FACTORS THAT INFLUENCE HOW PARTICIPANTS OF VIRGINIA’S GOVERNOR’S SCHOOL FOR AGRICULTURE THINK ABOUT, PERCEIVE, AND ENGAGE WITH AGRICULTURE AND AGRICULTURAL CAREERS

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Academic Abstract

The world is facing significant challenges as a result of societal practices. Many of those challenges are agricultural in nature and include worldwide food insecurity, intensified greenhouse gas emissions resulting in climate change, major losses in biodiversity, substantial pressure on natural resources, and increasingly antimicrobial-resistant pests and diseases. To address these challenges, the workforce of the agricultural system must continue improving, collaborating, innovating, and transforming at a global scale. The diversity of agricultural challenges calls for a diverse workforce with science skills as well as cultural competencies.

Agricultural educators and practitioners are consistently concerned with strengthening the relationship of youth and agricultural career choice. The field of agricultural education is also working to ensure that youth who choose agriculture have the knowledge, skills, and competencies necessary to address agricultural challenges. However, youth have steadily chosen careers outside of agriculture, leaving thousands of jobs available.

Researchers have explored many reasons why youth may not choose agriculture, though few have considered aspects of identity or have explored factors that impact perceptions and thoughts of agriculture in depth. The overall purpose of this research was to explore how aspects of identity, including occupational identity status, inform agricultural career interest and choice; and to understand youth perceptions and thoughts of agriculture within a four-week agricultural education program. The purpose was achieved using
research questions and objectives for each individual study. Data were collected using inventories, surveys, group interviews, and blog post assignments to describe participants. Data analysis included thematic analysis and descriptive statistical analysis. Findings show that the participants often had a more negative perception of agriculture prior to the program and expanded their view of agriculture after learning more about the industry. There are many factors that shape perceptions of agriculture, including identity characteristics, learning experiences, and contextual factors. The findings have implications for the field of agricultural education and the entire agricultural industry. At the conclusion of each study within this research, recommendations for agricultural educators, practitioners, and researchers were made. The recommendations include developing and implementing agricultural education programs that serve underrepresented populations in agriculture and conducting research to investigate ill-explored areas that emerged as findings from the research.
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General Abstract

The world is facing many problems in the agricultural industry. These problems relate to food, land, and climate – amongst others. These problems must be addressed; and to do so, there must be a workforce in the agriculture industry that is skilled and competent. Agricultural educators and practitioners are tasked with preparing the agricultural workforce and have a continuous mission to encourage youth to choose agricultural careers. A problem is that youth are largely not choosing agricultural careers, and many jobs in agriculture go unfilled. Researchers have explored reasons why youth largely choose careers in other industries; the reasons include different factors such as opinions of parents and the exposure to agricultural careers.

This research explores additional reasons why youth may not choose a career in agriculture and explores previously known reasons in the context of the 2019 Virginia’s Governor’s School for Agriculture program. The overall purpose of this research is to explore additional reasons for career choice in agriculture, including aspects of identity. The overall purpose of this research was also to explore youths’ perceptions and thoughts of agriculture in-depth. The purpose was achieved by asking a series of research questions and by stating a series of objectives. The research questions and objectives were addressed using data collection methods of group interviews, blog post assignments, inventories, and surveys. The data that was collected was analyzed using thematic analysis and descriptive statistical analysis. The findings from this research show that there are many reasons why youth who were participants of the 2019 Virginia’s
Governor’s School for Agriculture program think about and perceive agriculture. The reasons relate to identity characteristics, learning experiences, and contextual factors. These reasons also influence how youth choose to be involved in agriculture. The findings have implications for the field of agricultural education and the entire agricultural industry.

For each article within this research, recommendations for agricultural educators, practitioners, and researchers were made. These include expanding the reach of agricultural education and further exploring findings that emerged from the research.
Dedication

Endless gratitude for the support, for the yesses, for the confirmations. For every kind act shown to me, every uplifting conversation, every right-on-time thing I read and listened to. For everyone before me, with me, and after me.

Thank you.
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Introduction

The field of agriculture is composed of crops and animals that provide food and products to sustain the entire human population. Agriculture as a field open to influence from natural resources, rural development, and nutrition. Agriculture is necessary to address poverty and food insecurity across the globe—contributing significantly to the global gross-domestic product and feeding billions worldwide (The World Bank, 2018). Even as many earn and profit from agriculture and have enough to eat daily, the field of agriculture has several growing threats. One of the major threats is climate change which could dramatically impact crop yields, especially in the most food-insecure areas of the world. What complicates this situation is that agricultural production contributes to 25% of greenhouse gas emissions which intensifies climate change (The World Bank, 2018). Another threat to agriculture is the use and detriment of resources. Agriculture uses 70% of the world’s freshwater and also produces a dangerous amount of pollution and waste. Lastly, within the agricultural food system, nearly 821 million people as of 2017 are hungry or undernourished. People are either not eating enough or eating the wrong types of food with widespread malnourishment and obesity on the rise (The World Bank, 2018).

Threats to agriculture are only expected to rise as the consensus amongst scientists and researchers is that the world’s roughly population of 7 billion is expecting to rise to roughly 9 billion by the year 2050. The agricultural industry will need to produce the food and fiber that is necessary to sustain a growing population. With the reality of climate change, the industry will need to implement sustainable production methods that are also more efficient (Food and Agriculture Organization, 2009). With the increase in population, there is an increase in demand for crops such as cereals for food, animal feed, and biofuels. Incomes are also expected to increase which will place demand on production of livestock, dairy, and vegetable oils. The land
needed for crop and animal production will need to be expanded by millions of acres, placing pressure on natural resources (Food and Agriculture Organization, 2009). With 2050 in the not so distant future, actions to strengthen the food system, improve livelihoods in poverty-stricken regions, and respond to climate change need to be expedited and expanded (Food and Agriculture Organization, 2018).

In order for agricultural development to improve and meet impending demands in a sustainable and efficient way, there are significant players who need to fill important roles. Increasing productivity, addressing climate change, advancing infrastructure, and making scientific progress all require contemporary knowledge and skills from a talented workforce (International Agri-Food Network, 2018). This entails retaining and training the current workforce and preparing the future workforce for career opportunities in agriculture. To ensure a continuous channel of talented workers in the agricultural industry, it is important to encourage youth to see agriculture as a valuable career choice – this requires buy-in from young people (International Agri-Food Network, 2018).

Agriculture has been consistently impacted by the attitudes and perceptions that individuals hold towards the field. Historically, agriculture has been perceived as a field that is focused primarily on aspects of production agriculture as opposed to a professional career path (Jones, Williams, & Gill, 2017). The post-World War II era brought economic development which changed the cultural context of agriculture. Many countries, including the United States, began to see agriculture as in need of modernization through applying new technologies. This modernization was designed to produce more food with less labor required. By 1950, 20 percent of the United States’ workforce was working in agriculture and by 1980, the number dropped significantly to 4 percent (Jones, Williams, & Gill, 2017).
A portion of the country’s population saw agriculture as a sort of artifact that remained in the realm of rural life. It was considered to be a holdover that was necessary for consumption but not as integral to the modern economy or modernized life. As such, agricultural education, once a priority with the establishment of the Morrill Acts and later, the Smith-Hughes Act (Herren & Hillison, 1996), fell behind other areas of economic and social change (Jones, Williams, & Gill, 2017). Agricultural education was not included in the fields that were considered to be scientific; therefore, it was not considered to be prestigious in the workforce. These perceptions of agriculture effected the perceptions held of students which were validated by family and school personnel. Students saw agriculture in an unattractive light, and were encouraged to pursue other fields of study by parents and teachers (Jones, Williams, & Gill, 2017).

Over the past few decades, agriculture has increased in modernization; evolving and becoming more complex. Global investments in agriculture have amplified, with particular interest in the application of modern agricultural techniques. Developed and some developing countries have adopted a more contemporary view of agriculture as a professional pursuit. Additionally, some investments have been made in expanding agricultural education and training. In the U.S., educational institutions at different levels have introduced curricula that exposes students to modern agricultural concepts and to the different career paths that are available in agriculture (Jones, Williams, & Gill, 2017). Agricultural education through schools, programs, and organizations are designed to prepare the current and future workforce for careers in the agricultural system. Research has found that workforce preparedness depends on career development strategies from formal and non-formal agricultural education, K-12 and postsecondary agricultural education, and even agricultural communication in the form of marketing and media. These contributors to agricultural education must work together with the
agricultural industry to generate interest in agricultural careers and provide the skills necessary for careers in crucial challenge areas (Stripling & Ricketts, 2016).

**Background of Study**

Many scholars in the field of agriculture have written about youths’ interest in pursuing the field as a career choice. However, little literature explores interest and choice in careers in agriculture in the context of the career development process with in-depth, qualitative methods. This study provides insight on why students may or may not be open to careers in agriculture depending on their identity characteristics and contextual influences that contribute to engagement in agriculture and interest and choice in agricultural careers. This study also provides insight on strategies that can be used to help students reconsider or consider for the first time a career in agriculture.

**Problem Statement**

Due to the economic advancements and modernization of agriculture, demand for highly skilled and educated professionals has increased significantly (Cannon J. G., Broyles, Seibel, & Anderson, 2006). The agricultural evolution has created a surplus of positions that require training in high-level math and science for careers in areas such as food and finance. Over the past few years, researchers have noticed a trend that as time goes on, there will not be enough individuals to take on these positions that ensure the future success of agriculture (Goeker, Smith, Fernandez, Ali, & Theller, 2015). As a significant number of jobs are left unfilled by agricultural graduates, employers begin turning to biology, business administration, education and other fields for new employees. College graduates with knowledge and expertise in agriculture are crucial for making advancements and solving problems in food security, sustainability, and the environment. Not only will graduates need to be able to respond to these
issues in a United States context, they will also need to be able to respond to problems in a global context such as population growth and climate change (Goeker, Smith, Fernandez, Ali, & Theller, 2015).

Agricultural education’s most important role is to prepare individuals for agricultural careers so that the gap between agricultural graduates and agricultural careers can be alleviated (Esters & Bowen, 2005). Esters and Bowen (2005) indicate that in order to alleviate the gap, it is important to understand the motivation that direct people into certain careers and to also understand the decision-making processes that go into a career. The authors also indicate that there are other factors that contribute to career choice, including gender, race, parental influence, socioeconomic background, school achievement, and confidence (Esters & Bowen, 2005).

As more emphasis is being placed on recruitment of youth to agricultural careers, it is important to explore different components of the career decision-making process in detail. Many researchers have studied perceptions that youth from varying demographic backgrounds have of agriculture and/or the factors that can influence career choice (Esters & Bowen, 2005); (White, Stewart, & Linhardt, 1991; Wildman & Torres, 2001). Some researchers have also considered theoretical concepts to explain the career decision-making process in agriculture: Fishbein & Ajzen’s (1975) framework of belief, attitude, intention, and behavior (Cannon J. G., Broyles, Seibel, & Anderson, 2006); (Duncan & Broyles, 2006), Lent et al. (1994) framework of Social Cognitive Career Theory (Fraze, Wingenbach, Rutherford, & Wolfskill, 2011).

Beyond the consideration of the aforementioned factors and frameworks, little consideration has been placed on other components of career choice. Youth at the adolescent stage are heavily forming their occupational identities (Skorikov & Vondracek, 2011) yet no agricultural education research deeply considers identity development in research studies.
Additionally, little research has been conducted using in-depth, qualitative methods to understand how youth think about and perceive agriculture.

**Purpose Statement**

The purpose of this research is to determine how adolescents perceive and think about agriculture and agricultural careers, and to explore various aspects that inform their interest in pursuing agriculture as an academic major and career. There are several research objectives and questions that were used to achieve the purpose of this research. The research objectives and questions are associated with three different articles which are comprised in this dissertation.

**Research Questions and Objectives**

*Article 1*

1. How do the youth participants think about and perceive agriculture as a concept and a career?
2. What influences the participants’ thoughts and perceptions of agriculture as a concept and a career?
3. How do youth see themselves being involved with agriculture after participating in VGSA?

*Article 2*

1. How do students in VGSA reflect in blogs on their experiences within the program?
2. How do the students in VGSA reflect in blogs on their change in perceptions of agriculture and agricultural careers?

*Article 3*

1. Determine occupational identity statuses of participants.
2. Identify the career goals as indicated by participants before and after the program.
3. Determine if participants’ occupational identity development associate with their experiences in the VGSA program.
Considerations of this Research

A consideration of this research is that the research conducted is a case study (Stake, 1995) with a case that is unique in terms of characteristics of the participants. Additionally, the case is unique because the participants attended the 2019 Virginia’s Governor’s School for Agriculture program. The data collected from the participants may not be reflective of any other VGSA cohort or a general population of youth engaged with agriculture.

A second consideration of this study is my involvement with VGSA during summer 2019 in a leadership role. I served as on-site director for the program which involves being an immediate point of contact for students and parents. I organized many of the logistics and oversaw aspects of the program including staffing, housing, travel, and other day to day operations. Students saw me in this leadership role which may have had an impact on the participants’ engagement with aspects of the research.

Significance of the Study

Previous studies conducted on the topic of perceptions of agriculture as a concept and career focuses on few general demographics such as race, gender, and geographic location. Other existing literature that considers club membership on student perceptions and choice tend to list the different factors that can affect perceptions and choice without much context. This research aims to consider a variety of identity characteristics including occupational identity status. Additionally, this research presents thick description data that provides context to the participants’ perceptions of agriculture and experiences in the Virginia’s Governor’s School for Agriculture.

Adolescence is a major time for identity development and the experiences that adolescents go through likely have major implications on agriculture that should be explored
through research. Research on identity status can advance new knowledge about adolescent career development in agriculture as messages and information communicated about agriculture—intentional or not, and from all sources—is salient for young people as they develop and form identity. Additionally, as evidenced through STEM careers (Steinke, 2017), assessing identity could help the agricultural sector predict choice of agricultural careers as well as encourage persistence through and commitment to agricultural careers.

**Defining Agricultural Careers and Traditionally Non-Agricultural Careers**

The field of agriculture is defined as “the science or practice of farming, including growing crops and raising animals for the production of food, fiber, fuel and other products (USDA National Agricultural Library, 2017).” While this definition is accurate, it does not fully encompass all that the field of agriculture entails. Agriculture is complex and multifaceted with several concentrations and connections to many areas. One way to show the vastness of agriculture is to consider the careers that people have within the field.

Advance CTE, formerly the National Association of State Directors of Career Technical Education Consortium, developed the National Career Clusters Framework which organizes a wide variety of careers into 16 clusters. The first cluster in the framework is agriculture, food and natural resources (AFNR) which contains 7 different career pathways: agribusiness systems; animal systems; environmental service systems; food products and processing systems; natural resources systems; plant systems; and power, structural and technical systems. Advance CTE defines the cluster as being “focused on the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources (Advance CTE, 2012).” The AFNR cluster is representative of agriculture and provides a list of
careers that span the entire field. This research refers to the AFNR cluster to define agricultural careers.

The rationale for using the AFNR cluster from the Career Clusters framework is because of its credibility and wide usage. The framework is largely used for curriculum design and instruction for use in agricultural education CTE programs, providing information on knowledge and skills that students should know and be able to do after completion of an agricultural education program. The framework reflects what postsecondary education institutions and business and industry expect to see from young people entering certain career pathways. Due to the utility of the framework, it has been adopted by the United States Department of Labor, the leading Career and Technical Student Organizations, several state boards of education for use of the framework’s career plans of study, and can be found in various contexts in relation to career development. In addition to use in agricultural education CTE programming, the framework and AFNR cluster specifically, has been referenced widely throughout agricultural career development research.

Keeping in the framework of the National Career Clusters Framework, traditionally non-agricultural careers are any of the 15 other career clusters out of the 16 total. The other 15 career clusters are Architecture & Construction; Arts, Audio/Video Technology & Communications; Business, Management & Administration; Education & Training; Finance; Government & Public Administration; Health Science; Hospitality & Tourism; Human Services; Information Technology; Law, Public Safety, Corrections & Security; Manufacturing; Marketing, Sales & Service; Science, Technology, Engineering & Mathematics; and Transportation, Distribution & Logistics. The separation is not rigid, as most agricultural careers heavily involve use of science skills. Some of the career clusters intersect at different points such as government and public
administration and agriculture, food, and natural resource in the case of a representative for a USDA program, for example.

**Exposure to Agricultural Careers**

All students that attend VGSA take a Careers in Agriculture course which takes place throughout the entire duration of the program. In this course, the students are exposed to various agricultural careers and work on career development skills such as developing a resume and cover letter. The following is a description of the Careers in Agriculture course: “A survey of opportunities for careers in agriculture. Students will explore potential careers in agriculture and complete an assessment matching personal strengths and skills to qualifications needed for specific careers. Students will also learn about the career services available at colleges, tools available for seeking employment after graduation, and how to network with professionals in the agriculture industry (Virginia's Governor's School for Agriculture, 2020).”

**About the Virginia’s Governor’s School for Agriculture and Virginia’s Governor’s School Programs**

Researchers have identified gifted and talented students as the next potential leaders that could close the gap between agricultural graduates and agricultural jobs available; particularly jobs that involve the use of higher order scientific and technical skills. Programs have been established to expose gifted and talented youth to agriculture and build upon their knowledge of the agricultural system. These programs are also designed to encourage gifted and talented youth to pursue agricultural careers (Cannon J. G., Broyles, Seibel, & Anderson, 2006). There is one such program called Virginia’s Governor’s School for Agriculture.

Virginia’s Governor’s School for Agriculture (VGSA) is a four-week, summer residential program for rising junior and senior high school students who are considered gifted and talented.
The program is designed to provide an academically rigorous and agriculturally focused experience to the “future scientists and leaders of Virginia, the United States, and the World (Virginia's Governor's School for Agriculture, 2019).” VGSA is one of seven Summer Residential Governor’s Schools in Virginia. The other programs are the Mentorship in Engineering, Mentorship in Marine Science, School for Humanities, School for Medicine and Health Sciences, and School for Visual and Performing Arts. In addition to the Summer Residential Governor’s Schools, there are 21 Summer Regional Governor’s Schools which are designed to meet the needs of local gifted elementary and middle school students. Along with the Summer Residential and Summer Regional Governor’s Schools, there are 19 Academic-Year Governor’s School that serve gifted high school students during the school year. Collectively, all 3 groups of schools make up the Governor’s School Programs (Virginia Department of Education, 2019).

The Virginia’s Governor’s School Program was established in 1973 by former Virginia governor, Linwood Holton. The initiative began with three summer residential programs comprised of 400 students. Since the first round of Governor’s School Programs started in 1973, the Program has expanded significantly with over 40 Program sites that serve more than 7,500 students throughout the state (Virginia Department of Education, 2019).

The Governor’s School Programs share an overarching purpose of meeting the needs of gifted and talented students and providing opportunities that are typically unavailable at the home schools of students. Students who participate in Governor’s Schools are able to concentrate on areas of intellectual or artistic interests and strengths. Students can learn in the ways that suit their needs as gifted learners. Governor’s School Programs use teaching and learning techniques
that are non-traditional, such as field studies and hands-on experiences (Virginia Department of Education, 2019).

VGSA has been active since 2001 and was started by the leaders in the Department of Agricultural, Leadership, and Community Education (ALCE) as a way to expose young people in Virginia to the field of agriculture. The department still serves as the administrative unit over the program. The major stakeholders work within the department as program director, on-site director, and program leaders. Other major stakeholders are the Virginia Department of Education which provides funding for the program and the program collaborators that provide instruction through classes and activities. The program is designed to provide academic rigor and educational enhancement for future scientists and leaders through agriculture. These students will go on to impact Virginia, the United States, and the world (Virginia's Governor's School for Agriculture, 2019).

The program is a four-week, summer, residential program where high school students throughout Virginia come to visit Virginia Tech. One hundred students are selected to attend and must be rising juniors and seniors who are considered gifted and talented. The students come from public, private, and home schools. While participating in the program, students are able to interact with faculty and researchers in classes and on projects. In addition to the College of Agriculture and Life Sciences, the program collaborates with the Colleges of Natural resources and Environment, Liberal Arts and Human Sciences, and Veterinary Medicine (Virginia's Governor's School for Agriculture, 2019).

The curriculum for the program includes multiple components including major and major courses, core courses, elective courses, and global seminar. Additional information on the components of the VGSA curriculum is found in the appendices. The major courses that the
students take make up a major that students choose prior to beginning the program. The major choice options are Agricultural and Biological Systems Engineering, Agricultural Economics, Animal Science, Food Science, and Plant Science. In addition to major courses, students take core courses which provides interdisciplinary introduction to agriculture, food, and natural resources. There are also elective courses which provides an opportunity to explore faculty members’ research expertise and interests. These cover areas such as robotics, horticulture, genetics, and community foodsheds. A major component of the courses that students take is engagement with the university farms and laboratories. The other major part of the curriculum is the global seminar. This is where students are broken up into groups of four to five-member teams and work on a research project that represents the USDA-NIFA research challenge areas which are food security, climate variability and change, water, sustainable bioenergy, childhood obesity prevention, and food safety (USDA-NIFA, 2020). Through their research, the students participate in a research symposium and poster session (Virginia's Governor's School for Agriculture, 2019).

The students work in teams and collaborate with one another to create unique solutions to wicked social issues that have been deemed high-priority by the USDA through the research challenge areas. The teams of students are assigned prompts based on the challenge areas that provide structure to their research. Additional information on the global seminar prompts can be found in appendix L. Students begin the process by researching the background information of the challenge area that they have been assigned and developing an understanding of complexities in the area. Students then begin to brainstorm solutions to their issue and evaluate them as a group. The solution that the team chooses should be something that could bring positive social change to the community or system that is being affected by the issue. What follows next are
weeks of research and projects done by each team that details the challenge area and the solution that they came up with. Throughout the global seminar process, students are engaging with one another through shared responsibility in getting the work done. They are sharing feedback amongst themselves and are also receiving it from program leaders.

**Demographic Profile of the 2019 Virginia’s Governor’s School for Agriculture Students**

Female students accounted for 67% of the students and male students accounted for 33%. Students were 41% Asian, followed by 32% white. Twenty percent of the students had two or more racial identifications. Hispanic or Latino students accounted for 3% of the student. Black students accounted for 2%. Another 2% of students indicated other for their racial identification. Thirty-eight percent of the students live in large towns (2,501 to 25,000 inhabitants) and 35% live in small cities (25,001 to 100,000 inhabitants). Sixteen percent of students live in large cities (more than 100,000 inhabitants) and 3% live in small towns (less than 2,500 inhabitants). Eight percent of students live in rural areas on or off of a farm. Demographic information was collected using a VGSA registration survey and a VGSA exit survey.

**Research on Virginia’s Governor’s School for Agriculture**

Previous research conducted on the Virginia’s Governor’s School for Agriculture has focused on the impact of the program on perceptions of agriculture and influence on career choice of program alumni. Duncan and Broyles (2004) explored the knowledge and perceptions that VGSA youth have before and after participation in the program and investigated any differences of perceptions between students with and without prior experience in agriculture. The researchers found that the program increased agricultural literacy of the students and that unsure answers on the pre-test were changed to definitive answers on the post-test (Duncan & Broyles,
2004). The researchers carried out another similar study (Duncan & Broyles, 2006) that again explored the pre and post perceptions of VGSA students and explored the perceptions that VGSA students had of specific agricultural concepts such as biotechnology and the environment. Results were similar to their 2004 study and showed that student answers to certain questions became more definitive after completion of the program. Students’ perceptions of agricultural concepts varied (Duncan & Broyles, 2006). Cannon, Broyles, Seibel, and Anderson (2006) set out to explore the impact that VGSA had on the career choices of alumni of the program. The researchers used Fishbein and Ajzen’s (1975) belief, attitude, intention, and behavior conceptual framework. The framework is used to explain how the information that students in VGSA receive influences their perceptions and knowledge of agriculture and agricultural careers.

Students choose to pursue or not pursue an agricultural career based on how the information that they have learned impacts their attitudes of agriculture. The goal of the VGSA program in 2006 (and currently in 2019) is to provide a positive experience for students that will foster positive attitudes towards agriculture, ideally leading to desire to choose agriculture as a career. In the study, the researchers found that the program did not have a major influence on the career choices and goals of the alumni but it did influence their knowledge and perceptions of agriculture (Cannon J. G., Broyles, Seibel, & Anderson, 2006).

**Theoretical Framing**

This study is based on the social cognitive career theory, psychosocial development theory, and identity status theory. The concepts of the social cognitive career theory (SCCT) were first introduced by Betz and Hackett in 1981. The theory was published later on by Lent, Brown, and Hackett in 1994. The theory addresses aspects of academic and career development
by presenting a model on how career choice is impacted by the interests of an individual (National Academy of Engineering, 2018).

The theory asserts that an individual’s career development is dependent on many factors such as their interests, experiences and environment. According to Lent (2013), the social cognitive career theory seeks to explain how individuals “develop vocational interests, make occupational choices, achieve varying levels of career success and stability, and experience satisfaction or well-being in the work environment (Lent, 2013).”

SCCT is rooted in the works of Bandura’s social cognitive theory (SCT) which was developed in 1986. Bandura’s theory addresses how an individual and their behavior and environment intersect. Both theories posit that people have agency or self-direction but that there are different variables that can reinforce, weaken, or supersede agency. SCCT and SCT focus on the variables of self-efficacy, outcome expectations, and personal goals in relation to career development. Self-efficacy as defined by Bandura is “people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances (Bandura, 1986, p. 391).” Outcome expectations are what individuals believe will be the outcomes or consequences of behaviors. Personal goals refer to intentions to engage in a behavior to produce a desired outcome. SCT assumes that goals are impacted by self-efficacy and outcome expectations as believing in your capabilities and imagining desired outcomes triggers intent. Goals, in turn, have an impact on self-efficacy and outcome expectations as lack of success with achieving goals can have a negative influence on belief in one’s capabilities and belief that the desired outcomes will come to fruition (Lent, 2013).

The SCCT has different models that make up the framework which are the models of interest, choice, performance, satisfaction, and career self-management. The models are
conceptually differently but are overlapping within the theory. Each model considers self-efficacy, outcomes expectations, and goals as described previously – Lent (2013) refers to these concepts as cognitive-person elements (Lent, 2013). The cognitive-person elements work with person inputs which include aspects such as gender, race, and abilities; background contextual affordances such as exposure to occupational role models; and learning experiences such as school and career development experiences (Lent, Brown, & Hackett, 2000; Lent, 2013).

According to Lent and Brown (2019), the interest model is a component of the choice model and is built into it (Lent & Brown, 2019). The interest model assumes that self-efficacy is influenced by outcome expectations and that both variables determine interests. The choice model assumes that self-efficacy, outcome expectations, and interests have a significant impact on goals that individuals choose to pursue. The performance model assumes that abilities and the quality of past performances are prognostic of future performances (Lent & Brown, 2019). The satisfaction model and career-self management models are newer, as they were not included with the original SCCT models of interest, choice, and performance (Lent & Brown, 2019). The satisfaction model assumes that satisfaction with work and education is influenced by self-efficacy, outcome expectations, and goals. The career self-management model was developed to predict how individuals make choices regarding work and education and navigate the tasks, crises, and challenges that arise given the occupation chosen. Like in the other four models, self-efficacy, outcome expectations, and goals have an influence on career self-management, influencing the actions that individuals take, such as applying for a job (Lent & Brown, 2019).

Erikson developed the psychosocial development theory which describes the eight stages that every person passes through over their life cycle. During each stage, there is a psychosocial crisis that could have a positive or negative outcome for the development of personality. The crises
are basic trust vs mistrust, autonomy vs shame and so on. Erikson’s use of the word psychosocial stems from the crises involving the psychological needs of a person and their conflict with their surrounding social environment (McLeod, 2018).

Each stage of psychosocial development has a crisis or developmental challenge that could have a positive or negative outcome for an individual. Successfully resolving the crisis prepares an individual for the next stage and unsuccessfully resolving the crises causes challenges for the next stage (Arnett, 2016). The first stage is infancy where hope and drive through the crisis of trust versus mistrust is developed. The second stage is early childhood where willpower and self-control through the crisis of autonomy versus shame and doubt is developed. The third stage is preschool where purpose and direction through the crisis of initiative versus guilt is developed. The fourth stage is school age where competence and method through the crisis of industry versus inferiority is developed. The fifth stage is adolescence where fidelity and devotion through the crisis of identity versus role confusion is developed. The sixth stage is young adulthood where love and affiliation through the crisis of intimacy versus isolation is developed. The seventh stage is middle adulthood where care and production through the crisis of generativity versus stagnation is developed. The eighth stage is maturity where wisdom and renunciation through the crisis of integrity or despair is developed (Hanks, et al., 2015). Erikson placed emphasis on the adolescent stage and formation of identity of which he wrote at length about (Sokol, 2009). The major developmental challenge of this stage is becoming sure about identity, capabilities, beliefs, and desires as opposed to being insecure about these areas (EnGage, 2017).

This study focused on the fifth stage which is the development of adolescents and applied the context of choice of career and academic major. During adolescence is when youth are discovering themselves and finding their own identity which includes determining their personal
goals. Also, with a focus on adolescence, James Marcia developed the four identity statuses of psychological identity development. Marcia’s work was a refinement and extension of Erikson’s model but focused on adolescent development. Marcia proposed that the adolescent stage does not consist of identity resolution or identity confusion as Erikson believed but instead consists of the degree to which an adolescent has explored and committed to an identity. The degree of exploration and commitment applies to choice of vocation, religion, gender roles and so on.

Marcia’s theory was developed by conducting a series of identity status interviews with adolescents. From the interview, Marcia identified four identity statuses that youth can have. Marcia asked the interview participants if they had established commitment to an occupation or ideology and if they had experienced or were experiencing a period of decision making (Leonard, 2014). The first status is identity achievement in which an adolescent has committed to a sense of identity (or role or value) that they have chosen. The second status is identity moratorium in which an adolescent has not committed to an identity and are still establishing life goals. The third status is identity foreclosure in which adolescents have committed to an identity and may appear satisfied with their choices. The fourth status is identity diffusion in which adolescents have not made any choices and may be unwilling to altogether (Leonard, 2014).

Compared to developmental psychology theories such as Erikson’s stages of psychosocial development and Marcia’s theory of identity status, SCCT is more apt to address theoretical concepts that explain career behavior. Erikson’s and Marcia’s theories are more apt to address theoretical concepts that explain development at specific ages and stages (Lent, 2013). Nevertheless, SCCT has a connection with developmental theories in that the focus is on how individuals navigate tasks and milestones including the careers they choose (Lent, 2013).
Because of this, the research in this study considers Erikson’s and Marcia’s developmental theories and the concepts as important components of the career development process.

A conceptual framework was developed to serve as a foundation for this research. Figure one below was adapted from Social Cognitive Career Theory and details each component of the study in visual format. The conceptual framework also contains examples of each component that are relevant to the path through an agricultural career.

![Conceptual Framework]

**Figure 1. Conceptual Framework, adapted from Lent, Brown, and Hackett (1994)**
In this study, the perceptions and thoughts discussed in article 1 and 2 that the VGSA students have are concepts that are explained by the person inputs piece of the conceptual framework. Perceptions and thoughts are individual characteristics that connect with background and proximal contextual influences which shape learning experiences and interest and engagement with agriculture. The factors that influence perceptions and thoughts are said learning experiences and contextual influences which are discussed articles 1 and 2. The theoretical frameworks of Erikson and Marcia regarding psychosocial development and identity status are connected to this conceptual framework through person inputs and contextual influences. Occupational identity is a part of one’s identity characteristics. The career development process in the conceptual framework is modeled after how an adolescent in VGSA might experience it. Erikson’s theory recognizes adolescence as an identity, though it changes as youth grow older. The theory also recognizes social environments such as at home, at school, and amongst peers as major influences to development.

Ultimately, this conceptual framework explains that identity characteristics, contextual influences, and learning experiences shape how adolescents believe in their capabilities to engage with agriculture and shape what they think the outcomes will be of such engagement. If self-efficacy and outcome expectations are high and desirable, youth are more likely to develop interest in pursuing agriculture and navigate the path to an agricultural career. If self-efficacy and outcome expectations are low and undesirable, youth are less likely to do these actions.

**Overview of Methodology**

Approval was sought from the Virginia Tech Institutional Review Board (IRB) prior to any collection of data from participants. A copy of the IRB approval letter is found in appendix B. The IRB ensures the safety of human subjects and is the governing body that approves
research which includes this study. The IRB ensures that no human subjects are being treated unsafely and that no human rights are being violated. The IRB also ensures that all human subjects are participating on their own free will and have been fully informed of what the study entails.

Because the study includes high school students as participants, I followed the ethical regulations of child participants. According to the Virginia Tech Institutional Review Board, “The special vulnerability of children makes consideration of involving them as research subjects particularly important. To safeguard their interests and to protect them from harm, special ethical and regulatory considerations are in place for reviewing research involving children (Virginia Tech IRB, 2018).” Many states, including Virginia (where this research was conducted), require the assent of child participants and the permission of a parent or legal guardian in place of consent. The procedures of the study should be explained to children and they must be respected and asked whether or not they wish to participate in the research (Virginia Tech IRB, 2018). A Parental Permission and Assent form was used for participants under 18 years of age and an Informed Consent form was used for participants over 18 years of age which was distributed to parents and participants prior to the start of the study. A copy of the form is found in appendix A.

*Establishing Validity and Reliability*

For this research, I used theoretical triangulation to establish internal validity. Theoretical triangulation is the use of more than one theory when investigating a phenomenon (Thurmond, 2001). Thurmond (2001) explains the intent of theoretical triangulation: “The intent is to conduct the study with multiple lenses and questions in mind, to lend support to or refute findings (Thurmond, 2001).” The theories used in this research to support the findings are the social cognitive career theory, theory of psychosocial stages, and theory of identity status.
Methodological triangulation was also used to establish internal validity. According to Bekhet and Zauszniewski (2012), methodological triangulation involves using more than one type of method to study a phenomenon (Bekhet & Zauszniewski, 2012). Further, the authors explain two ways to use methodological triangulation which are across method and within method. Across method uses qualitative and quantitative data in a study while within method uses only qualitative or only quantitative data in a study (Bekhet & Zauszniewski, 2012). Some of the benefits of using methodological triangulation are that it offers confirmation of findings and enhances understanding of phenomena (Bekhet & Zauszniewski, 2012).

To achieve within method methodological triangulation, I used multiple methods for data collection which are the group interviews, blog post assignments, and occupational identity status inventories. Additionally, the methods for data analysis were used more than once which was the thematic analysis used for the group interview data and the blog post assignment data.

As an additional strategy to establish internal validity for this study, I wrote a statement that described how I affect and am affected by the research process that I undertook. This is known as a researcher’s reflexivity (Merriam & Tisdell, 2016). A researcher’s reflexivity serves as an opportunity to explain how biases, perspectives, and assumptions have influenced the undertaking of a study and the interpretation of the resulting data (Merriam & Tisdell, 2016).

Research Design

This study used a case study design (Stake, 1995) to explore the ways youth think about, perceive, and engage with agriculture and agricultural careers. Case study research allows me to focus on a single case as the phenomenon of interest and to conduct an in-depth examination of the phenomenon in real-life context (Jacobsen, Friesen, Daniels, & Varnhagen, 2011). The case study took a single-case design because the phenomenon to be investigated is a standalone unit.
The rationale for the case study component to this research design lies with my desire to investigate Virginia’s Governor’s School for Agriculture (VGSA) in its full context as opposed to another setting such as a high school. I am immersed in the case as a person with close proximity with interest in the “particularity and complexity” of the case (Stake, 1995).

VGSA is associated with other Governor’s Schools in Virginia but is the only one to immerse students in an extensive and rigorous pre-college experience with a focus on agriculture. Additionally, the students who participate in VGSA are from diverse and varied backgrounds who bring unique experiences with them to the program. These characteristics make the program unique which is in line with characteristics of case study research (Stake, 1995). This research could hypothetically investigate a number of students from a number of high schools in the state but there is only one VGSA. Lastly, rather than conducting a sweeping investigation of other youth in other settings, the conceptual framework that guides this study is able to be applied to a specific case.

*Qualitative Approach*

Phenomenography was used as a qualitative approach for data collection and analysis. Phenomenography is defined as a way to map the ways that people conceptualize, perceive, understand, and experience aspects of phenomena (Tight, 2016). Examples of phenomena are events, relationships, and dynamics (Beaulieu, 2017). Phenomenography frequently involves interviews and other data, including written responses (Tight, 2016). Phenomenography and phenomenology are sometimes confused for one another, yet, they are distinct. Phenomenology is rooted in philosophy and considers questions that explore the phenomenon itself while phenomenography is rooted in education research and considers questions that explore the different ways of understanding and perceiving a phenomenon (Beaulieu, 2017).
Research Methods

The first qualitative method used are group interviews. Interviews are one of the most common methods of qualitative data collection. These were used to explore the perceptions, experiences, and views of participants in an in-depth fashion. The interviews for this study were semi-structured to allow the researcher and participants flexibility to go into detail and elaborate (Gill, Stewart, & Chadwick, 2008).

The second qualitative method used are blog posts. The blogs used for this study serve as web-based diaries where participants are free to type out their perceptions, opinions, and experiences. The blogs were used for thematic analysis and to add thick description to the study (Prescott, Gray, Smith, & McDonagh, 2015).

The following is an outline of the three articles that is intended for publication as a result of this dissertation research.
Article 1

Purpose Statement

The purpose of this study is to understand how youth participants of Virginia’s Governor’s School for Agriculture think about and perceive agriculture and agricultural careers; and the factors that influence their thoughts and perceptions. The purpose was achieved by asking three research questions:

Research Questions

1. How do the youth participants think about and perceive agriculture as a concept and a career?
2. What influences the participants’ thoughts and perceptions of agriculture as a concept and a career?
3. How do youth see themselves being involved with agriculture after participating in VGSA?

Population

The participants in this study are 98 high students who have been chosen to participate in the 2019 VGSA program.

Sample

Quota sampling was utilized in this study. A sample of the total population that is representative of the 98 VGSA students was selected. The sample was proportional to the population in terms of gender, race and ethnicity, grade level, and geographic location, problem-solving style and identity status. The demographic characteristics of gender, race, ethnicity, grade level, and geographic location were determined using a registration survey that the participants completed prior to attending the program. Problem-solving style was determined using Kirton’s Adaption-Innovation inventory which is administered to all VGSA students each year for research purposes and to provide them with information on how they prefer to solve
problems. Identity status was determined using Melgosa’s Occupational Identity Scale which was administered to all VGSA students for research purposes and to provide them with information on their status in regards to occupational exploration and commitment.

Data Collection

In order to answer the research questions for this study, the research utilized a series of group interview sessions. The group interviews took place during the last two weeks of VGSA where students were asked questions that explore their perceptions of agriculture as a concept and career and the factors that influences their perceptions. Five group interviews were conducted with between two and five participants per group. Several questions were asked in the group interviews for participants to respond to:

1. Take a moment and reflect on what comes to mind when you think about agriculture
   Please share what that looked or felt like. This question is designed to understand the mental image that participants have of agriculture

2. What do you feel has contributed to how you think about or view agriculture? This question is designed to identify the factors that have contributed to participants’ perceptions of agriculture. This question also has several additional probing questions to be asked after the initial question:
   a. Has anything you have seen on the news, online, television, that has contributed to how you feel and/or think about agriculture, if at all?
   b. Have your parent(s) or guardian(s) shared strong views or opinions about agriculture that you feel have influenced your view, if at all?
   c. Have your friends shared strong views or opinions about agriculture that you feel have influenced your view, if at all?
d. Have your teachers and/or counselors shared strong views or opinions about agriculture that you feel have influenced your view, if at all?

e. How has your race/ethnicity contributed to how you feel and/or think about agriculture, if at all?

f. How has your gender identity contributed to how you feel and/or think about agriculture, if at all?

g. How has where you live or have lived previously contributed to how you feel and/or think about agriculture, if at all?

h. Is there anything additional anyone would like to share regarding what has contributed to your view of agriculture? (e.g. media, history, family and/or friend influence, teacher and/or counselor influence, demographic representation – race, gender, rural, urban, etc., any other factors as identified by students).

3. When I say agricultural career, what do you think of? Please share your thoughts about these careers. This question is designed to understand participants’ mental images of agricultural careers.

4. What value do you place on agricultural careers in relation to other careers in the space of agriculture? For example, agricultural economist and a food science technician. This question is designed to understand how participants might view certain agricultural careers as more valuable than others.

5. What value do you place on agricultural careers in relation to non-agricultural careers? For example, an agricultural economist and a civil engineer. This question is
designed to understand how participants might view certain non-agricultural careers as more valuable than agricultural careers.

6. If at all, in what ways have you begun to consider agriculture as a career after participating in VGSA? This question is designed to gauge participants’ interest in an agriculture after participating in the VGSA program.

7. If at all, how has the program changed what might have originally come to mind when you think about agriculture? This question is designed to gauge participants’ change in mental images of agriculture as a concept.

8. If at all, how do you imagine seeing yourself in agriculture?

Data Analysis

Group interviews provided content and text information to analyze. Group interviews that took place were audio recorded and transcribed. The transcriptions were analyzed by hand and coded for themes based on the data presented utilizing thematic analysis. Open coding was conducted by highlighting data that were interesting and seemed relevant to the research questions and overall study and by making notes in the margins of the transcript. Axial coding was conducted with each transcript. After completing the coding and grouping for each transcript, the themes were named.

Establishing Validity and Reliability

To address external validity or generalizability in this study, a model presented by Polit and Beck (2010) called transferability was considered. Transferability is also called case-to-case translation and reader generalizability. This type of generalizability applies the findings of a study to different people or settings than which are under investigation (Polit & Beck, 2010). Transferability has been described as a collaborative activity where the researcher provides
detailed descriptions (often referred to as thick description) that readers can infer about and “transfer” to people and settings that they have in mind. Transferability connects to concepts presented by (Campbell, 1986) on proximal similarity (his relabeling of the term external validity) and (Lincoln & Guba, 1985) on fittingness (the similarity between two contexts).

As mentioned above, thick description is needed for transferability to take place. This includes the text that is written about the study and other important information that help readers to grasp the context of the study and its participants. This important information includes demographics, characteristics, and settings. In addition to thick description, a study can achieve transferability through the use of the purposive sampling method. Referencing Lincoln and Guba (1985), Jensen (2008), states that with purposive sampling, “participants are selected because they most represent the research design, limitations, and delimitations of the study. Participants most consistent with the research design will enhance the potential that readers can assess the degree of transferability to their given context (Jensen, 2008).” For this study, quota sampling, a type of purposive sampling was used.

Assumptions

The researcher assumes that the participants are honestly and accurately responding to the group interview questions.

Limitations

There are limitations that the researcher considered in conducting this research. The first limitation is that findings cannot be generalized to other Governor’s Schools or students involved in agriculture but may be transferrable to students in programs similar to VGSA. The second limitation considers the self-censorship threat in which students may have censored their responses to the group interview questions. The third limitation considers the Hawthorne Effect
in which participants may have altered their behavior as a result of being observed or studied. To attempt to control threats, participants were advised that the group interviews were informal and were designed to have a conversational tone.
Article 2

Purpose Statement

The purpose of this research study is to find out how students attending Virginia’s Governor’s School for agriculture are engaging with and thinking about agriculture while participating in the program. The purpose of this study was achieved by answering the following questions:

Research Questions

1. How do students in VGSA reflect in blogs on their experiences within the program?
2. How do the students in VGSA reflect in blogs on their change in perceptions of agriculture and agricultural careers?

Population

The population for this study consisted of the 98 students who participated in the 2019 VGSA program.

Sample

For this study, systematic sampling was utilized. Systematic sampling encompasses selecting every nth subject of the population as the sample. Systematic sampling involves defining the population from which the sample will come from, determining the preferred sample size, estimating the size of population, and calculating the sampling interval (Guest, Namey, & Mitchell, 2013). Though there are 98 students in the population, 81 students submitted one blog post. The preferred sample size is 10 students so the sampling interval will be every 8th students’ blog post in A to Z alphabetical order.
Data Collection

One blog post assignment was administered and managed using the Canvas learning management system that each student had access to. An assignment folder was created to manage the distribution of the blog prompts, instructions, and submitted responses. Each blog response was between 200 and 300 words to keep them concise. The responses from participants were contained in the Canvas Learning Management System which is secure and confidential. The blogs used for this study served as web-based diaries where participants were free to type out their perceptions, opinions, and experiences. The blogs were used for thematic analysis and to add thick description to the study (Prescott, Gray, Smith, & McDonagh, 2015). Guiding questions for the blog post assignment include:

1. What is your project?
2. What have you learned about agriculture thus far?
3. How have your perceptions of agriculture or agricultural careers changed since attending Governor's School?

Data Analysis

Blog posts were analyzed using the process of thematic analysis. Thematic analysis is defined as the identification of themes that come out of the data (Burnard, Gill, Stewart, Treasure, & Chadwick, 2008). The data analysis process as described by Merriam and Tisdell (2016) was followed, which begins with open coding. After conducting open coding throughout the assignments, the codes were grouped together to form themes.

Establishing Validity and Reliability

Data triangulation was used to address internal validity for this study. Data triangulation involves using data from a variety of sources (Farquhar, Michels, & Robson, 2020). The data to
be used to triangulate this study was collected via the group interviews in article 1. The two data sets are discussed in the concluding chapter.

Assumptions

The researcher assumes that the students are honest in their reflections on their experiences and perceptions for the blog post assignments.

Limitations

There are limitations that the researcher considered in conducting this research. The first limitation is that findings cannot be generalized to other Governor’s Schools or students involved in agriculture but may be transferrable to students in programs similar to VGSA. The second limitation considers the self-censorship threat in which students may censor their reflections in their blog posts. Controlling for this threat was a challenge as the students were aware that other students would be reading and commenting on their blog posts, and that their blog post could potentially be posted on the public VGSA blog website.
Article 3

Purpose Statement

The purpose of this study was to understand the occupational identity statuses and occupational choices of adolescents enrolled in the 2019 Governor’s School for Agriculture. To fulfill the purpose, the following research objectives were developed:

1. Determine occupational identity statuses of participants.
2. Identify the career goals as indicated by participants before and after the program.
3. Determine if participants’ experiences in the VGSA program had an impact on their occupational identity development.

Population

The participants in this study were 98 high school attending students who participated in the 2019 VGSA program.

Sample

Total population sampling was used. This method explores an entire population with a specific set of characteristics. In this case, the specific set of characteristics are participation in and completion of the 2019 Virginia’s Governor’s School for Agriculture program.

Data Collection

Melgosa’s Occupational Identity Scale was administered to all participants using Qualtrics software, Version 2019 which is secure and confidential, during the first week of the program. Instructions on completing the OIS was read aloud and written on the inventory. Participants had 30 minutes to complete the scale. At the conclusion of the administration, each participant’s responses were downloaded from Qualtrics and scored using the inventory scoring
guide. Upon scoring, the scores were SPSS database. Participants then received an explanation of their score. All responses and scores were secured on a password-protected computer.

A registration survey and evaluation survey were administered using Qualtrics software, Version 2019 which is secure and confidential. Participants received email notification with a direct link to the survey once they became available. Survey responses were downloaded from the Qualtrics software and subsequently entered in the SPSS database. All survey responses were secured on a password-protected computer.

**Instrumentation**

Three instruments were utilized to collect data and achieve the objectives of the study.

**Melgosa’s Occupational Identity Scale**

Melgosa’s Occupational Identity Scale (OIS) is an instrument that measures occupational identity status. It was developed by Julian Melgosa in 1987. The OIS separates occupation from the other domains of religion, politics, intimate relationships, and lifestyle of which the identity status theory developed by Marcia is based on.

Marcia’s identity status theory was developed as an extension to Erikson’s work on adolescent identity development. The theory posits that two important processes are taking place as adolescents are forming their identity. The first process is exploration or crisis in which adolescents are exploring and experimenting with different components of identity such as beliefs, roles, and occupation. The second process is commitment in which adolescents become devoted or dedicated to a chosen identity. The exploration and commitment processes combine and result in four identity statuses: diffusion, foreclosure, moratorium, and achievement (Stitt, 2016). The OIS contains 28 items and uses a 5-point Likert scale ranging from 1 at strongly disagree to 5 at strongly agree. According to Melgosa (1987), reliability coefficients range
between .70 and .87. Concurrent validity coefficients range between .38 and .79 (Melgosa, 1987).

Registration and Evaluation Survey

A registration and evaluation survey were utilized to collect demographic and other characteristic data from participants. Demographic data included grade level, gender, race and ethnicity, parental/guardian education level, and geographic location, grade point average, previous agricultural experience, membership in youth organizations and national standardized testing scores. Characteristic data included career goals and information regarding thoughts on agriculture and agricultural careers.

Data Analysis

Data from the OIS and surveys was entered into and analyzed using the SPSS Statistics Software (Version 25.0). I used descriptive statistics to describe what the data shows (Trochim, 2006). Descriptive statistics were used to run are frequencies and percentages.

Assumptions

The researcher assumes that the participants are honestly and accurately responding to all aspects of the data collection which are the inventories and surveys.

Limitations

There are limitations that the researcher considered in conducting this research. The first limitation is that findings cannot be generalized to other Governor’s Schools or students involved in agriculture but may be transferrable to students in programs similar to VGSA. The second limitation considers the social desirability threat which is when individuals answer questions on surveys and inventories in a manner that they believe will be favorably viewed. To attempt to
control threats, students were advised that the inventories are not tests or assessments, thus there were no right or wrong answers.

**Reflexivity Statement**

In my time as an agricultural education teacher, I engaged with college and career readiness concepts and spent time discussing career choice and options with my students. This is something that I enjoyed doing and I realized that career success is one of the most important ways that young people can reach towards a prosperous life. As a professional in agriculture, I would often encourage my students to consider agriculture as a career path because of its interdisciplinarity and variety of options available. I found that very few students expressed an interest in agriculture and the majority disregarded the idea.

When I decided to come to graduate school, I established my research interest around career choice amongst young people. My goal was to learn the factors that contribute to how youth think about, perceive, and engage with agriculture as a career and academic major. I also wanted to learn about their career interests and choices in relation to characteristics such as identity and influencers such as parents. If programs and settings similar to VGSA can learn more about the factors that influence how youth view agriculture, then ideally the curricula, learning activities, and other outreach methods can be improved and tailored to consider those factors.

I recognize that my identity characteristics are sources of privilege as well as marginalization in life and in the context of this research. In article one of this study where group interviews take place, participants share personal details about their lives as well as their thoughts and perceptions with me. Some of what they shared involves their experiences as
minorities and an advantage of being a minority myself, I believe, is that the participants feel comfortable sharing thoughts and perceptions about racial identity in agriculture. I would say the same for thoughts and perceptions shared about gender and other aspects of identity.

I can remember having less than positive experiences in agriculture as the only person of color or only woman in my agriculture classes or at conferences. My experiences in agriculture has shaped how I think about, perceive, and engage with it and I can understand the thoughts and perceptions that the participants have. There were barriers that influenced my path as well as supports that pushed me along the way. Overall, I want all VGSA students to know that there is a place for them in agriculture. Some will choose agriculture as a career while others will be more agriculturally aware. Either way, there will be barriers (being from an urban area, your parents wanting you to stay home and work on the farm, etc.), but I believe that VGSA can serve as a support by exposing youth to the aspects of agriculture and providing different learning experiences.

Chapter Summary

This chapter introduced the contextual, methodological, and theoretical components of this research. These were covered by providing the context, problem, purpose, objectives, research questions, background, significance, conceptual framework, and research approaches and methods for the research. Findings from the study will be discussed in each individual article.
References


Jones, K., Williams, R. J., & Gill, T. B. (2017). "If you study, the 1st thing you want to be is working under the sun:" an analysis of perceptions of agricultural education and occupations in four countries. *Agriculture and Human Values*, 15-25. doi:10.1007/s10460-016-9685-4


Article 1: Thoughts and Perceptions of Agriculture and Agricultural Careers as Told by Students of Virginia’s Governor’s School for Agriculture

Abstract

Perceptions of agriculture and agricultural careers have been consistently explored in research in regards to choice to follow an agricultural path. In most agricultural education research that studies perceptions of agriculture, the approach and methods are quantitative in nature. This research study offers an exploration of perceptions of agriculture in a qualitative nature with detailed accounts of the participants’ thoughts and perceptions of agriculture and agricultural careers. The findings show that the participants think about and perceive agriculture in similar ways such as having negative views of farming. There are common factors that influence how the participants think about and perceive agriculture which include learning experiences, identity characteristics, and contextual influences. The findings also indicate that participants plan to engage in agriculture in similar ways such as academically, professionally, or by being advocates of agriculture. This research has implications for agricultural education researchers and provides recommendations for agricultural educators and practitioners.

Introduction

The field of agriculture is complex with needs to be addressed regarding utilization of land, food production, management of natural resources, consumption of energy and climate change (Andenoro, Baker, Stedman, & Week, 2016). There must be people ready to take on roles that work on providing solutions to these agricultural issues. Recognizing this, the American Association for Agricultural Education (AAAE) determined that a Sufficient Scientific and Professional Workforce that Addresses the Challenges of the 21st Century was a top research
priority. In the 2016-2020 National Research Agenda published by AAPE, such a workforce is
designated as priority three (Stripling & Ricketts, 2016).

Although this focus area is of importance to the entire agricultural industry, it is
agricultural educators who represent all aspects of agricultural education including K through 12,
postsecondary, non-formal, formal, adult and other areas who must educate people about
agriculture and foster choice of agricultural careers (Stripling & Ricketts, 2016; Edgar, Retallick,
& Jones, 2016).

With the complex issues needing to be addressed within agriculture, it is clear that the
industry has expanded. This means that some professionals in agriculture will need to be
knowledgeable in production and some will need to be knowledgeable in other areas that
represent the complexities in agriculture such as nutrition and big data (Stripling & Ricketts,
2016). The good news is that enrollment in postsecondary agricultural programs is increasing,
and along with an increase in agricultural students, job availability in agriculture is also
escalating. But on the other end, many of the jobs available will go unfilled by students with
expertise in agriculture and employers will turn to non-agricultural graduates (Stripling &
Ricketts, 2016).

To help combat the gap between the number of professionals with expertise in agriculture
entering the field and the number of jobs available, researchers have recommended that
postsecondary institutions develop opportunities to expose youth to the concept of agriculture
and to promote agricultural careers (Stripling & Ricketts, 2016). Programs have been developed
to serve such purpose of educating youth about agriculture. The programs take place in a variety
of settings including formal and nonformal (Enns, Martin, & Spielmaker, 2016).
It is important for such programs to understand how youth make decisions regarding their post-secondary plans (Cannon & Broyles, 2006). Research shows that there are different factors that impact post-secondary interest in agriculture and choice of pursuing agriculture as a career. One of the major factors is access to secondary agricultural education. Agricultural education programs at the secondary level are mostly concentrated in rural areas which creates a barrier for underrepresented students who may live in urban and suburban areas (Bird, Martin, Tummons, & Ball, 2013). Where secondary agricultural education is lacking, colleges and departments of agriculture can partner with local urban and suburban schools to fill in gaps. Research shows that many individuals are not aware of agriculture and its vast career opportunities (Lundry, Ramsey, Edwards, & Robinson, 2015). College partners are primed to share that knowledge. Jean-Phillippe, Richards, Gwinn, & Beyl (2017) found that programming through partnerships and programming centered on urban and suburban youth can serve as a method to garner interest and positive attitudes towards agriculture (Jean-Phillippe, Richards, Gwinn, & Beyl, 2017).

**Theoretical Framework**

The Social Cognitive Career Theory (SCCT) was used as an overarching theory to explore the variables presented in this study. The studies focused on the person inputs, learning experiences, goals and actions. SCCT is considered to be an important and useful framework to use in the exploration of career choice. A significant amount of research suggests that SCCT is helpful in the areas of career interest and performance in addition to career choice (Hackett, 2013). It has been used in a number of fields including agriculture (Fraze, Wingenbach, Rutherford, & Wolfskill, 2011). The concepts of the theory were first introduced by Betz and Hackett in 1981. The theory was published later on by Lent, Brown, and Hackett in 1994. The theory is centered on how people make career decisions as well as the cognitive process of career
choice (Bowden, De Ycaza, & Zinto, 2015). The initial concepts developed by Betz and Hackett applied Bandura’s early work on self-efficacy to the career development of women (Hackett, 2013).

Lent et al. (1994) theorized that career choice is impacted by three cognitive interactions: outcome expectancies, career interests, and career self-efficacy. The theory posits that outcome expectancies and career interests are directly influenced by self-efficacy. Self-efficacy in this case is essentially a person’s confidence in themselves to complete a task. Therefore, according to the theory, a person’s level of self-efficacy and ability to complete tasks for a specific career has an impact on the decisions they make about the career. Self-efficacy theorist Bandura believed that successful completion of a task increases a person’s belief that they can succeed. Positive belief is aligned with career interests and outcomes (Fraze, Wingenbach, Rutherford, & Wolfskill, 2011).

SCCT has set a foundation for interventions that can be used in various areas of career development. In the case of educational and career programs, SCCT suggests directing efforts towards expanding the interests and nurturing the career aspirations of younger students and facilitating career goal setting and implementation in older students (Hackett, 2013). Based on the SCCT framework, VGSA implements career exploration through a career development course and career development activities in the program. Fraze et al. (2011) explains that career exploration helps students to make thoughtful career choices. The activities that students participate in also helps to increase their agricultural literacy and awareness (Fraze, Wingenbach, Rutherford, & Wolfskill, 2011).

When developing interest in agricultural careers, a student’s confidence in being able to complete the tasks that a job requires directly impacts their career choice decision making.
students engage in agricultural activities while in a career exploration process, they can gather information to use in their career choice. After participating in agricultural activities, youth tend to have a more positive perception of agriculture as a career choice (Fraze, Wingenbach, Rutherford, & Wolfskill, 2011).

**Purpose**

The purpose of this study is to understand how youth participants of Virginia’s Governor’s School for Agriculture think about and perceive agriculture and agricultural careers; and the factors that influence their thoughts and perceptions.

**About Virginia’s Governor’s School for Agriculture**

Virginia’s Governor’s School for Agriculture (VGSA) is a summer residential program for rising junior and senior high school students who are considered gifted and talented. The program is designed to provide an academically rigorous and agriculturally focused experience to the “future scientists and leaders of Virginia, the United States, and the World (Virginia's Governor's School for Agriculture, 2019).” While participating in the program, students are able to interact with faculty and researchers in classes and on projects that encompass the USDA NIFA research priority areas as well as agricultural focus areas including agricultural engineering and economics, and the animal, plant, and food sciences.

**Research Questions and Methodology**

To fulfill the purpose of this study, the following research questions were developed:

1. How do the youth participants think about and perceive agriculture as a concept and a career?
2. What influences the participants’ thoughts and perceptions of agriculture as a concept and a career?
3. How do youth see themselves being involved in agriculture after participating in VGSA?

Quota sampling, a type of purposive sampling, (Mack, Woodsong, MacQueen, Guest, & Namey, 2005) was utilized in this study. I selected a sample of the total population that is representative of the 98 VGSA students. The sample was proportional to the population in terms of gender, race and ethnicity, grade level, and geographic location, problem-solving style and identity status.

In order to answer the research questions for this study, group interviews were utilized. The group interviews took place during the last two weeks of the program. Students were asked questions that explore their thoughts and perceptions of agriculture as a concept and career and the factors that have influenced their thoughts and perceptions.

Several questions were asked in the group interviews for participants to respond to:

1. Take a moment and reflect on what comes to mind when you think about agriculture. Please share what that looked or felt like. This question is designed to understand the mental image that participants have of agriculture.

2. What do you feel has contributed to how you think about or view agriculture? This question is designed to identify the factors that have contributed to participants’ perceptions of agriculture. This question also has several additional probing questions to be asked after the initial question:
   a. Has anything you have seen on the news, online, television, that has contributed to how you feel and/or think about agriculture, if at all?
   b. Have your parent(s) or guardian(s) shared strong views or opinions about agriculture that you feel have influenced your view, if at all?
c. Have your friends shared strong views or opinions about agriculture that you feel have influenced your view, if at all?

d. Have your teachers and/or counselors shared strong views or opinions about agriculture that you feel have influenced your view, if at all?

e. How has your race/ethnicity contributed to how you feel and/or think about agriculture, if at all?

f. How has your gender identity contributed to how you feel and/or think about agriculture, if at all?

g. How has where you live or have lived previously contributed to how you feel and/or think about agriculture, if at all?

h. Is there anything additional anyone would like to share regarding what has contributed to your view of agriculture? (e.g. media, history, family and/or friend influence, teacher and/or counselor influence, demographic representation – race, gender, rural, urban, etc., any other factors as identified by students).

3. When I say agricultural career, what do you think of? Please share your thoughts about these careers. This question is designed to understand participants’ mental images of agricultural careers.

4. What value do you place on agricultural careers in relation to other careers in the space of agriculture? For example, agricultural economist and a food science technician. This question is designed to understand how participants might view certain agricultural careers as more valuable than others.
5. What value do you place on agricultural careers in relation to non-agricultural careers? For example, an agricultural economist and a civil engineer. This question is designed to understand how participants might view certain non-agricultural careers as more valuable than agricultural careers.

6. If at all, in what ways have you begun to consider agriculture as a career after participating in VGSA? This question is designed to gauge participants’ interest in an agriculture after participating in the VGSA program.

7. If at all, how has the program changed what might have originally come to mind when you think about agriculture? This question is designed to gauge participants’ change in mental images of agriculture as a concept.

8. If at all, how do you imagine seeing yourself in agriculture?

Participants

For this study, 19 students of the 2019 Virginia’s Governor’s School for Agriculture program participated in the group interviews. There were five groups – group one had five participants, group two had four participants, group three had three participants, group four had two participants, and group five had two participants. The demographic breakdown for group one was all female; of Asian, Hispanic/Latino, and mixed descent; 16-17 years of age; from large towns or cities and one from a small, rural town. Group two was two males and two females; of Asian, Black, and white descent; 16-17 years of age; from large towns, a small city, and a small, rural town on a farm. Group three was all female; of Asian and white descent; 16-17 years of age; from a large town, small city, and a small, rural town. Group four was all male; of Hispanic/Latino and mixed descent; 16 and 17 years of age; from small and large cities. Group
five was three females and two males; of Asian and white descent; 16-17 years of age; from large
towns, and small and large cities.

Data Collection

Data were collected by facilitating five group interviews that took place during VGSA. At the beginning of the program, all VGSA students took Kirton’s Adaption-Innovation inventory (KAI), which is a frequently used inventory in the program to help students understand their problem-solving style. They also took the occupational identity status inventory to learn what their identity status is in regards to choice and commitment to a career. There is a spectrum or continuum for each inventory. KAI's continuum is from adaptive starting at 32 to innovative ending at 160. The occupational identity status spectrum (or quadrant) is identity achieved, identity diffused, identity foreclosed, and identity moratorium. Homogeneous and heterogeneous groups were desired; all adaptive, all innovative, and a mix of both. This was done to see how groups of students with similar and different characteristics (cognitive style and occupation identity status) would respond to the group interview questions that were asked of them.

Once this information was organized (inventories scored and analyzed) a list of names was compiled, groups were formed according to scores and identity characteristics that were representative of the entire VGSA population. The students were asked to stay for a bit after class one day to learn about the group interviews. It was explained that they were chosen to participate in the study based off of responses to the inventories that they’ve taken in the program and by being students in VGSA. It was explained that participation in the group interview is voluntary and that if they signed up, they could still change their mind about participating at any point. Sign-up sheets were passed around and students were told that would receive an email with the details (location and time) of the group interviews that they were
assigned to. Students were also told that the incentive to participate would be pizza from Benny’s, a popular, local pizza restaurant.

**Data Analysis**

Upon completion of the group interviews, interviews were transcribed from mp3 recordings to electronic word documents. The size of the data for this study were relatively small with only five transcripts. Each had a varying number of pages but none more than 30 pages. All data were analyzed by hand, no computer software was used in the data analysis process. The approach to analysis was deductive in nature, as a theoretical framework to apply to this study had already been identified; instead of allowing a theory to emerge from the data. The deductive approach is suitable for studies where the research is aware of potential responses from the participants (Burnard, Gill, Stewart, Treasure, & Chadwick, 2008). This approach has benefits and drawbacks as with any research approach, namely that it is easier and quicker to use but can add bias and limit the development of themes and theory (Burnard, Gill, Stewart, Treasure, & Chadwick, 2008).

As an agricultural education professional who has engaged with youth in similar settings as the participants in this study as well as with youth from similar backgrounds as the participants, I was aware of probable responses. This is augmented by my familiarity with agricultural education research conducted on the Virginia’s Governor’s School for Agriculture as well as with youth in other agricultural outreach programs. There were pre-existing ideas that I had about factors that influence how youth think about and perceive agriculture that I assumed would emerge from the data. These ideas were the race and ethnicity of self and others; gender of self and others; geographic location of self and others; media in formats including but not limited to movies, television, news, book, and social media; parents and family members; peers; school
personnel; and negative and/or disinterested perceptions of farming. Additionally, I expected the participants in this study to have responses that described negative and/or disinterested perceptions about agriculture in general but that they would express a change in perception, having learning about agriculture over the course of the four-week VGSA program.

Constructing Themes

After transcribing the group interviews, the first step was to read the transcript for the first group that I interviewed and begin the process of thematic analysis. Thematic analysis is defined as the identification of themes that come out of the data (Burnard, Gill, Stewart, Treasure, & Chadwick, 2008). I followed the data analysis process as described by Merriam and Tisdell (2016) and began with open coding. Open coding was conducted by highlighting data that were interesting and seemed relevant to the research questions and overall study and by making notes in the margins of the transcript. This is called open coding because I was open to code what emerged (Merriam & Tisdell, 2016). After conducting open coding throughout the entire transcript, I grouped the codes together to begin forming themes. The process of grouping the codes from the first transcript is called axial coding (Merriam & Tisdell, 2016). Throughout this process, I wrote a list of the groupings in a research notebook. I then moved on to the second transcript for the second group that I interviewed and repeated the process with the groupings from the first transcript in mind as described by Merriam and Tisdell (2016). I repeated this process for the third, fourth, and fifth transcript – keeping the groupings from each previous transcript in mind and referring back to lists.

Throughout the data analysis process, I consistently considered the purpose of the study which is to understand how youth participants of VGSA think about and perceive agriculture and agricultural careers and the factors that influence their thoughts and perceptions. I want to know
what they think, I do this by asking questions and listening to what they are saying. In what they say, I am writing down codes and groupings that describe what they think and why. The codes and groupings are reflective of the purpose of the study, the research questions, and the tenets of the social cognitive career theory.

After completing the coding and grouping for each transcript, I named the themes. As described by Merriam and Tisdell (2016), naming themes is “an intuitive process, but is also systematic and informed by the study’s purpose, the investigator’s orientation and knowledge, and the meanings made explicit by the participants themselves (Merriam & Tisdell, 2016).” According to Merriam and Tisdell (2016) the themes should be responsive to the purpose of the study and provide answers to the research questions of the study (Merriam & Tisdell, 2016). Therefore, the themes presented in this study are consistent with the established purpose and research questions. The coding table and codebook is found in appendix F and appendix H.

**Findings**

The data for the group interviews conducted for this study yielded several themes which represent how participants in this case think about and perceive agriculture and agricultural careers, the factors that influence the thoughts and perceptions that the participants have about agriculture, and how the participants see themselves being involved in agriculture after participating in VGSA. The themes provide answers to the research questions of the study and are presented according to the research questions:

How do the participants think about and perceive agriculture as a concept and career?

Theme 1 – Farming

Theme 2 – Broadened view of agriculture and agricultural careers
Theme 3 – Value of agricultural careers within the field and compared to traditionally non-agricultural careers

What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career?

Theme 1 – Relationships with family, peers, school personnel, and mentors
Theme 2 – Identity characteristics
Theme 3 – Learning experiences

How do the participants see themselves being involved with agriculture after participating in VGSA?

Theme 1 – Academically or professionally engaged
Theme 2 – Advocate of agriculture

The excerpts that support each theme are not organized by group interview and instead are organized based on the relevance of the excerpt to the theme. Participants in each group have been given pseudonyms to protect their privacy. The excerpts that accompany each theme have been edited for length and clarity.

RQ 1: Theme 1 – How do the participants think about and perceive agriculture as a concept and career? – Farming

When asked to reflect on what comes to mind when thinking about agriculture prior to participating in VGSA, participants’ responses shared thoughts and perceptions related to the theme of farming. Participants’ thoughts and perceptions of farming were commonly skewed toward manual labor which tends to hold negative perceptions.
Madelyn – When I think about agriculture, I mainly think about the animal side of it – raising livestock and growing crops and stuff. I knew it went beyond farming but I mainly thought about farming.

Peniel – Whenever I thought of agriculture, I just associated it with farms – including livestock but also crops. I didn’t really think about it as any sort of the business or economics and that kind of thing. I only thought about it as the physical farm and the work that’s done.

In these quotes, participants express seeing agriculture as farming. They see it as involving plants and animals being used for production.

In regards to farming and thoughts and perceptions after participating in VGSA, participants expressed having a more complete understanding of farming and a change in thoughts and perceptions of farming that included stereotypes and derogatory terms directed towards those involved in production agriculture.

Nic – I think that this experience has enhanced my understanding of what a farm is and how many subfields of that farm that work together to create a product at the end. You may just see crops and you may see wheat and grain or just the final product but the process through which that product is generated is extensive and has multiple stages that were unknown to me at the beginning. But, the more I learned about it, the more we understood how complex that system actually is.

Kev – Farming is a huge agricultural career. It requires a lot of knowledge on other parts of agriculture. It’s not just planting crops and picking them up. It might’ve been that a couple of hundred years ago, but now we have to worry about weeds, pesticides, GMOs. Some farms have so much land that you need a drone to cover it. Although they are farmers, they still have to worry about all the chemistry and biology, too.

In these quotes, participants express that they still think of farming when thinking of agriculture but also expressed a broadened view of agriculture. This is relevant to the concept of agriculture equals farming because participants realize that farming is agriculture but they may not have the same negative, stereotypical perception towards farming and agriculture.
RQ 1: Theme 2 – How do the participants think about and perceive agriculture as a concept and career? – Broadened view of agriculture

When asked to reflect on what comes to mind when thinking about agriculture after participating in VGSA, participants’ responses shared a common theme of thoughts and perceptions of agriculture as more wide-ranging and broader than previously considered.

*Madelyn* – I’ve always considered agriculture as a career because I have a passion for working with animals and I’ve always wanted to either be a vet or work with horses or do something in that kind of field. But after Gov School, I’ve realized that I have so many more options that I originally thought I did. Because I was like, “oh, if I want to work with animals, I have to be a vet.” But no, I have so many more career choices than I originally thought.

*Belen* – You only think about the 2% of farmers when you think of agriculture. You don’t think about everybody who works in soil management or water quality or all of the other aspects of agriculture that we’ve learned about now but there’s a lot more to agriculture. I always had an interest in chemical engineering and water quality and I had no idea that was agriculture.

Participants expressed that after going through the VGSA program, they broadened their perception of what agriculture is and what agricultural careers entail. Their previous thoughts and perceptions of agriculture and agricultural careers were changed. They realized that agriculture is a part of daily life, which was previously unrecognized by some participants.

RQ 1: Theme 3 – How do the participants think about and perceive agriculture as a concept and career? – Value of agricultural careers within the field and compared to traditionally non-agricultural careers

When asked to reflect on what comes to mind when considering agricultural careers within the field and traditionally non-agricultural careers, participants perceived some agricultural careers within the agriculture industry as less valuable than others. An example of this is the job of a dairy farmer being perceived as less valuable than the job of an agricultural
lawyer. Some participants perceived agricultural careers in general as less valuable when compared with some traditionally non-agricultural careers. An example of this is the job of a plant scientist being perceived as less valuable than the job of a medical doctor. Some participants also either perceived agricultural careers as equally valuable within the agriculture industry and equal compared to traditionally non-agricultural careers. Some also perceived agricultural careers to be equal within the agriculture industry but less valuable compared to traditionally non-agricultural careers.

*Vashti* – In the agricultural industry, there’s a social status. So, if you’re a geneticist or an engineer or someone that has to have a substantial degree to get that sort of job, I think you would be looked at much more highly. Even outside of the agricultural spectrum. If I said that I was an agricultural lawyer, since there’s still a lawyer part attached to that, it’s looked at more highly than a dairy science farmer or someone of that nature.

*Maxine* – I feel that where we grow up and live, people are encouraged to become doctors, lawyers, and engineers. I feel like putting agriculture in front of those might give it a negative connotation to people. You’re not encouraged to go into agriculture because people aren’t really exposed to how much of an impact it really makes on our economy and our country as a whole.

*Ryin* – I personally don’t place a different value on agricultural careers because every single person helps create the products that are served to the population even though it may not seem like it. For instance, the truck driver who drives the fresh product from the farms to the production plants or to the grocery stores. We wouldn’t be able to get that food without them. Driving the food is as important as growing it. So, I feel they all kind of support each other and I don’t see one career as more valuable than another.

The participants expressed that agricultural careers are often looked at as a less-valued career. It is not viewed to be as prestigious as a lawyer or doctor for example in some cases. Personal values and perceptions play a role in how agricultural and traditionally non-agricultural careers are viewed.
RQ 2: Theme 1 – What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career? – Relationships with family, peers, school personnel, and mentors

References to family, peers, school personnel, and mentors were consistent through each group interview. The influence that family members, peers, school personnel, and mentors have can be considered positive or negative according to how participants describe the interaction or conversation that they have with these people in regards to agriculture and agricultural careers.

The experiences, behaviors, thoughts, and perceptions of family members serve as a reason why participants think about and perceive agriculture and agricultural careers in the way they do. Family members who grew up on farms or expressed disapproval with participants’ choice to attend VGSA have influenced how the participants think about and perceive agriculture and agricultural careers.

Similar to family members, peers have an influence on participants’ thoughts and perceptions. Peers who previously participated in VGSA and encouraged participants to attend, assumed attending VGSA meant that participants wanted to be farmers and shared their agricultural background with participants have influenced how the participants think about and perceive agriculture and agricultural careers.

School personnel such as teachers, counselors, and advisors have an influence on participants’ thoughts and perceptions similar to family members and peers. The school personnel that the participants engage with in agricultural education teachers who share thoughts and information about agriculture that encourage youth to participate in agriculture or pursue an agricultural careers. Some school personnel also share thoughts and information that discourages youth to participate in agriculture or pursue an agricultural career.
The mentors that participants most referred to were within VGSA – the Governor’s School Leaders – whom participants spent a significant amount of time with, served in the capacity of mentor through the nature of their job. The Governor’s School Leaders or GSLs accompanied all VGSA students to their classes and field trips, assisted with research projects, and facilitated fun activities, and supported the overall well-being of the students. Participants would ask GSLs, who were often majoring in agriculture, questions about agriculture and agricultural careers. Additionally, the faculty members of Virginia Tech who taught classes or facilitated field trips also served as mentors whom participants sought guidance and advice from in regards to participating in agriculture.

When asked to reflect on what comes to mind reflecting on influences on thoughts and perceptions of agriculture and agricultural careers, family members were often mentioned.

**Ryin** – My dad grew up on a farm and so he’s very interested in it. For instance, all this stuff in the news now talking about farms and big corporations and he knows it from a small farm standpoint and how the day to day things work. And sometimes I actually call him, we’ll just say hi and then I talk about what we’ve been doing in Gov School and he gets very into it and he starts talking about a bunch of different things about how when they milk the cows, how they milk the cows and stuff like that.

**Michel** – My parents make it seem like farming is a good lifestyle. They can support themselves. I know we have family friends that have their own chicken coop or they have a nice, small field of plants and crops. So, they always put a positive image on agriculture for me. And honestly, I think when I’m older I might do a small farm as a side hobby.

**Rafael** – Both of my parents are very urban and lived in urban areas, but I have grandparents that have agricultural backgrounds. For instance, my grandfather was a farmer. He wasn’t on it all of the time but he did own a farm. However, that almost gave my dad a more negative view of agriculture, just because he had seen both the urban and agricultural world and he much preferred the urban world. And some of that has leaked into me.

When I came here to Gov School, my mom was like “oh, I don’t want you to be a farmer.” And I was like, “that’s not really going to happen.” But at the same
time, it’s not about becoming a farmer, it’s learning about how to change the industry, to become more modern.

**Clara** – When you say agriculture in my family – I should preface this by saying we’re very traditionally Asian. We have that stereotypical mindset in my family. And so, when you say agriculture, they instantly think farmer and think that that’s on the other end of the spectrum. That’s not what you want to strive for. You don’t want to be in the agriculture industry. Even when I told my relatives that I’m going this summer to a school to learn about agriculture, they were like, “why would you want to do agriculture? That makes no sense. Why didn’t you apply to the Governor’s School of Medicine?” It was just seen negatively. I wasn’t making the right decision.

It is clear through these participants’ responses that family members influence how they view agriculture and agricultural careers. The influence that family members have can be considered positive or negative and the influence is established through conversations with parents about their background, and conversations about attending VGSA.

Like family, peers were mentioned as an influence on how participants think about and perceive agriculture and agricultural careers.

**Jasmine** – When I told my friends that I was coming here to Gov School, they were like, “why? What could you do in a month? That’s so long about agriculture. There isn’t that much to it” But let’s say somebody was going to the engineering Governor’s School, then they’d be like, “oh my gosh, wow. That’s so impressive.”

**Michel** – A lot of people in the grade above me know about the Gov School of Agriculture. A couple of them had already went. Because of that, I feel that the people I talked to understood that agriculture isn’t just farming, it’s also life sciences.

It is clear through these participants’ responses that peers influence how they view agriculture and agricultural careers. The influence that peers have can be considered positive or negative and is presented largely through conversations with friends and classmates.
School personnel such as teachers, counselors, advisors, and administrators were mentioned as an influence on how participants think about and perceive agriculture and agricultural careers. Some of influences from school personnel were positive while others were more negative.

**Madelyn** – My vet science teacher told me about Gov School. She also sponsors FFA at our school. She’s taught us a good bit about FFA and the vet science and dairy science team. She’s the one who told me about Gov School and how it would be a good opportunity to learn more about agriculture.

**Maxine** – When I heard about Governor’s School for Agriculture, I didn’t really know if I wanted to apply for that one. My counselor was telling me, it’s not just farming, it’s a whole industry and its so much more than what you think; and it would be a really great opportunity. So, I’m really glad that I did apply and if she didn’t push me to do it, then I probably wouldn’t have come.

**Clara** – None of the counselors really talk about Gov School for Agriculture. All they said was it was pretty easy to get in and no one really applies because no one cares about agriculture. That’s why I chose to apply, because no one cares about agriculture up in Northern Virginia and Gov School is really different.

It is clear through these participants’ responses that school personnel influence how they view agriculture and agricultural careers. The influence that school personnel have can be considered positive or negative and the influence is established through conversations about the agriculture industry and which Governor’s School program to apply to and why.

Mentors were mentioned as an influence on how participants think about and perceive agriculture and agricultural careers. Participants often referred to Governor’s School Leaders and their class instructors in a positive way.

**Darius** – One of our GSLs Max was part of the FFA. I had no clue what that was before coming here and I don’t think anyone at our school or in our county has even promoted anything like that; if they did, that would be nice as well as eye opening for our community.
Kev – I actually appreciate the professors and graduate students who take the time out to talk to us. In the classes we have, I stay back and talk to them about their research and what they’re doing. I learned that a lot of them grew up in Northern Virginia with little to no farm experience but here they are teaching at Governor’s School for Agriculture. It just showed me the applications that a specific major can have. And honestly, now I feel that everything can be related back to agriculture, regardless of what it is.

It is clear through these participants’ responses that mentors influence how they view agriculture and agricultural careers. The influence that mentors have can be considered positive or negative and the influence is established through conversations and engagement with leaders and other important figures.

The participants expressed different ways that individuals in their lives influenced their decision to engage with agriculture. Influence was split between showing support for the decision and being against it. Some of the participants had family and teachers who had experience in the field and encouraged engagement. Other individuals in the participants’ lives found agriculture to be a pursuit that is not worthwhile.

Like family members, peers served as an influence on how the participants thought about and perceived agriculture and agricultural careers. Some participants had a change in attitude towards farming and agriculture because of newly made friends at VGSA. Other participants may have considered not attending VGSA if the opinions of peers who are VGSA alumni had not had a positive influence. Some participants have peers who mocked that they must’ve wanted to become farmers by going to learn about agriculture. School personnel also served as an influence through encouraging or discouraging participants to attend VGSA. Self-efficacy and outcome expectations, and thus career choice, can be undermined or bolstered depending on the influence from school personnel serves as a support or barriers (National Academy of Engineering, 2018). Participants reported being encouraged to attend VGSA by their teachers,
counselors, or advisors while some participants were told to not apply. The thoughts and perceptions that individuals in the participants’ lives have about agriculture has an impact on participants but the feedback given served as weaker barriers than the more supportive influences. The mentors that participants referred to in their interview responses had a generally positive influence on their self-efficacy and outcome expectations – especially in regards to agricultural careers.

Family members, peers, school personnel, and mentors serve as sources of information and/or contextual influences that shape the career choice process according to SCCT (Lent, 2013). Family members engage in supportive conversation about what a participant is learning in VGSA, peers taunt a participant for their interest in VGSA, an agriculture teacher encourages a participant to attend VGSA, and a GSL shares details on their path to through agriculture – all of these are examples of influences on self-efficacy and outcome expectations that were shaped before and during VGSA. While I did not follow up with the participants after the conclusion of this study, I assume that continued to be influenced by family members, peers, school personnel, and mentors when they returned home, started the new school year, and will continue to be influenced throughout their career development.

RQ 2: Theme 2 – What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career? Identity characteristics

What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career?

A consistent theme that emerged from the group interviews was identity characteristics in agriculture and the representation of those identities. Representation refers to different people that represent different aspects of human society in terms of race, gender, geographic location,
ability, and other forms of culture including immigration and political affiliation. In terms of who participants see represented in agriculture, they often referred to the population of people who are often present at conservative political rallies and make up the conservative base. These individuals often, but not exclusively, live in rural areas which for some participants means farmers. Essentially, some participants see agriculture as a space for white people in general, and especially those who live rurally and represent ideals that conflict with their ideals and sometimes, their identity characteristics as minorities, immigrants, urban dwellers, etc. Participants often cite the news and social media as sources of information regarding representation in agriculture but also cite experiences in VGSA.

In addition to social and cultural identity characteristics, some participants’ responses showed that occupational identity has an influence in how youth think about and perceive agriculture and agricultural careers. When asked to reflect on agricultural careers specifically, many participants indicated that they had already decided on a career outside of agriculture and had what could be considered an identity achieved occupational status. Other participants’ responses also alluded to having an identity achieved occupational status but they expressed a change in their previously chosen career option after being presented with agricultural career options that were viable alternatives. Some participants that indicated that they had not yet chosen a career, had what could be considered identity moratorium or identity diffusion occupational statuses and were open to an agricultural career after learning about the variety of options. Many participants wished that they had learned about agricultural careers earlier.

Participants typically see agriculture as a white-dominated field as well as a gendered field. Many shared thoughts and perceptions about agriculture and agricultural careers that centered farming and traditional agriculture.
Traci – I subconsciously associated folks who were in the agriculture industry with a sort of conservative lifestyle. I just assumed that everyone who owns a farm or who lives in the country has a kind of conservative mindset because of what they showed on the news and how, you know, the farmers would come out to support republicans.

Anytime you would see President Trump’s rallies and things, they would always have a negative connotation around them. And having associated a lot of farmers and people from rural areas with his presidency and the negative connotation surrounding it just blended together for me.

Vashti – I think that one of my perceptions is that every farmer in America, especially Southern Virginia in general, is thought to be stereotypically white, Confederate white too. I know that there was definitely some fear with people coming down here. When I was talking to some of my friends, they were worried about coming to Southern Virginia because I know that culturally, the differences are very stark politically and kind of in every regard. And I’m going to be honest, it has been kind of true.

Almost every single professor that we’ve had has fit, not the cultural stereotype, but has been Caucasian. But, I realized that there’s still more out there. It’s not just Confederate soldiers on a farm.

Maxine – I think that it might’ve been ingrained in peoples’ minds that a farmer would be a man because it was seen as a labor-intensive job. It’s a lot of hard work and women were seen as weak or something and they couldn’t handle that so they’re job was to stay in the home and take care of things. So, I think that once people see how broad the industry is and that even women can work in the field and stuff, they they’ll realize it’s not just the stereotypical thing that they think it is.

Participants expressed viewing agriculture as something that takes place in rural areas and a field that is largely comprised of white males. They came to this conclusion based on how information is given to them. Whether it was seeing the type of people that attends the President’s rallies or who they see depicted as a farmer in media, there is a certain image of who is in agriculture.
Regarding immigration, participants shared thoughts and perceptions about agriculture and agricultural careers mostly in the context of immigrants from South Asian countries which reflect their cultural backgrounds.

**Peniel** – *My grandparents came to the U.S. when they were in their 20s for graduate school. After coming here, they weren’t getting a degree in farming. They weren’t saving up all their money to come here and go work on a farm, they were going to cities to get jobs in technology and that kind of thing. I think that’s the mindset for a lot of immigrants in the more recent years. I guess you could say that has kept the agricultural industry, for the most part, to be people who were already in it – people who for them it was a family business that went back a long time and that kind of thing.*

**Savannah** – *I completely agree with the immigration thing. I’ve always thought about agriculture as a white male type of thing and it’s been that way through history. I don’t think there has been much incorporation of immigrants and stuff, especially because a lot of them came on visas for work and I don’t think a lot of them were on work visas for farms. So, my perception before was that agriculture is an industry where white males are going.*

**Traci** – *When people come over here to immigrate, they’re looking for jobs and a stable lifestyle and I don’t think they would see farming or living in the country as the kind of life they came here for.*

Participants expressed viewing agriculture as something has not been an area of interest for certain groups of immigrants due to the desire to pursue other career paths. The participants indicate that agriculture would not have been viewed as a viable career path for immigrants.

Participants referred to their geographic location as an influence to how they think about and perceive agriculture. The majority of the participants live in urban counties in Northern Virginia (NOVA) in the Washington, DC metropolitan area, though some live in more rural counties. Again, agriculture was or still is associated with farming and traditional agriculture and for some participants, that means that agriculture is an industry of the rural south. An assumption that is common in many of the responses is that farming or agriculture does not take place in
NOVA. Had VGSA taken place in NOVA or highlighted instances of urban agriculture, perhaps that assumption would not be present.

**Jasmine** – We come from NOVA and I feel that agriculture is kind of not shown to you as a career option there because people expect you to become doctors, engineers, something more. Since we come from NOVA, more people do that kind of stuff.

**Madelyn** – I live in a pretty rural area and just driving down the road where I live, you see dairy farms and horse farms everywhere you look. I feel that seeing that has given me more appreciation and respect for how hard people work to produce food for us.

**Traci** – Growing up in NOVA, I never thought about agriculture as its own entity. Food was on the table and we went to the supermarket to buy all the food. But, I never actually thought about where it comes from and who puts the effort into it. Every step of the process, someone’s involved and that all has to do with agriculture.

The participants expressed how their geographic location influences their thoughts and perceptions of agriculture and agricultural careers. Where participants live speaks to exposure to and engagement with agriculture.

Identity status was an influence on how the participants think about and perceive agricultural and careers because regardless of learning more about the agricultural industry and the careers that are available, some participants had already decided on a career outside of agriculture and were not interested in changing. Some participants shared that they had chosen a career previously but were considering changing their choice because of their new awareness of agricultural careers.

**Kiara** – Now that I’m here at Gov School, some of the jobs were actually really cool but I already have my job decided. But, if those jobs were I the mix when I was picking a career, maybe one could’ve won.
**Ryin** – I’ve rethought about what I want to do career-wise. I feel as though now I have so many options and I’m not going to be afraid if this pre-med thing doesn’t work out. I could go to the animal side and still be involved in medicine or I could even go to the plant science side, that helps people too because it creates more sustainability and durability of crops that could help people with their health and stuff like that.

**Clara** – Even if I don’t end up in a major in the school of agriculture, I think I would take a class or two. It’s always there for me on the able if I really want to pursue it. I’m still unsure, even though I’m a rising senior.

Participants’ responses indicate different occupational identity status such as identity achievement where careers are already chosen and identity moratorium where careers are not yet chosen. With a chosen career, participants can still consider agricultural careers as alternative options.

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**RQ 2: Theme 3 – What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career? – Learning experiences**

What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career?

In their responses, participants referred to VGSA as a factor that has influenced how they think about and perceive agriculture and agricultural careers. The activities and programming that the participants participated in are sources of information about agriculture and agricultural careers that affect their beliefs about engaging with agriculture. Some participants’ self-efficacy towards pursuing an agricultural career was increased as a result of participating in VGSA. In addition to career choice, some participants had increased self-efficacy towards other forms of engagement with agriculture such as gardening or minoring in an agricultural academic area.
School-based experiences such as having taken agricultural education courses or participating in FFA served as sources of information about agriculture and agricultural careers. As not all participants had access to agricultural education classes or agricultural organizations in their schools, other forms of school-based learning experiences serve as sources of information about agriculture and agricultural careers. Namely, participants recall only learning about agriculture in the context of history or social studies classes.

Participants also referred to seeing agriculture and agricultural careers being depicted in media such as television, news, and film. Media serve has sources of information that create learning experiences. Some background contextual factors such as previous experience with agriculture, determine how the participants attend to the information garnered from media. Some media portrays agriculture in a conventional way – such as showing a farmer in cowboy boots in a field. This imagery is reflective of traditional agriculture which is an important aspect of agriculture but is not reflective of other aspects of agriculture, including those that some participants might identify with more closely such as urban agriculture.

**Darius** – *I think that the best part of this whole Gov School experiences has been the field trips and all of the hands-on experiences and experiments that we’ve done here. Trips to the farm, watershed, labs and stuff like that. It’s really opened my eyes and changed my mind on what agriculture really is.*

**Maxine** – *Going to the engineering lab and seeing what they do and the research they conduct – they’re changing the future, which is not what you would think of agriculture being.*

Participants expressed that participating in the different field trips and experiences in VGSA influenced how they thought about and perceived agriculture and agricultural. The program made their thoughts and perceptions more comprehensive.
When asked to share what has contributed to their thoughts and perceptions regarding agriculture and agricultural careers, participants mentioned the way agriculture was presented in school.

**Jasmine** – *I think the school system. In history we learn about the ancient people – they were agriculture based and they were hunters and gatherers. All they did was farm and hunt. And also, when we’re little, the story books. Old McDonald, all that stuff has to do with farming and raising livestock and nothing about economics or engineering or anything like that. Our teachers don’t really talk about agriculture. I guess the most would be in history class when we talk about the agricultural revolution.*

**Savannah** – *When I think of agriculture, I used to think of history class when they teach you about how people build societies and everything. They talk about how agriculture plays a role. I think that’s the first time I actually incorporated agriculture as a theme. That’s what I thought about before and now I kind of think about it differently because here at Gov School we go deeper than just the Neolithic Revolution. We look at water quality and then we go to farms. We see how it impacts our daily lives.*

Participants expressed a lack of learning comprehensively about agriculture in school. If agriculture was mentioned, it was limited and in the context of history and childhood nursery rhyme figures.

Some participants discussed learning experiences in the context of school-based agricultural education.

**Aliya** – *It was the classes that I took in high school, it was plant science and all the FFA related stuff. It was all agriculture-esque.*

Not all participants lack access to agricultural education in school. Here, a participant expressed influence from agricultural education classes.
Participants also shared responses that highlighted media as a reason why some participants think about and perceive agriculture the way they do.

**Clara** – On the news back at home, when they talk about agriculture, they show pictures of just farmland. You don’t see the milk processing factory or anything that looks remotely technology-based. You see tractors but it’s always the cornfields and you never really understand that there’s more than that. No one thinks that the clothes you wear are a part of the agricultural industry.

**Kev** – Anytime they talk about GMOs on the news, it’s always been associated with a farm. They always have a picture of a farmer, a picture of a farm. But they don’t talk about biopharmaceuticals, biotechnology. They never make that connection to agriculture and how they’re related.

**Peniel** – Without any direct exposure to agriculture and the varieties of professions and things like that, I just sort of directly associated agriculture to farms. And that is perpetuated by the media – that was pretty much the only exposure I had to it.

Participants expressed they learned about agriculture through what is presented through media. The information in media that participants refer to largely presents agriculture along with imagery of farms.

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**RQ 3: Theme 1 – How do the participants see themselves being involved with agriculture after participating in VGSA? – Academically or professionally engaged**

The ways that the participants could see themselves being involved with agriculture after the program was most commonly in academic or professional settings. In academic settings, participants indicated consideration of pursuing an agricultural major. Participants also indicated consideration of choosing a minor in an area of agriculture or taking some agriculture classes. In professional settings, participants indicated consideration of pursuing or applying for agricultural jobs.
Aliya – There’s a farm near my house and around October they hire teenagers for seasonal jobs and I feel that would be a practical job for a senior so that I can be involved in agriculture.

Clara – I’m considering a degree in one of the agricultural sciences because it was something I never thought of before. Now I see how interesting and compelling agriculture is and it makes me want to explore it more.

Maxine – I think that being in a bioengineering field or something, it’s not directly on the farm but it’s still really important and it could change the future for the better. I feel that might be something I would be interested in, too.

Participants expressed different ways to be involved in agriculture that reflects thoughts about academic and professional paths.

RQ 3: Theme 2 – How do the participants see themselves being involved with agriculture after participating in VGSA? – Advocate of agriculture

In addition to discussion of academic and professional involvement with agriculture, participants described other ways to be involved. The ways that they discussed are reflective of being advocates of agriculture. Advocates of agriculture are important, as they have agricultural awareness and literacy. As advocates, the participants can go on to address the misconceptions and negative perceptions of agriculture that those around them might have. The participants recognize their newfound knowledge in agriculture and recognize that they can utilize it to educate others.

Ryin – Now that I have this really strong foundation in agriculture, I feel that I could debunk what people are thinking about agriculture and the people who foster the negative connotations around it. I could help educate the population on needing solutions to the problems we have that are having detrimental effects.

Traci – I can show off my knowledge about agriculture. When I get back home, I’ll say I went to Governor’s School for Agriculture. Everyone will be like, “oh, so you were a farmer huh?” And I’ll say “no, we did some water quality testing and did you know that they fly drones over the farms to figure out what crops got ruined and what needs attention? And there’s a lot of economics
involved with how it goes from the farm to your plate and all that.” I feel that I have the opportunity to share with other people so that they’re more educated as well. That’s what I want my role in agriculture to be for the foreseeable future.

Participants of VGSA expressed that they have learned new concepts while attending the program. The newfound knowledge they have can be used to engage with and advocate for agriculture.

Discussion

The findings of this study show that the participants think about and perceive agriculture in a variety of ways and also have varying thoughts and perceptions about agricultural careers. The thoughts and perceptions that emerged from the data were categorized into themes which are organized by research question as followed:

1. How do the participants think about and perceive agriculture as a concept and career?

Theme 1 – Farming

Theme 2 – Broadened view of agriculture and agricultural careers

Theme 3 – Value of agricultural careers within the field and compared to traditionally non-agricultural careers

2. What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career?

Theme 1 – Relationships with family, peers, school personnel, and mentors

Theme 2 – Identity characteristics

Theme 3 – Learning experiences

3. How do the participants see themselves being involved with agriculture after participating in VGSA?
Theme 1 – Academically or professionally engaged

Theme 2 – Advocate of agriculture

The thoughts and perceptions that participants shared in the group interviews reflect their points of view and biases about agriculture and agricultural careers. According to the social cognitive career theory, the insights shared are predispositions which function as an individual characteristic. Predispositions are affected by background contextual influences such as location of hometown and they have an impact on proximal contextual influences as well as learning experiences. The data that emerged from this study shows that the participants are predisposed to view agriculture and agricultural careers the way they do because of where they live, who they see represented in agriculture, what people they know told them, how much exposure they’ve had to agriculture, and what they’ve seen in media.

**How do the participants think about and perceive agriculture as a concept and career?**

Research question 1, theme 1 (How do the participants think about and perceive agriculture as a concept and career? Theme 1 – Farming) discussed farming as what the participants frequently brought up when asked about their thoughts and perceptions on agriculture. The data presented in this theme speaks to agricultural education literature that discusses youth’s correlation of agriculture as farming (Scherer, 2016; Holz-Clause & Jost, 1995). Farming and agriculture are related, as farming is the foundation of many components of agriculture including the food system. The problem is some participants have a negative, stereotypical perception of agriculture as low paid, backbreaking work. This phenomenon was discussed in research conducted with Governor’s School for Agriculture in 2006 in which researchers determined that the students had a more negative perception of farming and dated information on agriculture in general (Overbay & Broyles, 2008). Additionally, some
participants expressed views toward farming that were apathetic, as they indicated that they did not think much about farming beyond animal and plant production or did not have a reason to think about at all. In an older but relevant article, Lyson (1986) proposes three reasons why most people are apathetic toward farming: having little familiarity with farm life, disconnect between cost of food and farming conditions, and the view of a troubled farm sector as general ups and downs of the economy (Lyson, 1986).

Participants shared thoughts about farming which serves as a factor to how they perceive agriculture. There are different sources of information which shaped their thoughts which include imagery from media, conversations with family members and other individuals, and content covered in classes. In terms of the Social Cognitive Career Theory which this study is based on, the data represented by this theme is supported by concepts presented in the theory. Media, conversations, and education serve as learning experiences that affect self-efficacy and outcome expectations (McGregor, 2007). These learning experiences are sources of information that go on to shape career interest and choice (Lent, 2013). Participants are taught that agriculture was essential to building civilization but most had no access to agricultural education. Additionally, they have seen television shows, movies, and news stories that depict agriculture and farmers in a traditional and stereotypical way and have been told that agriculture is not a worthwhile pursuit by individuals in their lives. The effect of these learning experiences leads to a low likelihood of that participants developing an interest in agriculture and choosing it as a career. The opposite can be said of participants who have access to agricultural education programming in school. They could discern the imagery about agriculture in presented in media, and were encouraged to pursue agriculture. These participants have often developed an interest in agriculture and chosen an agricultural career.
Research question 1, theme 2 (How do the participants think about and perceive agriculture as a concept and career? Theme 2 – Broadened view of agriculture and agricultural careers) discussed wide-ranging, broadened views of agriculture and agricultural careers. Participants left the program with a variety of ideas on what agriculture is to them. Overall, participants shared that they think of engineering or economics and other aspects of agriculture that they hadn’t previously thought about. The programming through VGSA that participants engaged in serves as learning experiences and sources of new information on agriculture and agricultural careers. Websites and literature on agricultural careers paired with engagement with agricultural professionals and mentors shaped these learning experiences which go on to affect self-efficacy and outcome expectations. In terms of self-efficacy and outcome expectations, participants may ask themselves if they can do an agricultural career and may think about what would happen if they pursued an agricultural career. Some may go on to establish interest in an agricultural career and follow that path but others may not, depending on the perceived self-efficacy and outcome expectations. As the social cognitive career theory explains, there are other factors aside from new information learned about agriculture and agricultural careers which include person inputs such as your occupational identity status and influences such as parents’ opinion of agriculture.

Research question 1, theme 3 (How do the participants think about and perceive agriculture as a concept and career? Theme 3 – Value of agricultural careers within the field and compared to traditionally non-agricultural careers) discussed the value of agricultural careers within the industry and compared to traditionally non-agricultural careers. Value is another individual characteristic that impacts perception of agriculture and agricultural careers. Values are shaped by environment and they have an influence on career interest and choice. The data
shows that some participants view agricultural careers as equally valuable because all careers contribute to the work of agriculture. Other participants see agriculture as less valuable than careers such as medical doctors. Within agriculture, some participants place more value on STEM-based agricultural careers than those perceived as having less to do with STEM. Overall, these participants seemed to place more value on STEM-based careers in general and discussed being encouraged to pursue those types of careers. Many agricultural careers are STEM-based and require STEM skills and competencies (DiBenedetto, Easterly, & Myers, 2015) and if participants ultimately choose a STEM-based agricultural career, then progress is made toward closing the gap on the number of agricultural careers available and the number of agricultural professionals with the skills and competencies needed for the 21st century workforce (DiBenedetto, Easterly, & Myers, 2015).

Ultimately, before VGSA, participants saw agriculture as farming, and farming as land with animals or plants. After VGSA, participants had a more holistic view of farming and a broadened view of agricultural careers. Participants viewed agricultural careers as equally valuable when compared with other agricultural careers and traditionally non-agricultural careers or saw less value in some agricultural careers and less value compared to some traditionally non-agricultural careers. There are different factors that influence how the participants see agriculture, some of which have been described and will be discussed further along with other factors in the next section.

What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career?

Research question 2, theme 1 (What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career? Theme 1 – Relationships with family, peers,
school personnel, and mentors) discussed relationships with family, peers, school personnel, and mentors as an influencing factor to the thoughts and perceptions the participants have of agriculture. The data presented in this theme shows that family members can influence how the participants think about agriculture and agricultural careers through the experiences and perspectives that they share with the participants. This finding is supported by literature which states that family members have an influence on career choice (Porfeli & Lee, 2012; Lent, 2013). Family members who lived or worked on farms reinforce the concept that agriculture = farming. The information that family members shared with the participants could be considered positive, negative, or even neutral as indicated by how participants described what their family members told them and how they described the impact. Family members also shared some negative feedback with participants regarding their choices to engage with agriculture and participate in VGSA. Despite this feedback, participants still decided to attend VGSA. This phenomena can be explained through a point from Lent (2013) which is that negative influence may be a weaker barrier compared to more supportive barriers (Lent, 2013) such as a friend was also attending VGSA, an opportunity to have a pre-college experience at Virginia Tech, or even that they heard from past attendees that VGSA was a fun experience. Not all participants received less than positive feedback from family regarding agriculture and agricultural careers. Some of the information shared with participants about farming had a positive impact on their perceptions of agriculture.

Research question 2, theme 2 (What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career? Theme 2 – Identity characteristics) discusses identity characteristics in the context of gender, race, ethnicity, geographic location, immigration and occupational identity. The aforementioned characteristics are examples of
person inputs which in the SCCT, interact with contextual influences and shape self-efficacy and outcome expectations. In regards to gender, participants brought up the concept of gender role socialization. Gender role socialization is the internalizing of social and cultural beliefs about how genders should behave; these beliefs can be shared in subtle and explicit ways (Heppner, 2013). Participants described agriculture as a gendered field, mostly due to societal perceptions of farming as male-oriented due to the laborious nature of the work but also due to who they see represented in agriculture. Sources of information for the perceptions of gender representation in agriculture were based on historical contexts but also observations made in VGSA. These learning experiences and contextual influences pair with other learning experiences and contextual influences such as family members, peers, books, or engagement with farmers.

Participants also shared responses that indicate that race and ethnicity influence how they think about and perceive agriculture and agricultural careers. Race and ethnicity were discussed in terms of others – how agriculture is largely made up of other people who do not look like some of the participants. As discussed previously, farming comes to mind for the majority of the participants and according to the USDA 2017 agriculture census, of the 2,042,220 farms in the US, 1,973,006 of those farms have white producers (USDA NASS, 2017). These numbers support why participants view agriculture as a white-dominated field. The participants have formed their views of agriculture and farming by seeing media imagery of rallies for the president in which farmers are present. American farmers tend to support republican presidents and largely support President Trump and make up a significant portion of his base (Bennett, et al., 2018). Associating agriculture with white, conservative farmers influenced how participants view agriculture and also created an anticipated threat to experience a racist incident while traveling down to Blacksburg for VGSA.
Where participants live, or their geographic location, also influences how they thought about and perceived agriculture. Participants largely live in urban counties in Virginia though some live in rural counties. Urban dwelling participants tended to assume that agriculture and farming does not take place in their counties at the level that it does. Most participants live in Loudoun, Fairfax, or Prince William counties in Northern Virginia. Loudoun county has 1,259 farms with 121,932 acres of farmland, Fairfax county has 117 farms with 5,937 acres of farmland, and Prince William county has 304 farms with 22,874 acres of farmland (USDA NASS, 2017). The assumption on lack of agriculture in the participants’ urban counties is likely due to overall lack of interest in engaging with farms and agriculture as a whole. Additionally, participants expressed that people encourage them to pursue careers in medicine, law, and STEM, and that agricultural careers within the same vein as STEM for example, would be negatively perceived by the public. Rural dwellers had a more positive perception of agriculture by recognizing the aspects of agriculture within their hometown.

Some of the participants for this study were immigrants themselves or identify with the experiences of immigrants who are family, friends, or other members of their community. Immigration is an identity characteristic that functions as a factor that influences how the participants think about and perceive agriculture. Participants shared that immigrants that they know came to US to obtain education and careers in areas that did not include agriculture. Again, agriculture equals farming and farming is for white men.

Another identity characteristic that was discussed in the group interviews is occupational identity. Occupational identity is described as the alignment of the self with a career or occupational roles. Occupational identity is one of areas of development that adolescents go through according to Erikson and Marcia who created the theory of psychosocial development
and theory of identity status, respectively. There are four identity statuses (achievement, foreclosure, diffusion, and moratorium). The participants represented three of those statuses – no participants indicated having identity foreclosure. The identity statuses of the participants (and the VGSA population) was determined using Melgosa’s occupational identity scale. Identity achievement means that a career was chosen after time exploring career options. Identity foreclosure means that a career was chosen without having spent time exploring career options. Identity diffusion means that a career has not been chosen and not much exploration of career options is taking place. Identity moratorium means that a career has not been chosen but some exploration of career options is taking place. Participants in the study who expressed that they chose a traditionally non-agricultural career before VGSA would be identity achieved, as they already have an occupational identity and do not see agriculture as a viable alternative at the moment. Participants who expressed being unsure about their career choice would have identity diffusion or moratorium, as they were unsure about their career choice and were considering agricultural career options.

In all, identity characteristics serve as a factor that impact how the participants think about and perceive agriculture. They often work in tandem with contextual influences which impact learning experiences that shape self-efficacy and outcome expectations. An example of this is being a female and having been socialized to believe that farming (and thus agriculture) is work for a male. That experience is then compounded by only seeing male farmers in books or movies. Another example is being a racial minority and immigrant and having learned about slavery in Virginia and US in which enslaved people were forced to work land and produce agricultural products for slave owners. That experience is then compounded by seeing white farmers at political rallies where the rhetoric is in conflict with your very existence. These
phenomena shape belief in capabilities to engage with agriculture as a student or professional and shape the perceived outcomes of doing so. In addition to gender, ethnicity, race, and immigration, geographic location also has an impact on thoughts and perceptions of agriculture and agricultural careers. Interest in agriculture is likely higher if it is recognized as being a part of hometown culture or if there is recognition and engagement with agriculture in the hometown. Lastly, participants with an established occupational identity is less likely to be interested in choosing an agricultural and those without an established occupational identity may be more open to choosing an agricultural career. Even with established occupational identities and chosen career paths, it is possible for participants to consider an agricultural career as a viable alternative in the future as circumstances change – shifts in interests and values, job loss, etc. (Lent, 2013).

Research question 2, theme 3 discusses (What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career? Theme 3 – Learning experiences) learning experiences as a factor that influenced participants’ thoughts and perceptions about agriculture and agricultural careers. This is explained by the social cognitive career theory. Experiences from VGSA, content learned in class, access to SBAE, and media all shaped how participants view agriculture. VGSA provided opportunities for the participants to build self-efficacy and establish outcome expectations regarding agricultural careers by accomplishing tasks – though interest and choice are not guaranteed to result from those processes. Participants discussed learning about agriculture in school where the context was mostly historical in nature where agriculture was an integral piece to the development of society. Fewer participants live in rural counties in Virginia and thus, fewer had access to agricultural education programs in school. Having an agriculture teacher does have an impact on how the participants view agriculture and agricultural careers, though it is positive or negative depending on the
participants’ experiences. Lastly, media served as a learning experience where how agriculture is portrayed in television, movies, books, news, and online impacts how the participants view agriculture.

**How do the participants see themselves being involved with agriculture after participating in VGSA?**

Research question 3, themes 1 and 2 (How do the participants see themselves being involved with agriculture after participating in VGSA? Theme 1 – Academically or professionally engaged; Theme 2 – As an advocate of agriculture) discuss how the participants see themselves being involved in agriculture after participating in VGSA. The first theme ties in to pursuit of agriculture in an academic or career setting. Some participants came to VGSA with an already established agricultural occupational identity and expressed that they intended to continue pursuing an agricultural career. Other participants did not indicate pursuit of an agricultural career but were interested in taking some agriculture classes or even pursuing a minor in agriculture to supplement their traditionally non-agriculture occupational identity.

While a priority for the agricultural industry is to develop a skilled, competent, and diverse workforce (Stripling & Ricketts, 2016), having people who are agriculturally literate and aware is also a priority area (Enns, Martin, & Spielmaker, 2016). An agriculturally aware person understands the agriculture, food, and natural resources system in a social, economic, and environmental context (Enns, Martin, & Spielmaker, 2016). Research question 3, theme 2 discusses being an advocate of agriculture as a way to be involved with agriculture. Participants who do not pursue agricultural careers may go on to affect policy or public perceptions regarding agriculture and should be able to articulate the important work that takes place within agriculture. Participants described wanting to share their newfound agricultural knowledge with
peers and having the ability to address individuals’ misconceptions of agriculture. Additionally, participants expressed wanting to garden, farm, or serve as an advocate for the agricultural industry.

**Recommendations**

Regarding agricultural education research, I recommend that researchers conduct longitudinal studies with similar youth to understand thoughts, perceptions, and influencing factors at different intervals such as before, during, and after a program – especially programs that are longer in duration.

I also recommend discussing how more work can be done in agriculture to address diversity and inclusion issues, such as providing programming for and engaging more with diverse youth. Despite the barriers of not seeing themselves represented in agriculture, the participants who remarked on certain aspects of identity still decided to attend VGSA. The various contextual influences that served as supports, outweighed the barriers but for other youth, this may not be the case and they may pass on engaging in agriculture.

The last recommendation is for researchers to further explore the connection between politics and perceptions that youth have of agriculture in settings similar and different than VGSA. Politics in relation to engagement with agriculture has been ill-explored and further research is needed to understand new aspects of perceptions of agriculture.

**Limitations of the Study**

A limitation of the study is that not all invited participants showed up to the group interviews. While there is no specific number of participants who need to be in a group interview, the groups in this study had varying numbers of participants from 2 to 5. Reasons for
not showing for the group interviews include forgot about the interviews and timing conflict with other engagements.
References


https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Virginia/

Article 2: Thoughts and Perceptions of Agriculture and Agricultural Careers as Explored through Blogging Assignments

Abstract

Reflection is a key component to the learning process. Blogging has been determined as an effective method that can be used to facilitate reflection in educational settings. This study aims to find out how students attending Virginia’s Governor’s School for agriculture are engaging with, thinking about, and perceiving agriculture while participating in the program. Blog post assignments were used to provide an opportunity for the participants to reflect on their experiences in the program and changes in perceptions of agriculture. Their responses were analyzed and the findings showed that the participants learned new concepts while participating in the program through learning experiences. The findings also showed that participants experienced a change in their perceptions of agriculture and some indicated intent on pursuing an agricultural career. This research has implications on agricultural education research.

Recommendations are made for agricultural education educators and practitioners.

Introduction

Pursuit of an agricultural career has been explored consistently in agricultural education research. Lack of underrepresented individuals in agricultural careers as well as lack of enrollment in agricultural classes has also been a concern (Faulkner, Baggett, Bowen, & Bowen, 2009). To address these issues, it is recommended that educational institutions provide opportunities for youth to learn about the opportunities in agriculture that youth can pursue after high school (Faulkner, Baggett, Bowen, & Bowen, 2009). Youth can experience what agriculture has to offer through academic outreach programs which serve as interventions. Interventions are defined as “activities or programs designed to provide positive learning experiences that lead to
improved self-efficacy, optimistic outcome expectations, or both, with the overarching goal of encouraging interest, actions, and goals… or developing coping skills to overcome negative experiences or stereotypes (National Academy of Engineering, 2018).”

Interventions are a critical aspect to addressing negative perceptions that youth may have of agriculture. The negative perceptions can act as barriers to engagement with agriculture (Bowen, Bowen, Heinsohn, & Wiley, 1997). Some youth tend to view agriculture as a field for farmers and ranchers and for those who are interested in agricultural organizations and who are white and male (Bowen, Bowen, Heinsohn, & Wiley, 1997). Researchers have identified factors that shape perceptions of agriculture including media, family, and involvement in agricultural organizations (Duncan & Broyles, 2006). Factors also include gender, race, socioeconomic background, school achievement, and confidence (Esters & Bowen, 2005).

Virginia’s Governor’s School for Agriculture (VGSA) is an example of an intervention as it is a program designed to show students that they are capable of being successful as an agricultural engineer or food scientist, for example, and that pursuing such careers can lead to a future of opportunities and experiences. One of the ways to encourage interest, actions, and goals regarding agricultural careers is to expose youth to the variety of agricultural careers available. In VGSA, students are exposed to agricultural professionals who work in science and engineering, economics, business, food science, or plant science through their classes and activities.

The VGSA program entails classes and hands-on activities in addition to group research projects. Because of the engagement that the students have with agriculture in these settings, it is important for them to reflect on what they learn. Reflection serves as an important component to learning as identified by Dewey who proposed that learning does not come from experiences but
from reflection of experiences (Meder, Smalley, & Retallick, 2018). As stated by Gravois, Lopez, and Budden (2017), “Some of the most meaningful learning takes place when students reflect on how course concepts connect to their lives, the world around them, and how their learning has changed them personally and professionally (Gravois, Lopez, & Budden, 2017).” The authors explain that a significant amount of research supports the concept of reflection as a tool to encourage self-growth (Gravois, Lopez, & Budden, 2017).

**Using Blogging to Facilitate Reflection**

Blogging is considered to be a useful method for student reflection (Gravois, Lopez, & Budden, 2017). A blog is defined as an online journal that has posts that detail the thoughts and emotions that the author has. Blog posts are intended to be read by others to comment on (Chaumba, 2015). By participating in a blog assignment, students benefit from reflective thinking due to the sharing of perceptions and communication with other students on their blog posts (Chaumba, 2015). Engaging in reflective writing in blog posts help students to better understand their experiences (Gravois, Lopez, & Budden, 2017).

**Theoretical Framework**

This study is based on the social cognitive career theory (SCCT). The concepts of the theory were first introduced by Betz and Hackett in 1981. The theory was published later on by Lent, Brown, and Hackett in 1994. The theory addresses aspects of academic and career development by presenting a model on how career choice is impacted by the interests of an individual (National Academy of Engineering, 2018).

The theory asserts that an individual’s career development is dependent on many factors such as their interests, experiences and environment. According to Lent (2013), the social cognitive career theory seeks to explain how individuals “develop vocational interests, make
occupational choices, achieve varying levels of career success and stability, and experience satisfaction or well-being in the work environment (Lent, 2013).”

**Purpose and Research Questions**

The purpose of this research study is to find out how students attending Virginia’s Governor’s School for agriculture are engaging with and thinking about agriculture while participating in the program. The purpose of this study was achieved by answering the following research questions:

1. How do students in VGSA reflect in blogs on their experiences within the program?
2. How do the students in VGSA reflect in blogs on their change in perceptions of agriculture and agricultural careers?

**About Virginia’s Governor’s School for Agriculture**

Virginia’s Governor’s School for Agriculture (VGSA) is a summer residential program for rising junior and senior high school students who are considered gifted and talented. The program is designed to provide an academically rigorous and agriculturally focused experience to the “future scientists and leaders of Virginia, the United States, and the World (Virginia's Governor's School for Agriculture, 2019).” While participating in the program, students are able to interact with faculty and researchers in classes and on projects that encompass the USDA NIFA research priority areas as well as agricultural focus areas including agricultural engineering and economics, and the animal, plant, and food sciences.

**Methodology**

This qualitative case study was designed to explore how students in VGSA reflect on their experiences in agriculture and their perceptions of agriculture through blog posts. The population for this study consisted of the 98 students who participated in the 2019 VGSA
program. For this study, systematic sampling was utilized. Systematic sampling encompasses selecting every nth subject of the population as the sample. Systematic sampling involves defining the population from which the sample will come from, determining the preferred sample size, estimating size of population, and calculating sampling interval (Guest, Namey, & Mitchell, 2013). Though there are 98 students in the population, 81 students submitted one blog post. The preferred sample size is 10 students so the sampling interval will be every 8th students’ blog post in A to Z alphabetical order. Data saturation was reached.

A guiding question for the blog posts asked students about their research projects for global seminar. Global seminar is a part of the VGSA curriculum in which students work in teams to conduct research projects based on the USDA-NIFA challenge areas which are food security, climate variability and change, water, sustainable bioenergy, childhood obesity prevention, and food safety (USDA-NIFA, 2020). The rationale for using the USDA-NIFA challenge areas as a catalyst for the students’ research projects is that these areas represent the pressing agricultural challenges of the 21st century (USDA-NIFA, 2020). Additionally, VGSA is located at a land-grant university that has faculty and students conducting research on the challenge areas. VGSA students interact with these faculty and students in classes and activities and learn about their research projects. Students can take what they learn from their classes and activities and connect the knowledge to their group projects. The projects entail developing an understanding of the designated challenge area, brainstorming potential solutions, and developing a literature review, poster, and other components.

The blog post assignment was administered and managed using the Canvas learning management system that each student had access to. Instructions for the assignment were to write between 200 and 300 words and comment on at least two other students’ blogs. The
students were given guiding questions to provide structure to their blog posts but their posts were highly individual. There guiding questions were as followed:

1. What is your project?
2. What have you learned about agriculture thus far?
3. How have your perceptions of agriculture or agricultural careers changed since attending VGSA?

Students were encouraged to include hyperlinks to other content, photos, and media for added depth. Some blogs were selected to be posted on the main VGSA blog for public viewing after being submitted to Canvas.

After completing the sampling process and identifying the 10 blog posts to be analyzed, the process of thematic analysis began. Thematic analysis is defined as the identification of themes that come out of the data (Burnard, Gill, Stewart, Treasure, & Chadwick, 2008). The data analysis process as described by Merriam and Tisdell (2016) was followed and began with open coding. After conducting open coding throughout the assignments, codes were grouped together to form themes. The coding table and codebook is found in appendix G and appendix I.

**Findings**

Several themes emerged from the data for this study. The themes have been organized according to their relevance to the research questions. The students whose blog post assignments were included in this study had many similarities in how they reflected on their experiences in the VGSA program and how their perceptions may have changed since becoming a student at VGSA.

1. How do students in VGSA reflect in blogs on their experiences within the program?

Theme 1: Reflections on the global seminar research projects
Theme 2: New concepts learned

2. How do the students in VGSA reflect in blogs on their change in perceptions of agriculture and agricultural careers?

Theme 1: Significant changes in perceptions of agriculture

Theme 2: Pursuing a career in agriculture

RQ1: Theme 1 – How do students in VGSA reflect in blogs on their experiences within the program? – Reflections on the global seminar research projects

For their blog post assignments, some of the students shared information about their research projects such as what it entails, what potential solutions their team has generated, and what they have learned from conducting the research.

*Tara* – Through my global seminar project, I was able to learn about a process called carbon sequestration and how to further improve our environment to mitigate the climate change that humans played an important role in. By using agroforestry, the greenhouse gases in the air can be placed into the soil to not only open up our atmosphere but also improve the health of the soil, therefore helping the plants grow with more nutrients and increase the biodiversity.

*Hayleigh* – Our project was discussing the evident levels of E. coli in organic foods and how we could assist producers and consumers in ensuring their food is free of harmful bacteria. Some of the possible solutions we researched were: possibly using ultraviolet lights to help with sanitization, wastewater and runoff collection and sterilization, leaving land to fallow, and customer knowledge aids to help eliminate cross contamination and improper care.

*Maurita* – My global seminar project deals with food security and food waste and coming up with solutions to combat and reduce both issues. We have two main solutions to combating these issues. One part of our solution is combating food waste and food insecurity with the improvisation of food preservation technologies. The other part of our solution is using social media to combat these issues. Preservation technologies would help reduce food waste because preserving food would allow it to be eaten for longer times and allow it to be donated for longer amounts of time. Social media would help reduce food waste because it would help spread awareness of the amount of
resources and the costs of wasting food which would hopefully in turn encourage people to reduce the amount of food they waste.

The students wrote in the blog posts about the projects they completed while in VGSA. The projects served as an opportunity for them to work together in teams to complete research projects that reflect major challenges in agriculture.

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**RQ 1: Theme 2 – How do students in VGSA reflect in blogs on their experiences within the program? – New concepts learned**

In addition to discussing aspects of their global seminar research projects in their blog post assignments, students also shared reflections on new concepts that they have learned about agriculture since attending VGSA. Another guiding question for the students’ blog post assignments asked them what they had learned about agriculture as a student in the program. The students shared responses that reflected their identity characteristics and background contextual factors such as being from an urban area and having prior experience in agriculture.

**Thomas** – *Did you know that broilers, also known as chickens, rank as the number one animal agriculture commodity within Virginia? Also, the United States’ commodities regarding swine and poultry numbers rank second worldwide. These statistics can be shocking to those of us from urban/suburban backgrounds, especially for me coming from NOVA. Urban folks such as myself, easily find high quality produce and cuts of meat available at the supermarket, but we haven’t fully comprehended the process which leads to it appearing on our dinner tables. Therefore, with an increasing global population as well as a small agricultural workforce, sustainability will soon become a major problem if not addressed or brought to light. In order for action to be taken, the issue must become public and people must become well informed of the situation.*

**Kimmy** – *The Governor’s School program allowed me to explore new topics, such as sustainable energy sources, in a fun and exciting way. Lectures from professors and college students, hands on activities during field trips, and expert panels helped me to gain insight on agricultural topics.*
**Jack** – I came into this program with a good amount of prior knowledge about agriculture. However, since the first lecture by Dr. Martin I have been learning valuable information that I will likely use for years to come. So far, there have been interesting lectures and demonstrations on animal nutrition, dairy science, watershed health, weed sciences, drone usage in agriculture, Silva pastures, and a plethora of other topics.

These students expressed in their blog posts that they were able to learn new concepts in agriculture through learning experiences that built on their prior knowledge in agriculture.

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**RQ2: Theme 1 – How do the students in VGSA reflect in blogs on their change in perceptions of agriculture and agricultural careers? – Significant changes in perceptions of agriculture**

As discussed previously, considering the perceptions that youth have of agriculture is important when engaging youth in agricultural outreach. Another guiding question for the students’ blog post assignments asked students how their perceptions of agriculture or agricultural careers have changed since attending VGSA. Some of the students shared details about their perceptions of agriculture and agricultural careers before and/or after attending VGSA. Most reflected on a change in perception from negative to positive with a more thorough understanding of agriculture.

**Myra** – The resplendent part about being in this program is that my viewpoint on agriculture has changed tremendously. Previously, when I considered the word “agriculture,” I solely associated it with farming. However, that is just the tip of the iceberg. It involves engineering for greater crop yield, caring for/researching animals, flying drones to scout cropland, and more. Agricultural studies have a global impact and GSA has allowed me to broaden my perspective and even begin to truly consider a career within this sector of the economy.

**Maurita** – Since I started attending the Governor’s School for Agriculture, my perceptions of the field of agriculture have changed drastically as coming to the school has educated me greatly. Previously when I thought of agriculture I
thought of farming and producing meat products. Although I did always assume that there was more to the field and what is behind it I just didn't know how much about the field at all and was ignorant to the complexities of agriculture.

Anna – GSA has already greatly altered some of my previous perceptions of agriculture. I began my experience here worried that there would be a huge emphasis on farming; as someone coming from the suburbs of D.C., I was under the impression that I had no background directly relating to agriculture and had no idea what to expect. Teachers and friends who knew that I would be attending GSA teased me about how I would be forced to wear overalls and carry a pitchfork with me at all times.

However, no more than two hours on my first day at Virginia Tech, this misconception was quickly shut down. I learned that everyone is affected by agriculture every day, by simply eating three daily meals and even wearing clothing. Agriculture encompasses so much more than just farming; from economics to engineering, there is no shortage of fields for everyone to find an interest in. I'm very excited to continue in my learning here, and hope to discover new passions currently unknown to me.

These students expressed in their blog posts that in the VGSA program, their perceptions of agriculture changed. Students who thought that agriculture was a career based only on farming, now understand that agriculture is a career that intertwines in daily life.

RQ 2: Theme 2 – How do the students in VGSA reflect in blogs on their change in perceptions of agriculture and agricultural careers? – Pursuing a career in agriculture

When reflecting on their experiences in VGSA and perceptions of agriculture and agricultural careers, students also reflected on whether they plan to pursue agriculture as a career and if so, what that career might be. Some students also shared what has impacted their decision to pursue an agricultural career.

Jaquelyn – So far, the experiences in Gov School have just reinforced my want to be an animal science major and go on into veterinary medicine. It’s an aspiration I’ve always had and will never give up. The more I see now, the
more excited I become for what’s ahead, because I know I can make a
difference in and genuinely enjoy it.

Alex – Halfway into Governor’s School, we’ve been given the opportunity to
look into careers in agriculture. Although I know that agriculture isn’t always
driving tractors and crop farming, I was still unsure whether an agriculture
career path was the right one for me, considering I am more interested in a
technological field of study. As we started looking into certain career paths
using the website agexplorer.com, I found some jobs that were brought to my
attention that I wasn’t aware of before exploring agriculture.

So far, IT software & web development jobs as well as accounting and budget
analysis caught my eye, because I love implementing technology and
mathematics into my everyday life and I never really thought about applying it
into agriculture. After the Ag Careers class, I became more aware and open-
minded to ideas of going into the field of agriculture. I’ll still be exploring and
keeping my career options open.

Hayleigh – Through a program as enriching as this one, I was able to confirm
my passion for my future career of becoming an agriculture teacher. Even
though I was fortunate enough to come from an agriculturally rich
background, Governor’s School showed me that learning is important because
I learned something new from everyone every day.

The students expressed in their blog posts that they were able to come to conclusions
about their future careers. Although VGSA is a program where students learned new concepts
about agriculture and were exposed to a variety of career, not all students decided to pursue a
career in agriculture after completing the program.

Conclusions

The blog post assignments served as an opportunity for the students to reflect on their
learning experiences in VGSA and discuss how their perceptions of agriculture and agricultural
career changed. Blogging can be used as a pedagogical tool to facilitate reflective thinking when
students are able to create blog posts and comment on the posts of other students (Francis, 2019).
Upon reflection in their blog posts, students shared details on their learning experiences in VGSA and how those experiences may have changed their perception of agriculture. Some students discussed their experiences and perceptions with consideration of identity characteristics and contextual factors. The theoretical framework for this study, social cognitive career theory, speaks to these concepts and indicates that they can have an impact on the career pathway of the students.

Social cognitive career theory explains that learning experiences as described by the students, such as completing their global seminar research projects and learning about crop production techniques from visits to the farms all serve as a catalyst to self-efficacy and outcome expectations. If a student completes their research projects and successfully engages in those tasks, they might believe that they can engage in similar research in college or in a career which builds their self-efficacy. The same student might now also consider what might happen if they did pursue a major or career related to the research project that they completed. If the desired outcome expectations are positive, then they might develop an interest in continuing similar work. This situation can be reversed where a student does not successfully engage in their research project and does not build self-efficacy in the work and does not expect the outcomes of pursuing such work in the future to be desirable – leading to lack of interest.

As the social cognitive career theory states, there are many factors that contribute to the development of interest and choice in a career. In addition to learning experiences, person inputs such as geographic location and contextual influences such as previous experience in agriculture all impact interest and choice. By reflecting in the blog post assignments, the students are able to consider their person inputs and contextual influences in accordance with what they are learning at VGSA.
With new information being learned, the students were able to reconsider the perceptions that they had of agriculture. Learning about the different careers available in agriculture appears to have been valuable information according to the students’ blog post assignments. Students developed a broader view of what agriculture has to offer. The reflections showed that some students will pursue an agricultural career because of their experiences in VGSA, have confirmed their career choice (in or outside of agriculture) because of their experiences in VGSA, or are still unsure about their career choice. Ultimately, the mission of VGSA is to foster the students’ pursuit of an agricultural careers but it is recognized that fostering agricultural literacy and awareness is also important.

**Recommendations**

Agricultural educators and practitioners should consider including research activities such as the global seminar research projects as a way to teach youth about agriculture and generate interest in pursuing agriculture as a career.

Another recommendation is for researchers to conduct research with VGSA youth after they leave the program to determine if the new perceptions of agriculture fade once they return home. It is also recommended that researchers conduct similar studies to determine if similar findings will emerge with other youth.

**Limitations of the Study**

A limitation of this study is that students did not have more opportunities to reflect on their experiences in VGSA and perceptions of agriculture and agricultural careers. The students blogged once which means that other thoughts and perceptions that they had were not able to be discovered in this research as the students continued to learn throughout the four weeks of the program.
References


Article 3: Exploring Occupational Identity Status as a Factor of Agricultural Career Choice

Abstract
Choice of agricultural careers has been a consistent area of exploration in agricultural education research as fostering a diverse, skilled, and competent workforce is imperative for the agricultural industry. Many researchers have explored the concept of career choice in regards to different factors that influence choice but occupational identity status as a factor has been ill-explored. This research study sought to understand the occupational identity statuses in relation to occupational choices of adolescents enrolled in the 2019 Virginia’s Governor’s School for Agriculture program. To fulfill the purpose, research objectives were developed and achieved using Melgosa’s Occupational Identity Scale and two programmatic surveys. Findings showed that participants occupational identity statuses were mostly achieved or in moratorium and that identity achieved participants were less likely to change their career goals after participating in the program and that participants in moratorium were less likely to indicate a clear career goal. Other findings show that participants are highly interested in pursuing careers in STEM followed by careers in health science and agriculture. This study has implications for agricultural education research regarding career choice. Additional research should be conducted to further understand how occupational identity status is associated with career choice.

Introduction
Emphasis has been placed on recruitment of youth to agricultural careers. It is important to explore components of the career decision-making process in detail. Adolescence is considered to be a stage in life where significant career development takes place as youth are generally exploring career options and roles to which they will commit (Xu & Lee, 2019).
Agricultural practitioners are using programming in the various forms (workshops, camps, afterschool programs, etc.) and secondary agricultural education to reach youth, generate interest, and change perceptions (AAAE, 2016) but research regarding identity development and formation is largely missing.

Adolescence is a major time for identity development and the experiences that adolescents go through likely have major implications on agriculture that should be explored through research. Most notably and as evidenced through the application of identity status to STEM, identity impacts engagement, interest, learning, motivation, persistence, and commitment (Steinke, 2017). Additionally, as evidenced through STEM application, assessing identity could help the agricultural sector predict choice of agricultural careers as well as encourage persistence through and commitment to agricultural careers.

**Adolescents and Occupational Identity**

Beginning in childhood, youth are engaging in the career development process as they begin to establish an occupational or career identity (Porfeli & Lee, 2012). The career development process can be defined as "constructing, shaping, and reshaping the self as a worker (Xu & Lee, 2019)." After childhood, this process continues throughout the lifespan and well into adulthood but is considered especially important in adolescence (Melgosa, 1987). In childhood, when youth are thinking of who they will become as a worker, their thoughts are often different or more glamorous than what the future holds. In adolescence, youth are developing a sharper and more realistic version of their career identity (Porfeli & Lee, 2012).

The career identity is established once motivations, interests, and competencies are linked with career roles that are deemed acceptable (Xu & Lee, 2019). The career identity becomes a collection of meanings about the workforce in conjunction with the self (Garrison, Lee, & Ali,
Establishing a career identity is a significant developmental process that is an indicator for quality of life in regards to sense of purpose and personal growth (Garrison, Lee, & Ali, 2017; Praskova, Creed, & Hood, 2015). A well-developed career identity, in the same fashion as other aspects of personal identity, tends to lead to more self-awareness. Less developed career identity and other aspects of personal identity tends to lead to confusion and less awareness of self in regards to others and the world (Marcia, 1980).

To develop a career identity, it is widely believed that youth must go through a level of exploration and make a commitment. This belief largely stems from Eriksonian thoughts and theories regarding identity and development (Skorikov & Vondracek, 2011). Adolescents are engaging in career exploration that involves getting a better understanding of themselves, the workforce and the careers that suit them (Porfeli & Lee, 2012). This exploration can be symbolized through the question, “What kinds of work will be suitable to me? (Porfeli & Lee, 2012)” This question is often answered with and without intention by different sources such as parents, media, and external information about careers (Porfeli & Lee, 2012).

Adolescents generally commit to a career once they have decided on it and identify with it (Porfeli & Lee, 2012). Career commitment or decidedness has been associated with positive outcomes such as persistence through post-secondary education and is seen as a favorable process that youth go through. There is some caution, however, to youth committing to career prematurely and without sufficient exploration. Though there is no specific amount of exploration before making a commitment, adolescents should have a clear sense of self before choosing (Porfeli & Lee, 2012).
Theoretical Framework

Exploration and commitment in regards to occupational identity are the main tenets of Marcia’s (1966) Theory of Identity Status (Marcia, 1966). Marcia’s identity status theory has potential to contribute to research on agricultural career development as it considers how identity formation influences career choice. Marcia’s theory is an offshoot of Erikson’s theory on the stages of psychosocial development. According to Erikson’s psychosocial theory, human development is a lifelong process that hinges upon the need to become integrated into the social and cultural environment. It was the first theory that suggested that human development occurs across the life span and is widely accepted by researchers who study aspects of human development. The theory posits that humans go through eight stages that present different challenges along the way. Erikson refers to these challenges as crises that must be resolved in a stage by stage sequence. Successful resolution of the crises results in virtues while unsuccessful resolution of the crises results in disadvantages (Arnett, 2016).

The first stage of Erikson’s theory occurs during infancy where infants learn to trust or mistrust adults in the world around them based on the stability and consistency received from caregivers. The second stage occurs during toddlerhood where toddlers learn to be autonomous or doubtful of abilities based on outcomes of attempting to assert independence. The third stage occurs during early childhood where children learn to take initiative or feel guilty based on the outcomes of asking questions and attempting to make decisions. The fourth stage occurs during school age where older children learn to be industrious/competent or inferior based on the ability to demonstrate competencies that are valued by society. The fifth stage occurs during adolescence where teenagers develop an identity or experience role confusion/identity crisis based on their exploration of various roles, values, beliefs, and goals. The sixth stage occurs
during early adulthood where adults choose between intimacy and isolation based on the outcomes of exploring caring relationships with others. The seventh stage occurs during middle adulthood where adults feel generativity or stagnation based on what they are contributing to society. The eighth stage is late adulthood where adults feel ego integrity or despair based on contemplation of accomplishments in life (McLeod, 2018).

Erikson’s work on the adolescent stage has inspired significant interest amongst researchers (Arnett, 2016). Erikson himself wrote at length about the adolescent stage due to the development of identity that takes place during the adolescent years (Sokol, 2009). Developing a strong identity leads to developing a sense of direction that shapes the other stages (McLeod, 2018). There are different factors that contribute to the development of identity. The first factor is the start of puberty which leads to new skills and abilities—both cognitive and physical. The second factor is an increase in independence and autonomy which leads to more interactions with community and school. At this stage, adolescents are analyzing and thinking about how they are thinking and learning and peer relationships are taking precedence over family relationships (Carlisle, 2011). These factors as the foundation of identity development allow adolescents to explore and determine their beliefs, values, career goals, and relationships with others (Sokol, 2009).

As an extension to Erikson’s work on adolescent identity development, Marcia’s identity status theory was developed. The theory posits that two important processes are taking place as adolescents are forming their identity. The first process is exploration or crisis in which adolescents are exploring and experimenting with different components of identity such as beliefs, roles, and occupation. The second process is commitment in which adolescents become devoted or dedicated to a chosen identity. The exploration and commitment processes combine
and result in four identity statuses: diffusion, foreclosure, moratorium, and achievement. Youth with a diffused status have not explored nor committed to an identity and typically show little concern about making choices. Youth with a foreclosed status have made a commitment to an aspect of identity but have not explored any alternatives. Youth with a moratorium status have not made a commitment to an aspect of identity but are exploring alternatives. Youth with an achieved status have explored an aspect of identity and have committed to it (Stitt, 2016).

Adolescents who have achieved an identity may re-enter a period of exploration or crisis if the identity that they chose is not a good fit and doesn’t work out or if alternatives that are more attractive reveal themselves. This is what Marcia refers to as the MAMA cycle. If youth are identity achieved towards a certain occupation or belief, alternatives can cause youth to do more exploring (Stephen, Fraser, & Marcia, 1992).

Marcia’s work on identity status can advance new knowledge about adolescent career development in agriculture as messages and information communicated about agriculture—intentional or not, and from all sources—is salient for young people as they develop and form identity.

**Purpose and Objectives**

The purpose of this study was to understand the occupational identity statuses in relation to occupational choices of adolescents enrolled in the 2019 Virginia’s Governor’s School for Agriculture program. To fulfill the purpose, the following research objectives were developed:

1. Determine occupational identity statuses of participants.
2. Identify the career goals as indicated by participants before and after the program.
3. Determine if participants’ occupational identity development associate with their experiences in the VGSA program.

**Methodology**

The target population for this study consisted of 98 high school juniors and seniors who were participants in the 2019 Virginia’s Governor’s School for Agriculture program (VGSA). VGSA is a four-week, summer, residential program for students who are considered gifted and talented as defined by the Virginia Department of Education. The program is designed to provide an academically rigorous and agriculturally focused experience to the “future scientists and leaders of Virginia, the United States, and the World (Virginia's Governor's School for Agriculture, 2019).” The application and acceptance process is coordinated by the Virginia Department of Education.

For this study, total population sampling was used. This method is an exploration of an entire population with a specific set of characteristics. In the case of this study, the specific set of characteristics are participation in the 2019 Virginia’s Governor’s School for Agriculture program.

Melgosa’s Occupational Identity Scale was administered to all participants during the first week of the program. Melgosa’s Occupational Identity Scale (OIS) is an instrument that measures occupational identity status developed by Julian Melgosa. The OIS separates occupation from the other domains of religion, politics, intimate relationships, and lifestyle of which the identity status theory is based on. This makes it helpful for users who are interested in only studying the occupation domain. The instrument was designed to be a less time-consuming alternative to Marcia’s Identity Status Interview which was used to assess identity status (Melgosa, 1985).
The instrument was developed using the four constructs of identity status: achievement, moratorium, foreclosure, and diffusion. In addition to presenting evidence of validity, Melgosa conducted item analysis on each item within the four constructs and found the coefficient alpha of the scales of achievement and moratorium to be 0.87 and 0.84 respectively. The coefficient alpha of the scales of foreclosure and diffusion were 0.72 and 0.70 respectively (Melgosa, 1985).

The OIS contains 28 items and uses a 5-point Likert scale ranging from strongly disagree to strongly agree. The inventory was distributed to program participants using the Virginia Tech Qualtrics system. The participants were informed that the questionnaire contained a set of statements about their occupational plans and that there were no right or wrong answers. Participants were instructed to evaluate the items as they disagreed or agreed with each statement and to be sure to evaluate each of the 28 items. The identity statuses were determined using the participants’ responses to the OIS inventory. All of the VGSA students’ occupational identity scale responses were scored according to instructions described by Melgosa (1985).

In addition to Melgosa’s Occupational Identity Status inventory, the research utilized two surveys (a VGSA registration survey and a VGSA exit survey) to collect demographic and other characteristic information. The demographic characteristics include gender, race and ethnicity, parent/guardian education level, and size of hometown. The other characteristic information includes career goals as indicated on the registration and exit surveys and thoughts and perceptions regarding agriculture and agricultural careers.

The registration survey was distributed to participants prior to the start of the program and the exit survey was distributed to participants towards the end of the program. Regarding career goals, the participants’ responses were coded into categories based on the National Career
Clusters Framework which organizes a wide variety of careers into 16 clusters. The rationale for using the National Career Clusters Framework is because of its credibility, wide usage, and utility in categorizing career options. Two additional categories were added to account for participants who indicated more than one career goal from different clusters and participants who indicated undecided or undecipherable interest.

**Findings**

The first research objective of this study was to determine the occupational identity statuses of the participants. Sixty of the 98 VGSA students had an occupational identity status of identity moratorium which means that they were actively exploring occupations but had not made a commitment to a particular career. Thirty of the 98 VGSA students had an occupational identity status of identity achievement which means that they have actively explored occupations and have made a commitment to a career of their choice. Four of the 98 VGSA students had an occupational identity status of identity diffusion which means that they were not actively exploring occupations and had not committed to any career. No students had an occupational identity status of foreclosure, indicating an inactive exploration with a commitment to career. One student’s status was unknown due to incomplete responses on the inventory.

The second research objective of this study was to determine the career goals as indicated by the participants. The data from the first survey shows that 29% of the participants indicated a career goal in the science, technology, engineering, and mathematics (STEM) cluster. Following the STEM cluster, 19% indicated the health science cluster, 14% indicated the agriculture, food, and natural resources cluster. Four percent of participants indicated the business, management and administration cluster; four percent indicated the law, public safety, corrections and security cluster; and one percent indicated and the finance cluster. Three percent of participants indicated
two or more different career goals while 26% of participants indicated an interest that was undecided or undecipherable. An example of an undecided or undecipherable response is “I’m not sure what I want to do yet” or “I want a career that makes an impact.” Percentages in the analysis were rounded.

The data from the second survey shows that 34% of the participants indicated a career goal in the science, technology, engineering, and mathematics (STEM) cluster. Following the STEM cluster, 15% indicated a career goal in the health science cluster. Fourteen percent indicated a career goal in the agriculture, food, and natural resources cluster. Four percent of participants indicated career goals in the business, management and administration cluster; followed by four percent in the law, public safety, corrections and security cluster; and two percent in government and public administration cluster. Ten percent of the participants indicated two or more different career goals while sixteen percent of participants indicated a career goal that was undecided or undecipherable. Percentages in the analysis were rounded.

The third research objective was to determine if participants’ occupational identity status associate with their experience in the VGSA program. This objective was achieved using registration and exit surveys. The majority of participants who had an occupational identity status of achievement had no change in their career goal after attending the VGSA program. Sixteen identity achieved participants indicated on the registration survey that their career goal was not an agricultural career before VGSA and after participating in VGSA, indicated on the exit survey that their career goal did not change and they remained uninterested in pursuing an agricultural career. Nine indicated on the registration survey that their career goal was an agricultural career before VGSA and remained in pursuit of an agricultural career according to the exit survey. Four participants had a change in career goal from a traditionally non-
agricultural career before VGSA to an agricultural career goal after VGSA. One participant had a career goal in agriculture before the program, and changed their career goal to a traditionally non-agricultural career after the program. Three participants' data was determined to be unknown or uninterpretable from the responses provided.

Twenty-three of the participants who had an occupational identity status of moratorium had a career goal that was determined to be unknown or uninterpretable from the responses provided. Twenty-one participants indicated on the registration survey that their career goal was not an agricultural career before VGSA and indicated on the exit survey that their career goal did not change and they remained uninterested in pursuing an agricultural career. Twelve participants indicated on the registration survey that their career goal was in agriculture and indicated on the exit survey an unchanged career goal. Two participants had a change from a traditionally non-agricultural to an agricultural career as indicated between the registration and exit surveys. One participant had a career goal in agriculture before the program, and changed their career goal to a traditionally non-agricultural career after the program.

Participants with an occupational identity status of diffusion were small compared to the achievement and moratorium occupational identity statuses. One participant indicated a change in career goal from an agricultural career to a traditionally non-agricultural career according to the registration and exit surveys. Two participants were not in pursuit of an agricultural career before the program and remained that way after the program. One participant’s data was determined to be unknown or uninterpretable from the responses provided. No participants indicated an unchanged career goal in an agricultural career and none indicated a career goal in agriculture before the program and a change in career after the program. None of the participants
were determined to have an occupational identity status of foreclosure and thus, there is no data regarding career goals to report.

<table>
<thead>
<tr>
<th>Occupational Identity Status</th>
<th>Was interested in an agricultural career before and is interested now</th>
<th>Was not interested in an agricultural career before and is interested now</th>
<th>Was not interested in an agricultural career and is not interested now</th>
<th>Was interested in an agricultural career before and it not interested now</th>
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<td>-</td>
</tr>
</tbody>
</table>

Table 1 – Career goals according to occupational identity status

On the exit survey, participants were asked if they were open to agricultural careers before and after the VGSA program. Thirty percent of participants indicated being open to a career in agriculture before VGSA compared to 77% after VGSA. Fourteen percent of participants indicated being somewhat open to a career in agriculture before VGSA compared to 11% after VGSA. Fifty-three percent indicated not being open to a career in agriculture before VGSA compared to eight percent after VGSA. Three percent of participants indicated an unknown or undecipherable responses on both questions.

On the exit survey, participants were asked if VGSA influenced their career interests. The responses were categorized into no influence, some influence, and unknown or undecipherable. Seventy-eight percent of the participants indicated that the program had some influence on their
career goals. The influence that these participants describe are affirmation of career goal or consideration of pursuing agriculture in an academic setting such as obtaining a minor in some agricultural area. Thirteen percent of the participants indicated that the program had no influence on their career goals, though some reported developing an appreciation for or awareness of the agricultural industry and its variety of career options. Nine percent of the participants’ responses were considered unknown or undecipherable.

Conclusions

The findings show that the majority of the participants in VGSA have an occupational identity status that is achieved or in moratorium. This means that these adolescents in grades 11 and 12 have had a period of exploration sufficient enough to make a commitment to a career or are currently undergoing a period of exploration before committing to a career. Some of the participants had an occupational identity status of diffusion which means that they have not committed to a career and are also not currently undergoing career exploration. None of the participants had an occupational identity status of foreclosure.

At the end of the program, just above a third of the participants indicated a career goal in STEM. Following STEM, nearly a third more indicated career goals in Agriculture, Food, and Natural Resources and Health Science. Of the specific career goals, many participants indicated engineer, scientist, or doctor. This aligns with research on adolescent career development in that gifted and talented youth, such as the participants in the study, tend to aspire to careers that are considered to have prestige in society (Miller & Cummings, 2009).

Agricultural outreach experiences are educational interventions that can serve as powerful tools for identity development. It is important to note that promoting substantial identity development through short-term educational interventions such as VGSA is limited
(Irving & Sayre, 2016) but some is possible as evidenced through the findings of this study. Before participating in the VGSA program, twenty-six percent of participants indicated an unknown or undecipherable career goal compared to sixteen percent at the end of the program. In regards to agricultural careers, thirty percent of participants indicated being open to a career in agriculture prior to the start of the program compared to seventy-eight percent after participating in the program.

Knowing occupational identity statuses of a population and understanding the theory is helpful to practitioners who are involved in the career development of young people. Individuals who have explored and are committed to a career may benefit from in-depth exploration of their chosen career. Those who are exploring but have not made a commitment may benefit from activities that help them realize their strengths and careers that match. Those who are in low exploration and have not made a commitment may benefit from help with identifying their skills and interests. And those with low exploration and committed to a career may benefit from help with reconsideration of their career choice and in-breadth exploration of the paths that exist within their career choice (Pelco & Ball, 2018; Porfeli & Lee, 2012).

Aside from identity status, the concepts of occupational identity development and career development have major implications for agricultural education practitioners. Researchers have suggested different types of occupational identity development interventions. Porfeli and Lee (2012) make several suggestions including teaching youth that the workforce is increasingly dynamic and preparing them with knowledge and skills to adapt to changes in work and their identities; considering the context of individuals and developing a person-centered approach; and implementing interventions sooner rather than later in childhood (Porfeli & Lee, 2012).
Understanding the concepts of the identity status theory and knowing the identity statuses of a target population has important implications for agricultural educators, especially those who are interested in preparing youth for the agricultural workforce. Identity status tells us the level of exploration and commitment to an occupational career choice. As youth reach identity achievement and identify with a specific occupation, participation in the community of that occupation become linked (Irving & Sayre, 2016). From this information we can believe that if an individual is identity achieved with a commitment to a non-agricultural career, they will be less likely to participate in an agriculturally related community.

It is recommended that researchers replicate this study in different settings and context. It is also recommended that longitudinal studies be conducted that measure occupational identity status with youth in long-term agricultural settings such as school-based agricultural education programs and agricultural outreach programs to determine the change in status over time. Additionally, it is recommended that studies be conducted that determine occupational identity status of youth as well as explore the variables as determined by youth that shape occupational identity status such as feedback from media, peers, parents, and school personnel. It is also recommended that studies be conducted that explore the other domains of identity status such as ideological identity in relation to youth and agriculture. Lastly, it is recommended that studies be conducted that measure the occupational identity status of individuals in late adolescence and early adulthood, as occupational identity development continues well beyond adolescence.

**Limitations**

A limitation of this study is that it was conducted with a case of 98 students who attended the 2019 VGSA program. Replication of this study is needed with general population students. A second limitation of this study is that the foreclosure status was unable to be explore due to no
participants indicating a foreclosure status. A final limitation is that the moratorium students may have indicated an interest in a certain career or career field but may not have actually determine an actual career goal.
References


Melgosa, J. (1985). Occupational Identity Assessment Among Middle and Late Adolescents. Graduate Research at Digital Commons at Andrews University. doi:https://digitalcommons.andrews.edu/cgi/viewcontent.cgi?article=1570&context=dissertations


Conclusion

This chapter serves as a conclusion to the study and includes information on the need for this research, an overview of the methodology, and a discussion of the findings from each article in the study. To conclude the chapter, recommendations for researchers and practitioners are provided.

Significance of the Study

Agricultural job openings are going unfilled as there are not enough individuals with education and expertise in agriculture to fill them (Feldpausch, Bir, Olynk, Zuelly, & Richert, 2019). It is important that agricultural education researchers understand how youth make decisions regarding their post-secondary plans (Cannon & Broyles, 2006). Research to explore post-secondary education and career intentions that has been conducted. What this research adds to the field of agricultural education is the utilization of research methods that provide contextual insight on a unique case of youth involved with agriculture. The approach to this research is qualitative in nature and highlights the existing relationships in the phenomenon that is being explored. Additionally, this research produced the thick description of participants’ thoughts, perceptions, and experiences which were interpreted to provide insight on career interest and choice in agriculture.

This research also adds new knowledge to the field of agricultural education through consideration of occupational identity status as a factor that influences pursuit of an agricultural career. The aim of this research is to establish occupational identity status as an important factor to consider along with other ill-explored factors such as identity and representation.
Overview of Methodology

This case study research was conducted, collected, and analyzed using qualitative methods. In article 1: Thoughts and Perceptions of Agriculture and Agricultural Careers as Told by Students of Virginia’s Governor’s School for Agriculture, participants were chosen to participate via quota sampling to get representation of the 2019 VGSA population. Participants were interviewed in groups to understand their thoughts and perceptions of agriculture and agricultural careers. In article 2: Thoughts and Perceptions of Agriculture and Agricultural Careers as Explored through Blogging Assignments, all VGSA students were assigned a blog post assignment to understand how they reflect on their experiences in VGSA and their perceptions of agriculture and agricultural careers. Participants were chosen to participate via systematic sampling. In article 3: Exploring Occupational Identity Status as an Influence on Agricultural Career Choice, all of the VGSA students were participants in the study. Data was collected using inventories and surveys and presented in a descriptive format.

Discussion of Findings

Article 1: Thoughts and Perceptions of Agriculture and Agricultural Careers as Told by Students of Virginia’s Governor’s School for Agriculture

How do the participants think about and perceive agriculture as a concept and career?

The participants saw agriculture as farming, in which farming was perceived more negatively by participants prior to participating in VGSA. After attending VGSA, perceptions toward farming and agriculture evolved as the participants learned more about the processes of a farm and the different ways to work in agriculture. Participants developed a broader, more wide-ranging view of what it means to be a student or professional in agriculture. They also had varied views on value of careers when compared within agriculture and compared to traditionally non-
agricultural careers. Understanding how youth think about and perceive agriculture is important because if they are predisposed to dismiss or not even consider agriculture because of views of farming, they are unlikely to develop an interest in agriculture or choose it as a career.

**What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career?**

There are many factors that influence how youth think about and perceive agriculture. The factors considered in this study were individuals in the lives of the participants (family, peers, school personnel, and mentors), identity characteristics (race, gender, ethnicity, geographic location, immigration status, and occupational identity), and learning experiences (media, access to school-based agricultural education, and VGSA). These factors relate and interact in different ways according to social cognitive career theory. Some of the factors will function as barriers to youth engagement with agriculture and depend on the strength of those barriers and the strength of other supports.

**How do the participants see themselves being involved with agriculture after participating in VGSA?**

Some of the participants indicated that they planned to pursue agriculture academically or professionally while others recognized overall increase in agricultural awareness to serve as advocates of agriculture. Not all youth will pursue an agricultural career, some will work in policy, become doctors, work in construction, and so on but they will all be impacted by agriculture. Agriculturally aware youth go on to be sources of information and contextual influences to their own children, students, and peers and should be equipped with accurate information about what agriculture is. Additionally, values, interests, choices, and contextual
influences will change and, in the future, agriculture as a career may become a choice for some individuals.

**Article 2: Thoughts and Perceptions of Agriculture and Agricultural Careers as Explored through Blogging Assignments**

The findings in article 2 provide data confirmation to some of the findings in article 1, as the participants in article 2 are an entirely different group of VGSA students. The participants in articles 1 and 2 shared similar thoughts and perceptions of agriculture through different methods of data collection.

**How do students in VGSA reflect in blogs on their experiences within the program?**

In their blog post assignments, participants reflected on their experiences within the VGSA program by discussing their global seminar research projects. They discussed what their projects entailed according to the research problems that they were assigned. Participants also discussed the solutions to their assigned research problem that their team members were generating. The participants also reflected on learning new concepts while attending VGSA. The new concepts learned were obtained through conducting research for their projects and also by engaging in classes and activities through the program.

**How do the students in VGSA reflect in blogs on their change in perceptions of agriculture and agricultural careers?**

Most of the participants reflected on a significant change in the perceptions of agriculture from negative to positive, though some reflected on generally having a broader understanding of agriculture and agricultural careers. Perceiving agriculture as a limited field of mostly farming was discussed. Some participants’ career goals were established or reinforced in agriculture.
Article 3: Exploring Occupational Identity Status as an Influence on Agricultural Career Choice

Determine occupational identity statuses of participants.

Sixty of the participants had an occupational identity status of moratorium which indicates that they were largely still exploring career options and had not necessarily made a choice yet. Thirty of the participants had an occupational identity status of achievement which indicates that they spent some time exploring career options and had made a choice to a career. Four of the participants had an occupational identity status of diffusion which indicates that they were not actively exploring career options and had chosen a career. No students had an occupational identity status of foreclosure and one student’s status was unknown.

Identify the career goals as indicated by participants before and after the program.

The career goals that the participants described were categorized using career clusters. STEM, health sciences, and agriculture were the most described career clusters before and after the program.

Determine if participants’ occupational identity development associate with their experiences in the VGSA program.

The participants with an occupational identity status of achievement largely had stability within their career goals – those who were interested in agriculture mostly stayed interested in agriculture after the program. Those who were not interested in agriculture before the program mostly stayed uninterested after the program but some participants shifted to a career goal in agriculture. Few of these participants had an unknown or undecipherable career goal.

The participants with an occupational identity status of moratorium largely remained with undecided or undecipherable career goals. Many of these participants did describe a career goal
which indicates that although Marcia’s theory posits that these youth have not made a
commitment to a career, they are still exploring options and may have some interests at the
forefront of their thoughts.

The participants with an occupational identity status of diffusion were much fewer than
the achievement and moratorium statuses. Conclusions regarding these participants is difficult
because of the small number but although Marcia’s theory posits that these youth typically are
not actively exploring career options, that does not mean definitively that no exploration is
taking place.

**Recommendations**

The following recommendations have been developed for agricultural educators and
practitioners: understand how youth view agriculture by utilizing methods that facilitate
discussions or reflections. In all agricultural education settings, including SBAE and agricultural
outreach, it is beneficial to know how agriculture is thought about and perceived. When
developing programming, including content and activities that counteract misconceptions is
recommended so that youth can acquire a more thorough understanding of agriculture.

Agricultural educators and practitioners should be intentional about outreach and develop
programs and activities that are relevant to underrepresented youth, which includes having a
team that is diverse and that is culturally competent with social and cultural identity. Program
content and activities should utilize pedagogy that is student-centered and addresses
multiculturalism. Intention also needs to be set about communicating with family members and
school personnel who pass on their stereotypes and biases of agriculture to youth. When
recruiting youth for outreach activities and programs, it would be beneficial to communicate with
parents and school personnel about the agricultural industry in the 21st century as well as the
types of careers and opportunities available through agriculture. One way to communicate is through a promotional video that parents and school personnel can watch when visiting the website dedicated to the activity or program. Another way to communicate is through fact sheets that can be mailed directly to school counselors and advisors who may assist in recruiting.

Some youth will have developed an occupational identity by the time agricultural professionals engage with them and others will not have. Showcasing the variety of paths available in agriculture through programming and other outreach settings such as college and career fairs and school visits would be beneficial to help youth think about agriculture as a choice or alternative. Even brief engagement on agricultural paths may help youth address their own misconceptions about agriculture. How they think about it is dependent on some of the factors above but some youths’ interest might be peaked and barriers such as race and gender might be weakened if members of the outreach team are diverse.

The following recommendations were developed for agricultural education researchers: researchers should study thoughts and perceptions of agriculture with youth engaged with agricultural outreach programs using research methods to understand thoughts and perceptions before and after the intervention and at other data points.

Researchers should conduct studies that explore the factors from this study in the context of other agricultural outreach programs with youth with similar and different backgrounds. Additional research should also be conducted to determine other factors that should be considered aside from the ones in this study.

Researchers should conduct studies that explore how youth see themselves involved in agriculture in an in-depth approach.
Researchers should conduct studies that further explore the concepts of politics and immigration in relation to agriculture and agricultural careers. These are largely unexplored concepts in agricultural education literature.
References


Appendices

Appendix A – Parental Permission and Assent and Informed Consent Forms

Virginia Polytechnic Institute and State University
Parental Permission and Assent

Project Title: Governor’s School for Agriculture

Investigators: Dr. Curt Friedel, Assistant Professor (540-231-8177, cfriedel@vt.edu)

I. Purpose of Research
The purpose of the study will be to evaluate the overall effectiveness of the Governor’s School for Agriculture (GSA) in teaching agricultural concepts to these students, and the students learning of agriculture and leadership.

II. Procedures
Students participating in the GSA will be asked to share all assignments, assessments, and reflections completed, for evaluating the program. There will not be any assignments or extra effort required beyond normal participation in the GSA.

III. Risks
There is no more than minimal risk when participating in this study.

IV. Benefits
There are no direct benefits to the student or parent. The indirect benefits relate to how the student’s academic work and learning experiences, will be used in this research as a possible means to continually improve the curriculum of the GSA. There has been no promise or guarantee of benefits that have been made to encourage you to participate.

V. Extent of Anonymity and Confidentiality
Protecting the student’s identity is a top priority of this study. By participating in this study, your information will be kept strictly confidential. Any information that potentially could identify you or others will be coded to insure confidentiality. At no time will information be released that allows a student to be identified. At no time will the researchers release the results of the study to anyone other than individuals working on the project without your written consent. Only the research team will have access to your data. It is possible that the Institutional Review Board (IRB) may view this study’s collected data for auditing purposes. The IRB is responsible for the oversight of the protection of human subjects involved in research. Should you have any questions or concerns about the study’s conduct or your rights as a research participant, or need to report a research-related injury or event, you may contact the Virginia Tech Institutional Review Board at irb@vt.edu or (540) 231-3732.

VI. Compensation
There is no compensation for participating in this research.

VII. Freedom to withdraw
The student is free to withdraw from the study at any time without penalty.

VIII. Participant’s responsibilities
The student voluntarily agrees to participate in this study and will allow completed assignments to be evaluated after the GSA program has ended this summer to.

IX. Parent’s Permission
I have read and understand the Informed Consent and the conditions of this project. I have had all of my questions answered. I hereby acknowledge the above and approve of my child participation. I hereby acknowledge the above and approve of my child participation. By typing or drawing my signature below, I acknowledge that it is my intent to electronically sign this document and agree to the use of electronic records for the purposes provided herein.

[Signature]
[Date]

☐ YES ☐ NO

Student Assent to Participate

I, ____________________________, agree to be in a study that examines my participation in the Governor’s School for Agriculture. I agree to have my completed assignments, assessments, and reflections to be used to improve future classes of the Governor’s School. I can decide to stop being in this study at any time without getting in trouble. By typing or drawing my signature below, I acknowledge that it is my intent to electronically sign this document and agree to the use of electronic records for the purposes provided herein.

Student Signature: ____________________________ Age: __________ Date: __________

Witness: ____________________________ Date: __________

Virginia Tech Institutional Review Board Project No. 13-567
Approved June 11, 2019 to June 12, 2020

By typing or drawing my signature here, as a witness, I acknowledge that it is my intent to electronically sign this document and agree to the use of electronic records for the purposes provided herein.
Virginia Polytechnic Institute and State University
Informed Consent for Governor's School Participants Over the Age of 18 Years

Project Title: Governor’s School for Agriculture
Investigators: Dr. Curt Friedel, Assistant Professor (540-231-8177, cfriedel@vt.edu)

Use this form instead of previous form if student is, or will be 18 years-old while attending Governor’s School.

I. Purpose of Research
The purpose of the study will be to evaluate the overall effectiveness of the Governor’s School for Agriculture (GSA) in teaching agricultural concepts to these students, and the students learning of agriculture and leadership.

II. Procedures
You will be asked to share all assignments, assessments, and reflections completed while participating in the GSA, for the purpose of evaluating the program. There will not be any assignments or extra effort required beyond normal participation in the GSA.

III. Risks
There is no more than minimal risk when participating in this study.

IV. Benefits
There are no direct benefits to you for your participation. The indirect benefits relate to how the student’s academic work will be used in this research as a possible means to continually improve the curriculum of the GSA. There has been no promise or guarantee of benefits that have been made to encourage you to participate.

V. Extent of Anonymity and Confidentiality
Protecting your identity is a top priority of this study. By participating in this study, your information will be kept strictly confidential. Any information that potentially could identify you or others will be coded to ensure confidentiality. At no time will information be released that allows a student to be identified. At no time will the researchers release the results of the study to anyone other than individuals working on the project without your written consent. Only the research team will have access to your data. It is possible that the Institutional Review Board (IRB) may view this study’s collected data for auditing purposes. The IRB is responsible for the oversight of the protection of human subjects involved in research. Should you have any questions or concerns about the study’s conduct or your rights as a research participant, or need to report a research-related injury or event, you may contact the Virginia Tech Institutional Review Board at irb@vt.edu or (540) 231-3732.

VI. Compensation
There is no compensation for participating in this research.

VII. Freedom to withdraw
You are free to withdraw from the study at any time without penalty.

VIII. Participant’s responsibilities
I voluntarily agree to participate in this study and will allow completed assignments, assessments, and reflections be evaluated after the GSA program has ended this summer.

IX. Participant’s Permission
I have read and understand the Informed Consent and the conditions of this project. I have had all of my questions answered. I hereby acknowledge the above and give my voluntary consent. By typing or drawing my signature below, I acknowledge that it is my intent to electronically sign this document and agree to the use of electronic records for the purposes provided herein.

☐ YES ☐ NO

Participant Signature          Date

Virginia Tech Institutional Review Board Project No. 13-567
Approved June 11, 2019 to June 12, 2020
Appendix B – IRB Approval

**MEMORANDUM**

DATE: October 1, 2019

TO: Curtis R Friedel, Ibukun Damilola Alegbeleye, Jeremy Elliott-Engel, Brittany Alexandria Hoover, Carmen Dasiana Young, Maureen McGonagle

FROM: Virginia Tech Institutional Review Board (FWA0000572, expires January 29, 2021)

PROTOCOL TITLE: Governor’s School for Agriculture

IRB NUMBER: 13-567

Effective September 27, 2019, the Virginia Tech Institution Review Board (IRB) approved the Amendment request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:
https://secure.research.vt.edu/external/irb/responsibilities.htm

(Visit the Research Review Committee (IRC) site for the latest version of these requirements.)

**PROTOCOL INFORMATION:**

Approved As: Expedited, under 45 CFR 46.110 category(ies) 7
Protocol Approval Date: June 13, 2019
Protocol Expiration Date: June 12, 2020
Continuing Review Due Date*: May 22, 2020

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

**ASSOCIATED FUNDING:**

The table on the following page indicates whether grant proposals are related to this protocol, and which of the listed proposals, if any, have been compared to this protocol, if required.
**SPECIAL INSTRUCTIONS:**
This amendment, submitted September 27, 2019, updates research personnel.

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* Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this protocol is to cover any other grant proposals, please contact the HRPP office (irb@vt.edu) immediately.
Appendix C – Group Interview Protocol

Group Interview Protocol

1. Develop group interview questions that are relevant to research questions of the study.

2. Seek feedback on group interview questions and finalize.

3. Determine desired number of group interviews.

4. Identify participants based on sampling method and confirm that participants have a signed assent or consent to research form on file with program director.

5. Determine participation incentive.

6. Ask identified participants to meet after class to discuss participation in group interview on perceptions and thoughts of agriculture and agricultural careers.

7. Explain purpose of research, voluntary nature of research, and participation incentive.

8. Send around a sign-up sheet for those who are interested.

9. Send confirmation details of group interviews to participants who signed sign-up sheets; reiterate voluntary nature of group interviews.

10. Organize participation incentive prior to each group interview.

11. Begin each group interview by reiterating voluntary nature of the group interview and explain that individual participation can cease at any time.

12. Reiterate purpose of research, answer participants’ questions, and explain to participants that group interview is informal and conversational.

13. Welcome participants to help themselves to food and drinks which is the participation incentive.

14. Prior to asking first group interview question, explain that there are no right or wrong answers and that participants can pass on a question.

15. Begin conducting group interviews by asking interview questions.

16. At conclusion of group interviews, thank all participants for participating.
Appendix D – Email Sent to Participants

Hi everyone, thank you for your interest in participating in this research focus group. As explained yesterday, this is an informal research project in which I will ask you all questions about how you perceive agriculture and agricultural careers.

This is completely voluntary and you can change your mind about participating at any point. For your time, pizza from Benny's and other snacks will be available. The date, time, and meet up location of your focus group is [date, time] in [meet up location]. [Meet up location] is across the street from the dorm.

Thanks,
Brittany
## Appendix E – A Priori Propositions

<table>
<thead>
<tr>
<th>Proposition</th>
<th>Supporting Literature</th>
<th>Research Questions or Objectives</th>
<th>Data Collection Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Youth have more negative or apathetic thoughts and perceptions of agriculture and agricultural careers that are shaped by multiple factors explained by career development. Thoughts and perceptions can change with involvement in agricultural outreach.</td>
<td>It is imperative to understand the career development process and the factors that lead to career choice (Esters &amp; Bowen, 2005) Social Cognitive Career Theory can be useful in explaining factors that influence how youth think about, perceive, and engage with agricultural careers. The theory can also explain how thoughts and perceptions can change after involvement with an agricultural program (Fraze, Wingenbach, Rutherford, &amp; Wolfskill, 2011)</td>
<td>How do the youth participants think about and perceive agriculture as a concept and a career? What influences the participants’ thoughts and perceptions of agriculture as a concept and a career? How do youth see themselves being involved with agriculture after participating in VGSA?</td>
<td>Group interviews Field notes</td>
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<tr>
<td>With the opportunity to engage in reflection, youth can reflect on their experiences in an agricultural outreach program which provide insight to how youth are processing what takes place.</td>
<td>The act of reflection is important to the learning process. It has been proposed that learning comes from reflection of experiences (Meder, Smalley, &amp; Retallick, 2018). Blogging has been identified as a useful method for student reflection (Gravois, Lopez, &amp; Budden, 2017).</td>
<td>How do students in VGSA reflect in blogs on their experiences within the program? How do the students in VGSA reflect in blogs on their change in perceptions of agriculture and agricultural careers?</td>
<td>Blog post assignments</td>
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<tr>
<td>Youth have different occupational identity statuses that are relevant to agricultural career choice and reflect indicated career goals.</td>
<td>Determining occupational identity statuses of youth and understanding the theory is helpful to practitioners who are involved in the career development of youth (Pelco &amp; Ball, 2018; Porfeli &amp; Lee, 2012). To choose a career in STEM, the development of a STEM identity is necessary (Stitt, 2016). This is likely relevant to agricultural careers.</td>
<td>Determine occupational identity statuses of participants. Identify the career goals as indicated by participants before and after the program. Determine if participants’ experiences in the VGSA program had an impact on their occupational identity development.</td>
<td>Melgosa’s Occupational Identity Scale Program registration survey Program exit survey</td>
</tr>
</tbody>
</table>
Appendix F – Article 1 Coding Table

Coding table for article 1: Thoughts and Perceptions of Agriculture and Agricultural Careers as Told by Students of Virginia’s Governor’s School for Agriculture

Research questions and corresponding themes:

1. How do the participants think about and perceive agriculture as a concept and career?
   - Theme 1 – Farming
   - Theme 2 – Wide-ranging, broadened view of agriculture and agricultural careers
   - Theme 3 – Value of agricultural careers within the field and compared to traditionally non-agricultural careers

2. What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career?
   - Theme 1 – Relationships with family, peers, school personnel, and mentors
   - Theme 2 – Identity characteristics
   - Theme 3 – Learning experiences

3. How do the participants see themselves being involved with agriculture after participating in VGSA?
   - Theme 1 – Pursuing agriculture academically or professionally
   - Theme 2 – Being agriculturally aware

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Appendix G – Article 2 Coding Table

Coding table for article 2: Thoughts and Perceptions of Agriculture and Agricultural Careers as Explored through Blogging Assignments

Research questions and corresponding themes:

1. How do students in VGSA reflect in blogs on their experiences within the program?
   - Theme 1: Reflections on the global seminar research projects
   - Theme 2: New concepts learned

2. How do the students in VGSA reflect in blogs on their change in perceptions of agriculture and agricultural careers?
   - Theme 1: Significant changes in perceptions of agriculture
   - Theme 2: Pursuing a career in agriculture

<table>
<thead>
<tr>
<th>Person</th>
<th>RQ 1 / Theme 1</th>
<th>RQ 1 / Theme 2</th>
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## Appendix H – Article 1 Codebook

Codebook for article 1: Thoughts and Perceptions of Agriculture and Agricultural Careers as Told by Students of Virginia’s Governor’s School for Agriculture

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Initial Codes</th>
<th>Focused Codes</th>
<th>Definitions</th>
<th>Themes</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ 1: How do the participants think about and perceive agriculture as a concept and career?</td>
<td>Beef, cattle, crops, rural, livestock, farming, harvesting Plants, primary sector, climate, environment, ranching, fields, tractors, technology</td>
<td>Food production and other farming practices, effects of farming on environment and climate</td>
<td>Agriculture is thought to be food production through raising animals and growing crops.</td>
<td>Farming</td>
<td>Participants perception of farming as equivalent to agriculture. Farming is perceived as a narrow industry, largely composed of food production.</td>
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<td></td>
<td>Widespread, deeper industry, opened a new world, a part of daily life, a lot more than previously thought, realization, changed perspective, everything, everywhere, diverse, broadened spectrum</td>
<td>New, wide-ranging view of agriculture; deeper understanding of agriculture industry</td>
<td>Agriculture and agricultural careers are thought to be broader than previously thought, with influences on daily life.</td>
<td>Broadened view of agriculture and agricultural careers</td>
<td>Participants development of an expanded understanding of agriculture by learning about wide variety of agricultural careers.</td>
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<tr>
<td></td>
<td>Collective, important, less important, recognition, viewed as better, earning potential, higher demand, vital roles, equal contribution, social status, amount of education, negative connotation</td>
<td>Careers are equally important within and outside, careers are equally important within but not outside, careers have certain important within and outside</td>
<td>Agricultural careers are valued differently depending on personal beliefs, societal expectations, and salary information.</td>
<td>Value of agricultural careers within the field and compared to traditionally non-agricultural careers</td>
<td>Participants expression of importance and significance of agricultural careers and traditionally non-agricultural careers.</td>
</tr>
<tr>
<td>Research Question</td>
<td>Initial Codes</td>
<td>Focused Codes</td>
<td>Definitions</td>
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<tr>
<td>RQ 2: What factors influence the participants’ thoughts and perceptions of agriculture as a concept and a career?</td>
<td>Mom, dad, grandfather, grandma, family, roommate, friends, instructor, professors, GSL, teacher, counselor, advisor, students</td>
<td>Parents and grandparents, school personnel, peers, other important adults</td>
<td>People who fill roles as family members, peers, school personnel, and mentors or guides and have influence.</td>
<td>Relationships with family, peers, school personnel, and mentors</td>
<td>The individuals who serve as factors that influence how the participants think about and perceive agriculture as a concept and career.</td>
</tr>
<tr>
<td></td>
<td>NOVA, Asian, Vietnamese, India, Pakistan, El Salvador immigrant, Southern Virginia, white, Confederate, cultural, political, conservative republicans, stereotype, rednecks boy, girl, man, woman, male, female rural, diversity, disparity, suburban urban, job decided undecided, explore options</td>
<td>Geographic location, race and ethnicity, gender, immigrant culture, political ideology, occupational identity status</td>
<td>Aspects of personal identity that inform thoughts, perceptions, and actions.</td>
<td>Identity characteristics</td>
<td>The features and qualities of the participants that shape their thoughts and perceptions of agriculture and agricultural careers.</td>
</tr>
<tr>
<td></td>
<td>Movies, media, school, history, firsthand experience, TV, FFA, agriculture classes, news, books, lecture, activities, videos, programming</td>
<td>Media, school-based experiences, VGSA</td>
<td>Methods of learning about agriculture directly and indirectly.</td>
<td>Learning experiences</td>
<td>The ways in which participants develop knowledge about agriculture and agricultural careers.</td>
</tr>
<tr>
<td>Research Question</td>
<td>Initial Codes</td>
<td>Focused Codes</td>
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<td>RQ 3: How do the participants see themselves being involved with agriculture after participating in VGSA?</td>
<td>Research, lab, working with the animal side, working with the technical side, major in agriculture economics, implement part of agriculture in career, agriculture on the table, future career option, take a class, agricultural lawyer, minor, veterinarian, seasonal job at farm</td>
<td>College, career, job</td>
<td>The settings that involvement with agriculture can take place.</td>
<td>Academically or professionally engaged</td>
<td>A way to be involved with agriculture; includes studying agriculture in academic settings, pursuing agriculture as a career, and considering agricultural career options for future choice.</td>
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<tr>
<td></td>
<td>Debunk, educate, share knowledge, advocate for agriculture, community involvement, consumer, gardening, other agricultural hobbies</td>
<td>Address negative public perceptions and misconceptions, share newfound agricultural knowledge, recognize role of agriculture in daily life, engage in agriculture-based activities</td>
<td>The ways of being involved with agriculture; includes educating people, acknowledging role as consumer, and developing agricultural hobbies such as gardening and fermentation.</td>
<td>Advocate of agriculture</td>
<td>A way to be involved with agriculture; includes sharing information with others and engaging in activities with aspects of agriculture in mind.</td>
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</table>
### Appendix I – Article 2 Codebook

Codebook for article 2: Thoughts and Perceptions of Agriculture and Agricultural Careers as Explored through Blogging Assignments

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Initial Codes</th>
<th>Focused Codes</th>
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<tr>
<td>RQ 1: How do students in VGSA reflect in blogs on their experiences within the program?</td>
<td>Group project, solutions, research project, conducted research, capstone, team, researching</td>
<td>Conducting research in group, exploring topics, developing solutions</td>
<td>Components of global seminar projects which are reflected upon as experiences in the program.</td>
<td>Reflections on the global seminar research projects</td>
<td>Participants reflections on their experiences completing their global seminar research projects.</td>
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<td>Educated, learn about, learned a lot, provided insight, gaining more knowledge, understand, explore new topics, learning valuable information, exposed, firsthand experience</td>
<td>Gained new agricultural knowledge</td>
<td>The descriptions of acquiring new information on agriculture.</td>
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<td>Participants reflections of the new information that was acquired in various capacities of the program.</td>
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<tr>
<td>RQ 2: How do the students in VGSA reflect in blogs on their change in perceptions of agriculture and agricultural careers?</td>
<td>Changed drastically, new appreciation, new perspective, perceptions changed greatly, viewpoint changed tremendously, broadened perspective, altered previous perceptions</td>
<td>Meaningful change in perception</td>
<td>Indicates instances of change in perceptions of agriculture and agricultural careers.</td>
<td>Significant changes in perceptions of agriculture</td>
<td>Participants reflections of their important changes in how they perceive agriculture and agricultural careers.</td>
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<td>Confirmed passion, veterinary track, consider a career, animal science major, veterinary medicine</td>
<td>Career choice, career option</td>
<td>Indicates instances of change in perception that leads to agricultural career choice or change in perception that leads to consideration of agricultural career.</td>
<td>Pursuing a career in agriculture</td>
<td>Participants reflections on their desire to pursue or consider pursuing a career in agriculture due to important change in perceptions.</td>
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Appendix J – Article 3 Codebook

Codebook for article 3: Exploring Occupational Identity Status as a Factor of Agricultural Career Choice

Gender
1 - Male
2 - Female

Age
1 - 15
2 - 16
3 - 17
4 - 18

Extracurricular Activities
1 - One or more agriculture-related activity (FFA, 4-H)
2 - One or more agriculture-related and non-agriculture-related activity
3 - One or more non-agriculture-related activity
4 - No activities listed

Major
1 - Agricultural & Biological Systems Engineering
2 - Agricultural Economics
3 - Animal Science
4 - Food Science
5 - Plant Science

Father’s Education
1 - Less than high school
2 - High school diploma or GED
3 - 2-year college degree (Associate's)
4 - 4-year college degree (Bachelor's)
5 - Master's degree
6 - PhD or other advanced professional degree (law, medicine, etc.)
7 - Other

Mother’s Education
1 - Less than high school
2 - High school diploma or GED
3 - 2-year college degree (Associate's)
4 - 4-year college degree (Bachelor's)
5 - Master's degree
6 - PhD or other advanced professional degree (law, medicine, etc.)
7 - Other

Size of Hometown
1 - On a farm
2 - In a rural area, not a farm
3 - In a small town, less than 2,500 people
4 - In a large town, 2,501 to 25,000 people
5 - In a smaller city, 25,001 to 100,000
6 - In a large city, more than 100,000 people

How Participants Learned of GSA
1 - School personnel (teachers, counselors, coordinators, administrators)
2 - Family member (parents, siblings, other family)
3 - School personnel and family member
4 - Peers (friends and alumni)
5 - Peers and school personnel
6 - VDOE/GSA website
7 - Family member and peers
8 - VDOE/GSA website and peers
9 - More than two sources

Why Participants Chose to Participate in GSA
1 - Interest in program content
2 - To explore career options
3 - For a pre-college experience
4 - Recommendation from school personnel, family, peers, or alumni
5 - Other
6 - Two or more reasons

Prior Agricultural Experience
1 - Little to none (little could be 1 farm visit, petting zoo visit)
2 - Some (gardening, animal care, coursework in environmental science classes)
3 - Quite a bit (farm work, taken agricultural classes, actively involved in agriculture-related organizations)

Career Choices on Registration and Exit Surveys
1 - Agriculture, Food & Natural Resources
2 - Architecture & Construction
3 - Arts, Audio/Video Technology & Communications
4 - Business, Management & Administration
5 - Education & Training
6 - Finance
7 - Government & Public Administration
8 - Health Science
9 - Hospitality & Tourism
10 - Human Services
11 - Information Technology
12 - Law, Public Safety, Corrections & Security
13 - Manufacturing
14 - Marketing, Sales & Service
15 - Science, Technology, Engineering & Mathematics
16 - Transportation, Distribution & Logistics
17 - Two or more choices
18 - Undecided/undecipherable

How Much GSA Influenced Current Career Goal
1 - None
2 - Some
3 - Quite a bit

Open to an Agricultural Career Pre-VGSA
1 - Yes
2 - No
3 - Somewhat

Open to an Agricultural Career Post-VGSA
1 - Yes
2 - No
3 – Somewhat
Appendix K – 2019 VSGA Course Descriptions

Core Courses

Economics is Everywhere! Some Key Concepts to Understanding the Agriculture Economy (All students)
Students will learn how economics relates to their everyday lives and the world around them through discussions of the economic development, poverty, comparative advantage, financial planning, and the business of doing business.

Dairy Science 101: From Cow to Table (All Students)
In 2015 Americans consumed 627 pounds of dairy products per capita, a 16.3 percent increase in consumption since 1975. However, few understand the science and technology that are involved in producing, harvesting, processing, and marketing milk and milk products. This class will provide a basic overview of the dairy community and will cover dairy trends in production and manufacturing, physiology of lactation, and milk quality and safety. A field trip to the Virginia Tech Dairy Center at Kentland Farm will highlight precision dairy technology used to improve animal well-being and management. Educational and career opportunities will be explored.

It’s Not Your Grandfather’s Farm (All Students)
Introduction to the Animal Sciences is designed to expose students to the broad scope of the animal sciences, ranging from the basics of animal husbandry to cutting edge research involving animals. Emphasis will be placed on the applied biology related to the nutrition, reproduction, genetics, and well-being of domestic animals.

Natural Energy and the Environment (All Students)
Provides a general introduction to biological systems engineering, sustainable agriculture, and energy, with emphasis on best management practices utilizing biomaterials and natural resources. Students will experience working as engineers, learning what an engineer actually does, and hear from recent graduate students on their research interests and career goals. This team-taught course also covers recent trends in agriculture and biological systems.

Plant Sciences Introduction: Crop production, the Environment, and the Role of Biotechnology (All Students)
In this course, we will explore the use of challenges of feeding 9.3 billion people by 2050 and deal with a changing climate. The options include using more and more land or using the agricultural land we have to produce more. To increase food supplies we must develop crop and forage varieties that are tolerant to stress, diseases, pests, weeds, and more efficient in using water and nutrients. Plant breeding relies heavily on biotechnology, including transgenic approaches for some crops. In addition, we must maintain and improve soil and water quality as agriculture intensifies. We will examine the advantages and disadvantages of these approaches with regard to environmental sustainability while exploring the production systems of important staple crops.
Communicating in the Scientific World (All Students)
The purpose of the course is to develop skills in written and oral communication in the agricultural sciences. The course will specifically focus on skills in scientific writing, creating brochures, creating scientific posters, and public speaking with and without PowerPoint, and techniques for blogging.

The Value of the Library in the Digital Age (All Students)
It is estimated that our human knowledge (everything we know) is doubling every year, and doubling at an increasing rate. In this age of vast digital information, the library still stands as a mainstay of credible and scholarly evidence to be used to support our opinions. This course will provide techniques and strategies to use the library in today’s digital environment.

Careers in Agriculture (All Students)
A survey of opportunities for careers in agriculture. Students will explore potential careers in agriculture and complete an assessment matching personal strengths and skills to qualifications needed for specific careers. Students will also learn about the career services available at colleges, tools available for seeking employment after graduation, and how to network with professionals in the agriculture industry.

Major Courses – Series 1

Introduction to Biological Systems Engineering
(Agricultural & Biological Systems Engineering Majors Only)
Biological Systems Engineering (BSE) is the engineering discipline that applies concepts of biology, chemistry and physics, along with engineering science and design principles, to solve problems in biological systems. This course will explore a broad range of biological systems, from natural systems, such as watersheds with a focus on water resources, to built systems, such as bioreactors and bioprocessing facilities.

Introduction to Agricultural Marketing: You and Your Communication Strategy
(Agricultural Economics Majors Only)
In this class students will complete the 20-question True Colors Personality Quiz and participate in a group activity and discussion about our findings. Students will examine the 4 P’s of marketing which directly affect consumer purchasing behavior. Finally, students will select an agricultural product and develop a marketing communication strategy.

Focus on the Animal Sciences
(Animal Science Majors Only)
Each day’s session will focus on an aspect of the animal sciences, based on species, purpose, and/or discipline. Students will explore and apply practical concepts related to animal husbandry and survey the most recent research occurring at Virginia Tech with respect to animal science.
Introduction to Food Safety & Sensory Evaluation
(Food Science Majors Only)
Food science encompasses a wide range of topics. In this course, we will briefly touch on food safety, ready-to-eat food products, and handwashing and get the opportunity for a “hands-on washing” experience. We will then shift gears into discussing the importance of food sensory evaluation, which incorporates scientific laboratory methods to analyze human responses to foods, to the food science world. We will understand how the five human senses contribute to flavors and experiences of food and beverage products and explore different sensory methodologies. Students will also tour the Virginia Tech Sensory Evaluation Lab and Pilot Plant, and then have the opportunity to participate in food sensory tests.

Plant Sciences Introduction: The Big Data Revolution in Agriculture
(Plant Science Majors Only)
Students will explore how genomic data can be used to improve crop production by decoding genome evolution and characterizing domestication process. Student will learn how selective breeding and biotechnology can be used to identify genes underlying stable resistance traits. The challenges and opportunities of implementing precision agriculture in Virginia will be discussed. During field trip, students will learn to use drones and ground robots to collect crop phenotypes.

Major Courses – Series 2

Orientation to Biological Systems Engineering
(Agricultural & Biological Systems Engineering Majors Only)
Learn about watershed science and engineering through hands-on activities. Students will conduct an experiment using a rainfall simulator to examine the effects of land cover on runoff volume and pollutant loss. An introduction to the field of Metabolic Engineering will be given followed by hands-on applications with cyanobacteria that draw CO2 out of the atmosphere, plants engineered to produce valuable chemicals, and three-dimensional computer models that demonstrate the intersection of biology and mathematics. Students will then visit the StREAM Lab, a living, learning outdoor laboratory in and on Strouble's Creek in Blacksburg.

Choosing Wisely: What Economics Has to Offer
(Agricultural Economics Majors Only)
Students will learn in the basics of economic decision-making and how markets operate. Students will participate in microeconomic applications by investigating what can be done to successfully manage our natural resources.

Medicine Across the Species
(Animal Science Majors Only)
Each day’s session will focus on an aspect of veterinary medicine, based on species, purpose, and/or discipline. Topics include: companion animal care and prevention, food animal health care, preventing and treating toxicities in animals, and imaging in the dark.

Food Science: Fermented Foods and Food Additives
(Food Science Majors Only)
In this class we will study the fascinating world of fermented foods. Our ancestors thousands of years ago had no refrigeration and no stores, and they used fermentation to save and process foods, improving nutritional value along the way. We will also look at additives used by the food industry, what they are, why they are used and what regulations they follow.

Global Food Security
(Plant Science Majors Only)
This course will explore what food security means, why it is important, and how plant sciences can help solve global food security to assist in feeding the world's billions of people. Different approaches will be explored, including food systems, a deeper look at crop improvement and molecular breeding, and perspectives from the developing world.

Elective Courses

Aesthetic Horticulture: Combining Art and Science in Floral Design
Application of design elements and principles in creation of a variety of floral designs for the home, including bud vases, centerpieces, and a special party design. Additional info includes obtaining and preparing flowers, working with containers and design aids, design evaluation, and maintaining flower quality. No previous experience needed.

Animal Reproduction
How animals reproduce is both a fascinating topic and critically important for good animal management. The basic principles of male and female reproduction are explained. Main factors influencing fertility, the technologies used in the field and the impact of reproduction on production system, focused on the beef chain is explained.

The Meat We Eat
Course Description: This course is designed to give students a glimpse of the global meat industry, food safety, and consumer driven markets. Furthermore, this course will integrate topics of muscle biology, growth and development, and the mechanism that control the conversion of muscle to meat. Specifically, students will focus on understanding meat quality attributes that drive the consumer market, such as meat color, flavor, and tenderness. These goals will be achieved through lecture and lab components that will allow students to be exposed to meat fabrication, packaging, retail display, food safety, and the innovations behind these components that has continued to move the meat industry forward.

Restoring Community Food Sheds
Introduction to the economic, social, and ecological foundations of civic agriculture. Topics include localized food systems and citizen participation in civic agriculture. Emphasis will be given to a range of civic agriculture models, strategies, and hands-on approaches to establish, retain and strengthen community-based food and agriculture systems.

Cultivating Health, Wellness, and Safety for Agricultural Sustainability through a Sociotechnical Approach
The complexities that shape our food and agricultural systems are immense. For instance, farmers too often sustain injuries or illnesses, or have a physical or emotional disability that
impedes their ability to work safely and productively. In this course, students will be introduced to AgrAbility Virginia, a statewide program that uses a sociotechnical approach to help address the health, wellness, and safety of farmers and farmworkers, while, at the same time, addressing the issues of agricultural sustainability from farm-to-field. We will illustrate how we integrate the fields of mechanical engineering, health and occupational safety, and community education to improve the quality of life of farmers as our primary goal. The course will include: 1) an overview of AgrAbility Virginia and the community-university partnerships that make-up our technical assistance and educational delivery system; 2) a field trip to the Terrestrial Robotics Engineering & Controls (TREC) Lab in the Department of Mechanical Engineering to demonstrate how robotics are used as an emergent assistive technology in agriculture; and 3) a local farm visit focused on identifying real-life health and safety issues and solutions.
Appendix L – Topics for Global Seminar Projects
2019 Team Topics – Governor’s School for Agriculture

Childhood Obesity Prevention

1. Many believe food labels, sellers’ claims, and attractive food packaging mislead consumers about what they are eating. What are the possible reasons for this? How could food labels and/or packaging of food be altered for children and families to better understand and interpret food labels to make healthier eating choices? What are the costs, and what is at stake? Incorporate the use of science, technology, engineering, and economics in your response.

2. For ages 6 to 11, at least one child in five is overweight. Over the last two decades, this number has increased by more than 50 percent and the number of obese children has nearly doubled. Is it possible that parents are busier than two decades ago and reliance on packaged food and restaurants instead of making meals from fresh foods have increased childhood obesity rates? What facts support this, or refute this? What solutions do you have for parents in preparing foods for their children to lower obesity rates? Incorporate the use of science, technology, engineering, and economics in your response.

3. Many believe that educating children to make healthier decisions about what to eat may reduce childhood obesity, such as the use of “My Plate”. What is the current status of children being able to make informed decisions of how to eat a healthy diet? What factors should be considered in altering education programs for children to eat healthier? How would these solutions be implemented? Is the money spent on education worth the benefits? Incorporate the use of science, technology, engineering, and economics in your response.

4. With schools serving both breakfast and lunch to students in cafeterias, many students eat two of the three major meals of the day at school. Is there a connection between children eating school meals and obesity? What facts may contribute to this relationship? Based on these facts, what solutions may be offered to school cafeterias to help fight childhood obesity? Can schools afford to offer fresh and nutritious food at a low enough cost? Incorporate the use of science, technology, engineering, and economics in your response.
Climate Change

1. Storage of carbon in soil depends on various characteristics of the soil. What are the challenges and opportunities for using grassland and farm pastures as a solution to sequestering carbon? What factors should be considered in utilizing pastures and grasslands for this purpose? What should be recommended to agricultural producers based on available choices and costs? Incorporate the use of science, technology, engineering, and economics in your response.

2. It is estimated that 20 to 25% of emissions of greenhouse gases contributing to climate change come from agricultural production. What agricultural practices most significantly contribute to climate change? Why do these practices contribute to climate change? What solutions are available to lessen the contribution agriculture makes towards climate change? Is there a cost benefit for the farmer to adopt these changes? Incorporate the use of science, technology, engineering, and economics in your response.

3. Increased occurrences of heat waves may affect animal’s vulnerability to disease, reduced fertility, and production, as well as increase the number of parasites and diseases affecting livestock. What practices may be used as a solution to consider in the future of managing livestock in light of climate change? How should your proposed changes be implemented given the food systems currently in place? Incorporate the use of science, technology, engineering, and economics in your response.

4. Buying local food sold in the local community means the food did not travel large distances, and therefore less pollution is emitted during transport. What factors should be considered regarding relying more on local food production systems to mitigate climate change? What solutions exist for resolving issues related to these factors? Incorporate the use of science, technology, engineering, and economics in your response.
Food Safety

1. According to the CDC, reducing foodborne illness by 10 percent would prevent 5 million Americans from getting sick each year. How does poor water quality contribute to the incidence of food-borne illness during the production and processing of food? What causes of food-borne illness associated with water quality may be accepted or rejected based on facts? Based on your findings what practices may be used as solution to be adopted to produce and process food? What is the cost of the solution vs. the cost of inaction? Incorporate the use of science, technology, engineering, and economics in your response.

2. Organic foods are often considered healthier, but according to the CDC, people who eat more organic foods are up to eight times more likely to ingest E. coli bacteria. What are other factors to be considered in growing organic food based on aspects of food safety? What cost-effective solutions are available to mitigate these food safety issues? Incorporate the use of science, technology, engineering, and economics in your response.

3. Food companies are now expected to reduce waste, recycle, and increase performance while maintaining a process ensuring our food is safe. What food safety risks still remain with respect to current food packaging? What characteristics should be considered for future advancements in food packaging? Which cost-effective solutions in food packaging do you recommend based on your analysis? Explain why. Incorporate the use of science, technology, engineering, and economics in your response.

4. Agriculturalists have been using antibiotics in food animals since the 1940s to improve weight gain of animals. But, to what extent are antibiotics currently being used. What are the factors to be considered in deciding to continue use antibiotics in animal production systems? What cost-effective alternative solutions exist? Based on the factors related to food safety, explain why you would or would not recommend the prominent use of antibiotics for food-animal production. Incorporate the use of science, technology, engineering, and economics in your response.
Global Food Security and Hunger

1. The use of Genetically Modified (GM) crops to alleviate hunger is a subject of controversy around the globe. What is the current status of genetically enhancing food-plant varieties to withstand diseases, droughts, and other factors that would otherwise limit their production? Explain the issues associated with genetically altering food-plants for human consumption. Given this information, should food-plants be genetically enhanced as a solution to promote global food security and alleviate hunger? Why or why not? Incorporate the use of science, technology, engineering, and economics in your response.

2. The Special Supplemental Nutrition Program for Women, Infants and Children Program (WIC) is a Federal nutrition program that assists pregnant women, new mothers, infants and young children up to age five with obtaining the food they need. Do programs such as food banks, WIC, EBT, etc. have an impact on providing access to healthier food choices to low income populations? Why or why not? What cost-effective solutions may be made to serve low income populations? Incorporate the use of science, technology, engineering, and economics in your response.

3. It is believed that 13.5% of the population in developing countries is undernourished. What are the benefits and limitations of international food aid programs on addressing world hunger? What factors make these programs successful or unsuccessful? Given these factors, what cost-effective solutions do you recommend to helping people in developing countries abate hunger? Incorporate the use of science, technology, engineering, and economics in your response.

4. Approximately 17% of Americans struggle to find food, while 133 billion pounds of food is wasted each year and goes uneaten. What are the issues associated with food being wasted in the United States? What are the related factors to consider with regard to food waste in the United States? What cost-effective solutions exist to resolve these issues? Incorporate the use of science, technology, engineering, and economics in your response.
Sustainable Energy

1. It is believed that 30% of the US corn supply will be used to produce ethanol. Should corn be used to produce ethanol or would other plants be a better solution to producing ethanol in the United States? What are the factors to consider in choosing a crop for producing energy? Based on this evidence what crop, based on economics, do you recommend to be used for producing ethanol in the United States? Why? Incorporate the use of science, technology, engineering, and economics in your response.

2. Biomass may have the potential to supply energy to rural communities. What systems exist for conversion of agricultural biomass into bioenergy? What are the benefits and limitations of each system to agricultural producers? What system would you recommend as a solution to an agricultural producer as an alternative energy solution? Explain why. Incorporate the use of science, technology, engineering, and economics in your response.

3. Biodiesel produces lower levels of emissions than petroleum-based diesel, is less toxic, and is also biodegradable. What is the current status of bioengineering crops for more efficient production for bioenergy fuels? Explain the issues associated with genetically altering crops for energy purposes. Given this information, should crops be genetically enhanced as a cost-effective solution to provide energy? Why or why not? Incorporate the use of science, technology, engineering, and economics in your response.

4. Agricultural producers’ who adopt practices to reduce energy consumption will become more profitable, reduce the cost of food, and reduce emissions released into the environment. How efficient are agriculture producers in saving energy? What opportunities exist for energy savings in production agriculture? What solutions do you propose based on the available evidence? Explain why. Incorporate the use of science, technology, engineering, and economics in your response.
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Check Out @ Harper Hall, 240 W Campus Dr, Blacksburg, VA 24061, USA 7:30am - 10:30am

Graduation @ McBryde Hall, 225 Stanger St, Blacksburg, VA 24061, USA 11:30am - 2:30pm

Banquet @ Owens Hall, 150 Kent St, Blacksburg, VA 6:30pm - 9pm Banquet