○

Interact with other people (15)	○	○	○	○	○
Be with friends (16)	○	○	○	○	○
Have every day be different in some way from the other ones (17)	○	○	○	○	○
Have good space and light in which to work (18)	○	○	○	○	○

End of Block: Self-Concept Related to Career Values

Start of Block: Thank you

Thank you for taking the time to participate in the survey. Your feed back is greatly appreciated and is helpful when assessing the current talented and gifted education situation. We will use this data to assess where improvements need to be made and the best methods at which to assess them.

If you have any questions, please contact:
Dr. Jon Ulmer, julmer@ksu.edu OR
Darcie Gallagher, darcieg@ksu.edu **OR**
Kansas State University Research Compliance Office, comply@ksu.edu

Appendix B-Emails

Invitation.

College of Agriculture student,

You are part of Kansas State University's College of Agriculture undergraduate student population that has been chosen to complete a brief survey about potential experiences with gifted programs at the high school level. A goal of this survey is to understand how gifted programs influenced an individual to choose a major in the agriculture field.

If you choose to participate, the questionnaire is short, only 23 questions, and should take you approximately ten minutes to complete. After the survey window has closed, the data will be statistically analyzed. All of the responses will be stored in a secure location and the information will be published in collaborative fashion to protect your identity.

Follow this link to the Survey:
${l://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
${l://SurveyURL}

Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}

Should you have any comments or would like to discontinue your participation, please contact Dr. Jon Ulmer, Associate Professor in Agricultural Education, by email at julmer@ksu.edu or Darcie Gallagher, graduate student at darcieg@ksu.edu. For questions about your rights as a subject or about injuries caused by this research, contact the Kansas State University Research Compliance Office at comply@ksu.edu.

Many thanks,
Darcie Gallagher

Follow-Up.

College of Agriculture students,

Last week, you were sent an email asking for your participation in a survey regarding potential experiences with gifted programs at the high school level. This survey will close next Thursday, March 7, 2019. We hope that providing you with a link to the survey website makes it easier for you to respond.

Follow this link to the Survey:
${l://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
${l://SurveyURL}

Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}

As a reminder, your personal information is confidential and participation is voluntary. Should you have any comments or would like to discontinue your participation, please contact Dr. Jon Ulmer, Associate Professor in Agricultural Education, by email at julmer@ksu.edu or Darcie Gallagher, graduate student at darcieg@ksu.edu. For questions about your rights as a subject or about injuries caused by this research, contact the Kansas State University Research Compliance Office at comply@ksu.edu.

Sincerely,
Darcie Gallagher

Thank-you.

College of Agriculture student,

Recently, you were sent an email asking you to complete a survey about how gifted programs may have influenced your choice of major in agriculture. If you have already completed this survey, thank you for your participation! Your help is truly appreciated.

We also wanted to let you know that if you are interested in seeing the summary of the results, the information will be shared among sectors of education and published in a formal manuscript. Look for the title *Effectiveness of Talented and Gifted Education in College of Agriculture Major of Choice.* In the meantime, have a great rest of the semester!

Sincerely,
Darcie Gallagher

Appendix C-IRB Application Letter

KANSAS STATE UNIVERSITY | University Research Compliance Office

TO: Dr. Jonathan Ulmer
Communications and Agricultural Education
308 Umberger Hall

Proposal Number: 9542

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 11/22/2018

RE: Proposal Entitled, "Effectiveness of Gifted Education in College of Agriculture Major of Choice"

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written – and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §46.101, paragraph b, category: 2, subsection: ii.**

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

203 Fairchild Hall, Lower Mezzanine, 1601 Vattier St., Manhattan, KS 66506-1103 | 785-532-3224 | fax: 785-532-3278
comply@k-state.edu | k-state.edu/research/comply

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