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Effects of Agricultural Education and Career and Technology on Georgia Milestone Tests Scores in Biology, Geometry, and Algebra

by

E. Chad Crews

A DISSERTATION

Presented to the Faculty of

The College of Education and Human Services

At Murray State University

In Partial Fulfillment of Requirements

For the Degree of Doctor of Education

P-20 & Community Leadership

Agriculture Education

Under the Supervision of Chair Dr. Kristie Guffey

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Abstract

Student's achievement is directly linked to teacher evaluation as well as school and district CCRPI scores. The researcher conducted Independent two sample *t*-tests comparing student's achievement on Georgia Milestone test in geometry, algebra, and biology at the district and state level for students enrolled in agricultural education courses, Non-agricultural education CTAE courses and non-CTAE courses. On the state level, student's scores were grouped into the four-achievement level of Beginning, Developing, Proficient, and Distinguished. No individual scores were available so an average mean score was representative of each students score in the four categories. This study included Independent two sample *t*-tests for each group listed in each subject and as a whole. The researcher also conducted Independent two sample *t*-tests for agricultural education students and Non-agricultural education students as Brantley County High School. This data used exact test scores from the 2017-2019 school years comparing gender results of the two subgroups and overall subgroup results. The Brantley County High School data only provided two subgroups because of scheduling for the school. Students are required to complete a CTAE pathway so there was not a Non-CTAE group. The purpose of this study was to determine the effect of agricultural education on student achievement in each of the educational disciplines. This study included scores of students in each of the three specified groups for the 2017-18, 2018-19, and 2019-20 school years. The data for this study was retrieved from the Georgia Department of Education and the Brantley County Board of Education.

Key words: Agricultural Education, Georgia Milestone Assessment, and CTAE

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Thank you to my wife Amanda Crews for your support, encouragement and for always taking care of things at home as I worked toward completing this endeavor.

To my daughter Adeline, know that you can do anything you want to, if you try. I will always be there pushing you to be your best at whatever you decide to compete in or become.

I dedicate my degree work to my father Ellison Cager Crews who passed away just as I was starting this degree in 2019. You instilled a work ethic in me as a child and I will always be grateful.

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CHAPTER I

INTRODUCTION

In today's world of testing and accountability for educators, every avenue for increase in student learning is explored and exploited. One way to maximize student learning is through repetition. Core academic standards taught to students in their subject area are reinforced in non-academic areas. For example, animal science and plant science cover many principles taught in biology. In biology, students learn the Punnett Square but in animal science, students learn how the Red Angus cattle breed came about through the red recessive gene of the Black Angus. Another example of cross-curriculum learning would be in forestry science where students learn geometry by calculating acreage on land areas. Georgia Performance Standards, GPS of English, math, and science are taught in agricultural education and other CTE courses. These CTE and agricultural education students benefit from learning standards through hands on approach to learning, with practical application of the standards.

Agricultural education includes many realms of academia. The core curriculum of agriculture education includes math, science, English and some U.S. history. Forestry science, wildlife, animal science, and plant science standards reinforce science curriculum and especially biology standards. CTE like agricultural education encompasses a vast area of subjects. Some subject areas include higher-level math such as engineering, where some subjects require more anatomy based-curriculum like health occupations. These students in agriculture education and CTE learn through hands-on application of the academic standards.

Agricultural education has three components to successfully complete the program. The first component is the classroom/laboratory where students learn in a normal classroom and lab settings. Students are taught through traditional education styles such as lecture and hands on

application in the lab. The second component of agricultural education is the National FFA organization. The National FFA Organization is the an organization, also known as Future Farmers of America, that develops premier leadership, personal growth and career success through agricultural education (National FFA, 2020a). Agricultural education students are able to take skills learned in the classroom and lab to compete against students from other FFA chapters in Career and Leadership Development Events (CDEs or LDEs). The last component of the three-component model of agriculture education is the Supervised Agricultural Experience (SAE). In an SAE, students can apply learning to personal agriculture applications. The students take what they learn in the classroom/laboratory and put those skills into action. Through agricultural education, standards reinforce academic curriculum to students through FFA and SAEs.

Georgia agricultural education programs has continued to grow with the addition of elementary agricultural education. Elementary students were not counted in the agricultural enrollment but testified to the strength of the program inside the state. There were 79,491 Georgia agricultural education students during the 2019-20 school year from grades six through twelve (Georgia Ag. Ed, 2020 n.d.). These students enrolled in courses that ranged from exploratory agriculture to animal science and biotechnology of which counts for a fourth science credit for high school students (Georgia Department of Education, 2020a.). Of the 79,491 total agricultural education students, around 38,000 of these students enrolled in high school agricultural education courses. These students were able to benefit from the three-component model of agricultural education but tasked with the same graduation requirements of non-agricultural education students. The current Georgia evaluation tool for student achievement at

the high school level is the Georgia Milestone Test. These tests are administered in ten subject areas to high school students across the state (Georgia Department of Education, 2020b).

With the focus on increased student achievement, agricultural education departments, and other Career and Technical Education (CTE) programs need to collaborate with other academia to teach across the curriculum. By doing so, elective courses will further cement principles of math and science that would benefit students in academic course evaluation. In the test-demanding world of education, student success evaluations are summative assessments. Teacher effectiveness follows the student performance on these assessments and improvements that students make from year to year. CTE programs, especially agricultural education curriculum closely aligns with standards for geometry, algebra, and biology. Certain agricultural education courses in Georgia count as a fourth science credit. Other agricultural education courses reinforce math and science principles students must learn in order to complete task inside agriculture mechanics and forestry. As educators, everyone involved must contribute to the student's education success in every facet of education.

Students have the opportunities to apply science and math principles to hands-on on real world experiences inside CTE and agriculture education. Students can understand the principles of learning by doing. CTE brings the application of the principles to life by using real world applications to the standards. Connections between CTE, agricultural education, and traditional academic courses are necessary for student success and teacher success. Agricultural education allows students to see real world applications of standards.

Does the curriculum in agricultural education and CTE compares in rigor to the curriculum taught in general education classes such as English, math or science has been a question for administrators and guidance counselors for years? CTE and agricultural education

curriculum has been viewed as second-rate education for non-college bound students. The academic benefits of CTE courses have-not been researched to find its academic benefits in traditional subject areas.

Students must meet graduation requirements in Georgia with four science, math, and English courses (Georgia Department of Education, 2020b). The questions that arise with local guidance counselors and administrators is if the amount of rigor inside CTE and agricultural education courses equal the level of rigor in traditional science courses such as biology or physical science.

In the 2018-19 school year, 117,669 Georgia Milestone tests were administered to Georgia high school students in geometry, algebra, biology, physical science, and U.S. history (Georgia Department of Education, 2020b). Portions of those students were agricultural education and CTE students. The data for the 2019-20 year was not available due to COVID-19 school closures across the state and the discontinuation of Georgia Milestone Test for the spring of 2020. The assessments were administered again in the fall of 2020 even though many students were learning virtually or through Zoom and other meeting platforms. State Superintendent Woods applied for a waiver for the 2020-21 school year through the United States Department of Education, because of virtual learning for Georgia students and available technology for rural students but did not receive a waiver (Georgia Department of Education, 2020b).

Statement of the Problem

CTE and agricultural education have been perceived as a secondary type of education for high school students who were not smart enough to go to college. With the push throughout the

90's and early 2000's for every student to go to college, the education system saw a decline in students taking CTE or vocational courses. Many states started asking the question, do we really need CTE and vocational education? In 1996, the Georgia Department of Education conducted an audit of agricultural education. The audit evaluated the need for agricultural education by students and the benefit of the program (Georgia Ag. Ed, n.d.) After the audit, the agriculture education program in Georgia began to flourish. The audit showed how important the program was and how much of an impact agriculture education had on the education system. Giani (2019) discusses in his article that the Carl Perkins IV passed in 2006 caused the major reformation of Texas Career and Technical Education. CTE programs receive federal funding each year for high schools and technical colleges. This funding is named after Carl Perkins. With legislation like the Carl Perkins IV and V, school systems and departments of education have begun to place new importance in CTE and agricultural education.

One of the problems facing CTE and agricultural education teachers is the mindset of others such as administrators, and the public towards CTE and agricultural courses. They do not understand the importance of the curriculum taught and the connection of standards in CTE courses to other academic areas.

Purpose of the Study

The purpose of this study was to determine the level of academic achievement for students taking CTE and agricultural education courses on Georgia Milestone test in Biology, Geometry, and Algebra.

1. Determine student achievement of Brantley County High School agricultural education students compared to non-agricultural education students on the Georgia Milestone tests.

2. Determine student achievement of Georgia agricultural education students compared to non-agricultural education students on the Georgia Milestone Test.

Theoretical/conceptual framework

This study is a non-experimental research study. It is a causal comparative research focusing on cause and effect of agricultural education and CTE courses connection to student achievement success through Georgia Milestone Test in Geometry, Biology, and Algebra at Brantley County High School and Statewide data for the 2016-17, 2017-18, and 2018-19 school years for Brantley County High School.

Research Questions and/or hypothesis

Research Question 1: Was there a significant difference in student achievement of agricultural education students in Georgia compared to non-agricultural education CTAE students on the Georgia Milestone Tests in biology, geometry and algebra?

Research Question 2: Was there a significant difference in student achievement of agricultural education students in Georgia compared to non-CTAE students on the Georgia Milestone Tests in biology, geometry and algebra?

Research Question 3: Was there a significant difference in student achievement of agricultural education students at Brantley County High School and Non-agricultural education students on the Georgia Milestone Tests in biology, geometry and algebra?

H1=There was a significant difference of Georgia agricultural education male and females students' scores on Georgia Milestone Tests in biology, geometry, and algebra compared to Non-agricultural education CTAE students.

$H_0$1= There was no significant difference of agricultural education male and female students' scores on Georgia Milestone Tests in biology, geometry, and algebra compared to Non-CTAE students.

H2=There was a significant difference of agricultural education students' scores on Georgia Milestone Tests in biology, geometry, and algebra compared to non-CTAE students.

$H_0$2= There was no significant difference of CTAE students' scores on Georgia Milestone Tests in biology, geometry, and algebra compared to non-CTAE students.

H3=There was a significant difference of BCHS agricultural education students' scores on Georgia Milestone Test in biology, geometry, algebra and physical science compared to Non-agricultural education students.

$H_0$3= There was no significant difference of BCHS agricultural education students' scores on Georgia Milestone Test in biology, geometry, algebra, and physical science compared to Non-agricultural education students.

Significance of the study

The significance of this study determined if agricultural education and CTE students gain an academic advantage over non-CTE and non-agricultural education students on Georgia Milestone Tests in Geometry, Biology and Algebra. The study showed the academic importance of CTE and agricultural education. The study may also help improve the perception of academic rigor inside CTE and agricultural education curriculum and encourage placement of students into the programs by administration and guidance counselors.

This study maybe used by the state CTAE for a guideline to show how important CTE and agriculture education are to student achievement. Lobbyist may use this information to

lobby for additional funds for the state agriculture education program and CTE programs. The Georgia Vocational Agriculture Teacher Association can use this study to highlight how agriculture education students perform in academics areas.

Limitations

Data was not be available for the most recent year because of the COVID-19 interruptions to education. The data for fall of 2020 was not used in certain Georgia Milestone Test because limited access due to schools not being back in full capacity. This study will use data that from 2016-17, 17-18 and 2019.

Definitions

- **Agricultural Education-**Program which prepares students for careers in all areas of agriculture utilizing three components; classroom/lab, FFA involvement and Supervised Agricultural Experience program (National FFA, 2020a).
- **Career and Technical Education** (**CTE**)-the practice of teaching specific **career** skills to students in middle school, high school, and post-secondary institutions (Stauffer, 2020).
- **Career Development Events** (CDE)-focus on student success. FFA members study and practice to gain a complete and comprehensive knowledge of what it takes to succeed in a related career (National FFA, 2020c).
- **Coronavirus Disease 2019 (COVID-19)-** Official name for the disease caused by the SARS-CoV-2 (2019-nCoV) coronavirus (Corona Virus, 2021).
- **End of Course (EOC)-** Previous name of Georgia course formative assessments (Georgia Department of Education, 2020d).

- **Georgia Milestones Assessment System**- is a comprehensive summative assessment program and represents a single system of summative assessments that span all three levels of the state's educational system – elementary, middle, and high school (Georgia Department of Education, 2020b).
- **Georgia High School Graduation Tests (GHSGT)-**Tests adopted in 1991 and served as formative assessment in Georgia High Schools until 2011 (Georgia Department of Education, 2020f).
- **National FFA Organization**- An organization, also known as Future Farmers of America, that develops premier leadership, personal growth and career success through agricultural education (National FFA, 2020a).
- **Supervised Agriculture Experience (SAE)-** an after-school project that encompasses "learning by doing" that gives a student hands on training through goal setting, planning, and record keeping (National FFA, 2020c).
- **Three-Component Model of Agricultural Education-** visually displays the interrelationships between SAE, FFA, and classroom and laboratory instruction (Phipps et al., 2008).

Summary

The study of agriculture education and CTE student achievement on standardized test would benefit agriculture and other career and technology education teachers suppling data to prove the significance of their program on student success. This study would determine if agriculture and CTE curriculum has a significant impact on student scores in other areas of academia. This data would influence how colleagues and administrators view CTE and agriculture teachers. The assessment would evaluate which area of academic classes affected by

agriculture and CTE courses. Having a better understanding of this informational data can influence scheduling in local systems for CTE and agriculture education enrollment. Chapter 1 supplied a summary of the data collected and disaggregated.

CHAPTER II

LITERATURE REVIEW

What is Agricultural Education?

Agricultural education teaches students about agriculture, food and natural resources. Students in agriculture education learn skills through hands on learning. They develop skills in science, math, communications, leadership, management and technology. (NAAE, 2020c, para. 1). Agricultural education is an important component of K12 education in America. Agricultural education is taught in every state in the United States and in five U.S. Territories. Approximately 1,000,000 students enrolled in agricultural education classes. Around 12,000 secondary and two-year postsecondary Agricultural Education teachers deliver instruction in agriculture classroom each day (NAAE, 2020a.)

History of Agricultural Education

Teaching agriculture education in public school may date back to around 1858 (Johnson, 2009). Johnson cites evidence of various types of agricultural education being taught across the United States. Before teaching of agriculture was even brought about, the idea of youth apprenticeships and supervised instruction goes all the way, back to colonial times (Johnson, 2009). Pieces of agricultural education show up in different segments in the history of the United States. Rufus Stimson the principal of one of the early agriculture schools, is given credit for developing the first component of agricultural education, the supervised agricultural experience (SAE). He taught students about agriculture production basics and these students implemented these basics in their home farms (Moore, 1988). Classroom instruction may tie back to some of the first formal teaching of agriculture at two schools in Massachusetts around

1858 (Johnson, 2009). The Civilization Fund Act of 1819 sparked some of the schools like the two in Massachusetts to begin teaching something similar to agriculture education (Croom, 2008). Once instruction began in the two Massachusetts schools, other states decided to begin teaching vocation agriculture as well. A second component of agricultural education-classroom instruction was born.

The Smith Hughes Act of 1917 gave agriculture education a foot hold in America's public schools. According to Croom (2008)

> With the passage of the Smith Hughes Act in 1917, the national coordination of agricultural education naturally made it convenient for the development of an organization for rural youth that encouraged best practices in agriculture production, and provided an outlet for personal growth and development (p. 114).

Once this landmark legislation passed, boys were able to gain valuable knowledge about agriculture. These young men took the knowledge they gained in high school agriculture class and took it home to the farm. Through SAEs, students were able to apply the newest and most scientific advancements in agriculture home to the farm to apply in practice. Modern agriculture practices taught in the classroom and students put them into practice on the farm. The Smith Hughes act strengthened the relationship between classroom and SAE.

Prior to the Smith Hughes Act of 1917, advancements in agriculture were not making it to the farm. With Land Grant Universities conducting research in agriculture and agriculture teachers sharing the research with their students, American agriculture began to advance at new levels. The third component of the agriculture education program came about in 1928 when the FFA was founded. With the FFA formation in 1928, students were able to display what they

were learning in agriculture class and compete against other students in their state and soon across the nation at the national FFA convention held in Kansas City Missouri. CDEs and other contests where being held even before the FFA was formed. In 1926 the American Royal Livestock, held in Kansas City, Missouri held its first livestock-judging contest. It was at this contest that the ideas for the Future Farmers of America began to grow (National FFA, 2020b). The Smith Hughes act also supplied federal funds for training teachers in agricultural education. The Smith Hughes was monumental for all areas of Career and Technical Education. It opened the door for federal funding like the Perkins funding that federally funds CTE (Croom, 2008).

The development of the twelve-month contract allowed vocational agriculture teachers to provide supervision of farm projects programs during summer months (Camp, 1985). The extended contracts of agriculture education teacher still are beneficial today. Teachers work extended year contracts of additional twenty to fifty days beyond the school year. This time benefits agriculture teacher by allowing for professional development and chapter program activities outside of the school year. Teachers can still supervise SAE projects and take students to summer camp and leadership training. Through the addition of extended year contracts teachers have been able to improve their programs (Camp, 1985).

"The establishment of the National Vocational Agriculture Teacher Association in 1948 was surely a milestone in the profession," (Camp, 1985). The NAAE formerly NVATA has become a life support for agriculture educators nationwide. The NAAE supplies liability insurance for its members as well as supplies insurance for apprentice teachers. NAAE assists agriculture teachers who may have health problems through an assistance fund set up through one of the programs. The NAAE is on the forefront of lobbying for agriculture education. Agriculture teachers always have a voice in Washington on behalf of the profession thanks to

NAAE. These lobbyists work hard to secure federal funding for agriculture programs nationwide. The NAAE also offers professional development for agriculture teachers at the national NAAE convention each year.

The Three-Component Model of Agricultural Education

Agricultural education is universally recognized by the three-component classroom/laboratory, SAE and the FFA (Shoulders, 2017). These three components are essential to have a complete agricultural education program.

Classroom and Laboratory

The first component of the model is classroom and laboratory instruction (Croom, 2008) identifies this component as activities and learning experiences inside the confines of the school facility. Agricultural education instructors use various forms of pedagogy in delivery of learning to agriculture students. The quality of instructor founds the reputation of the agricultural education teacher to the students, parents, and the community (Shoulders, 2017). Many agriculture teachers use agricultural mechanics labs, welding labs, agriscience labs, school farms, greenhouses, and many other school agriculture labs to teach and apply hands on principles for students. These students learn basic skills in various segments of agricultural education. The classroom supplies foundation knowledge for the students to apply in the other components of the complete agriculture education program. The classroom is the foundation of the three-component model. Each part of the three-component model was to be equal and balanced. This balance ensures students success in the agriculture education program (Croom, 2008).

Agricultural Education offers seven career clusters. Agribusiness systems, animal systems, environmental service systems, food products and processing systems, natural resources systems, plant systems, and power structural, technical systems offered under the umbrella of agriculture education (Careertech, n.d.). These diverse career clusters offer vast opportunities for students to experience a broad educational experience. Students can focus on forestry and wildlife, plants, landscaping, and horticulture, animal science or agricultural mechanics and power machinery. Students can advance from these areas to more specified courses such as veterinary science or poultry science.

Agricultural Education programs offer very high-level science courses that are recognized as science credit. Animal science, Plant Science, Forestry Science, and Natural Resource Management are science-based courses that reinforce science-based principles that students learn in their regular science courses. These agriculture courses put science in action with hands on learning. Still other school are offering agriculture business courses that use higher-level math and high order thinking in business situations (Georgia DOE, 2020c).

Experimental Learning (Supervised Agriculture Experience)

The second component of agriculture education is the Supervised Agricultural Experience program. "Supervised Agricultural Experience (SAE) is an independent learning program for students enrolled in agriculture education courses" (Croom, 2008, p. 110). The SAE component of agricultural education is each student's independent project that mostly takes place outside of the school facility. However, some schools offer housing for animals or school laboratories for students to conduct their independent agriculture projects, most students conduct their SAEs away from the school. Supervised agriculture experience requires planning by the student, agriculture teacher, parents and an employer if necessary (Croom, 2008). The plan is

designed for students to take skills learned in the classroom or laboratory and apply them in their personal projects. Students learn by doing. Students can have amazing SAEs. The SAEs can be entrepreneurial where the student owns the entire project and manages everything about the business or exploratory where the students are just taking an observation position. Placement SAES is where students work for an employer. There are also research SAEs where student complete research projects to find agricultural advancements. The most common SAEs in Georgia are in the field of Nursery/Landscape (Georgia Department of Education, 2020a).

Leadership (FFA)

The third component of agricultural education is the National FFA Organization (FFA). "The FFA is an instructional tool that compliments both instruction and supervised agriculture experience" (Croom, 2008). The FFA is the student organization for agricultural education students. (National Coordinating Council for Career and Technical Student Organizations, n.d.). The FFA is where students can take what they have learned in the classroom and in their SAE and compete against other students in award areas and competitive skill demonstrations. The competitive skills contest are called Career Development Events (CDEs) and award areas for SAEs are call proficiencies.

There are 760,113 FFA members, aged 12-21, in 8,739 chapters in all 50 states, Puerto Rico and the U.S. Virgin Islands. (National FFA, 2020c) The FFA offers 47 proficiency areas for outstanding SAEs and 24 CDEs for at the national level. (National FFA, 2020a) State associations offer their own CDEs that are more closely aligned to their curriculum in their respective states.

FFA start occurred 93 years ago as thirty-three farm boys from eighteen states met at the Hotel Baltimore and formed what is today the largest vocational youth organization in America. The organization was originally called the Future Farmers of America. The Future Farmers of America closely resembled the organization that had come about in 1925 called the Future Farmers of Virginia. In 1935, the New Farmers of America founded for African-American students in Tuskegee, AL developed (National FFA, 2020b). The charter that governs the National FFA was signed into law in 1950 and now has been replaced by Public Law 116-7, which revises the federal charter and allows FFA to continue to be a viable part of agricultural education (FFA New Horizons, 2019).

The Future Farmers of America, which consisted of white male students enrolled in vocational agriculture, combined with the New Farmers of America in 1965, which consisted of African-American male students enrolled in vocational agriculture. The Future Farmers of America opened membership to females in 1969 (National FFA, 2020b).

In 1988, the National FFA Organization made two changes that greatly shaped the outlook for the future of the organization. The first move made was changing the name from the Future Farmers of America to the National FFA Organization. The second change was allowing middle school students to become FFA members (Golden, 2014). This change allowed seventh and eighth graders to be FFA members. This change increased membership as well as opened the eyes of students to FFA at an earlier age. Through middle school agriculture education, students are able to explore different areas of agriculture while in middles school and compete at the junior level. The National FFA Organization does not allow sixth graders to be members, the Georgia FFA Association allows sixth graders to be members and compete (Georgia Department Education, 2020a). Middle school chapters soon began to pop up across the nation. The

addition of middle school program brought a new challenge for agriculture education. Training and staff development had to be aligned more for a middle school student than a high school student. Teacher preparation changed as well. Advisory committee are composed of different individuals for high programs versus middle school because of the different need associated with a middle school program. Bridges had to be formed between middle school and high school program for students to transition from one school to another and one chapter to another (Golden, 2014).

Agriculture Support Staff

The agricultural education consists of an advisory committee, and FFA Alumni. The support staff can assist in the running of the FFA chapter as well as the entire agricultural program surrounding the local agriculture teacher.

Agricultural education teachers are required to set up an advisory committee made up of individuals from the community. This advisory committee serves as a sounding board for the agriculture teachers and help advise in what direction the program needs to be going as well as a sounding board. These individuals can help the agriculture teacher ask for supplies or materials that may be harder for the teachers to ask for themselves. The Advisory committee assist in curriculum decisions, lining up classroom field trips, bringing in experts to lead class lectures, and help student find placements into SAEs.

The FFA Alumni serves as a support group that can help raise money for the chapter, assist in training teams, or judge local CDEs. The Alumni is an invaluable asset for a FFA chapter. They are the booster club for the local chapter. Alumni members assist in student SAEs

by helping advisor care for livestock projects and travel. Many Alumni members haul animals for livestock events and serve as chaperone while at conventions and camps.

Sands (2019) reports that agriculture educators are not taking advantage of the complete curriculum nor the opportunities afforded them through the FFA Alumni. He further identifies that teachers are not teaching the emphasis of SAEs and only a small percentage of teachers are using their advisory committees for their purpose. Proper use of the advisory committee and Alumni can be beneficial to the local program in all three components of agriculture education.

Agricultural Education in Georgia

Agricultural education in Georgia has a strong vibrant past and currently is healthy and growing. The program adds new teachers and programs every year. Student success through FFA is at an all-time high and enrollment numbers continue to grow. Student SAEs are showcased at the national level through national winners in agriscience and proficiencies.

History of Georgia Agricultural Education

The Smith Hughes Act of 1917 was presented by two Georgia legislatures. Senator Hoke Smith and congressional representative Dudley Hughes are credited with the National Vocational Act in which it was named after them. Once vocational agriculture began being taught in Georgia, the idea of a boy's club came about. Henry Groseclose, Harry Sanders, Walter S. Newman and Edmund C. Magill founded the Future Farmers of Virginia in 1925 and started to spread the idea across to other states (National FFA, 2020b). Soon after, they made their way to Georgia in 1927 and approached vocational agriculture teachers about forming a national organization (Wheeler, 1948, as citied by Pollard, 2020, p.16). Statham High School in Barrow County was the first FFA chapter founded in Georgia. Following Statham High School local

chapters began springing up across Georgia. Soon there was a need for a state association and so it formed in July of 1929. Georgia became the tenth state to gain a charter and join the Future Farmers of America (Wheeler, 1948, as citied by Pollard, 2020, p.16).

As more and more high schools began to teach vocational agriculture, the demand for agriculture teachers began to grow and after 1988, with the addition of middles school programs, the demand grew larger each year. Programs continue to need teachers today. There is shortage of over 400-agriculture teachers nationwide (National Association of Agriculture Educators, 2020b). The three colleges- University of Georgia, Fort Valley State University, and Abraham Baldwin Agricultural College in Georgia, that have agriculture education programs cannot fulfill the teacher demands made by the Georgia agricultural education program. With the addition of elementary school agricultural education in Georgia, the gap of meeting the need for agriculture teachers in Georgia has just widened. The elementary programs will grow just like the middle school programs did when introduced in 1988.

Georgia Agricultural Education Curriculum

Georgia agricultural education offers thirty-five career pathways for students in agriculture education (Georgia Department of Education, 2020g). Courses range from animal science biotechnology to floral design and management. Georgia agricultural education offers forty-five different course offerings to students in public schools in Georgia. Four agricultural education courses in Georgia count for a fourth science credit. Starting in 2015 all students graduating from a public high school in Georgia must have completed four sciences. Through evidence of rigor in forestry science, plant science, animal science and natural resources management the board of regents approved each of these courses to count for a student's fourth science (Georgia Department of Education, 2020c). There were 79,491 students during the

2019-20 school year enrolled in agriculture courses in Georgia of which 37,955 were high school students. The highest course enrollment is in Basic Agriculture Science course. This course is the introductory course for all career pathway courses inside the 35 Georgia agriculture pathways. The lowest course numbers are in the natural resource management courses offered and are 41,536 middle school students enrolled in agriculture education in grades six thru eight (Georgia Department of Education, 2020a).

Georgia Agricultural Education Teacher Standards

The key to Georgia agricultural education success comes from the history of almost deletion. In 1996, the Georgia Department of Education performed an audit of the agricultural education program (Lee, 1996, as citied by Pollard, 2020, p. 25). When agriculture teachers learned of the audit, the group banded together to form a set of standards in which to run each agriculture program in the state. All agriculture teachers would agree to be self-governed by the same set of standards that the group came up with. Therefore, in 1996 the standards were set forth, voted on by the GVATA, and were put into placed. The state audit results reported that agricultural education was viable part of the education system and Georgia. The anxiety of possibly losing the program turned into a building block of today's agricultural education program. After 1996, the agricultural education funding became a line item in the governor's budget for extended day and extended year along with the funds for the young farmer program.

Every spring each teacher in the state has to complete a Program of Work for the upcoming year (Appendix G). The program of work is based off the set of standards, which were put in place in 1996. The Georgia State Board of Education adopted standards a means to evaluate agriculture teachers. The teacher must meet all standards to receive full-extended day and extended year grant money. Teachers can choose which CDEs they want to train a team for

but must have students participate in four CDEs in which two of them must be Leadership Development Events (LDE). The other standard mandates in which every teacher must meet.

The standards serve as governing tool to make sure all agricultural education teachers are doing their jobs and earning the extra funds allotted to them through the state budget. They also unify the profession as a whole.

Georgia Agriculture Education SAEs and FFA

Georgia agriculture education student's Supervised Agricultural Experiences are mostly in horticulture, landscape or animal science amongst high school students and agriculture education in middles school students. There are 347 Georgia agricultural education programs in the state, 221 high school, 126 middles school, 25 elementary school pilot programs, and 60 young farmer programs. During the 2019-20 school year, Georgia FFA membership hit an all-time high of 73,674 (Georgia Department of Education, 2020a). The program has seen continuous growth since 1996. Agriculture education enrollment and FFA membership has had growth for a record twenty-four years in a row.

Georgia FFA members have the opportunity to compete in forty-eight CDEs at the state level. Sixteen on these CDEs are for students in ninth grade or below. The Georgia FFA has continued to be a shining light on the national level. In 2019, the state had eight CDE teams finish in the top five at the national FFA convention. Two of those teams were national winners. The state saw thirty-two national finalist in the Agriscience fair with seven national winners. There were twenty-one national finalist in the forty-seven proficiency areas with four of those being national winners and one hundred and seventy-eight FFA members received their American Degree. In 2020, the National Convention was held virtually but Georgia had its

fourth national FFA president elected to serve as a national officer, the Outstanding Middle School Program in The Models of Innovation Category as well as numerous proficiency winners and Agriscience winners (Georgia Agriculture Education, 2020).

Georgia Agriculture Education Legislation

The reason for the continuous growth of the Georgia agricultural education program is the continued support of the state legislatures. In 2018, Senate Bill 330 was presented by Senator John Wilkson and passed the State House, Senate and was signed into law by Governor Nathan Deal. The bill implemented that agricultural education was a three-component model and implemented a pilot program for elementary agricultural education in Georgia. The bill further changed agriculture education certification under the Professional Standards Commission to include certification for K through grade five (Georgia Agricultural Education, n.d. a; Georgia General Assembly, 2018).

Georgia FFA Camps

In 1929 at the first State FFA Convention in Georgia, vocational agriculture teachers envisioned a FFA for boys to come and meet during the summer (FFA/FCCLA Center History, n.d). In 1937, the 146 acres was purchased for $1000 by the state FFA association for the first of two camps. With the help of the National Youth Administration (NYA), building began on the campgrounds in 1937. In 1938, granite was discovered on the property and it quarried to build many of the buildings at the camp. Mrs. Franklin D. Roosevelt visited the camp and supplied the funds for an infirmary. Dr. M.D. Mobley served as the State Director of Vocational Education and authorized to spend $35,000 to purchase building supplies for the camp (FFA/FCCLA Center History, n.d)). Through various funds, various Governor's support, and involvement of

the Future Homemakers of America, the camp became the FFA and FHA camp. Students from across Georgia spent the night at the Georgia FFA/FCCLA center in Covington, GA. FCCLA was formally the FHA. The FHA changed their name to FCCLA to follow the changes made in the Family and Consumer Science areas of academia. The State FFA/FCCLA plays host to 30,000 campers each year and serves 140,000 meals annually (FFA/FCCLA Center History, n.d.).

The second camp purchased by funds raised by Dr. John Hope. Dr. Hope was the president of Atlanta University and had a desire to help underprivileged students (Camp John Hope History, n.d.). Being of African-American decent himself, Dr. Hope wanted to supply a camp for African American students to participate in productive activities such as the New Farmers of America (NFA). The construction at the camp began in 1937 and the first camp was held in 1938 (Camp John Hope History, n.d.). Dr. Hope did not see his dream come true. He passed away in 1936. The camp provides safe, relaxing meeting place for various Career Technology Students Organization, CTSOs and teachers to hold meetings (Camp John Hope History, n.d.).

Georgia Young Farmer Association

The Georgia Young Farmer program was first founded in 1951 (Georgia Agriculture Education, 2020). The programs from 1951-1970 fulltime young farmer teachers operated independently. The Georgia Young Farmer Association was founded in 1971 (Georgia Agriculture Education, 2020). There were thirty-one chapters in 1971 with 1,050 members (Georgia Agriculture Education, 2020). The Georgia Young Farmer Association is now the largest state association in the country bosting 5,500 members and 60 Young Farmer chapters (Georgia Agriculture Education, 2020). Over 18,000 Georgians participated in adult agriculture

classes in the 2019-20 school year through the Georgia Young Farmer Program (Georgia Agriculture Education, 2020).

Georgia FFA Alumni and FFA Foundation

Georgia FFA Alumni and FFA Foundation continue to be strong in Georgia. The Alumni has a total of 28,357 alumni members and fifty-five active FFA Alumni Affiliates across the state (Georgia Agriculture Education, 2020). The FFA Foundation raised a total $1,767,802.04 for Georgia FFA members (Georgia Agriculture Education, 2020). This is the third consecutive year that the Foundation has raised over a million dollars (Georgia Agriculture Education, 2020). The FFA Foundation employee's three-fulltime workers who secure funding for the foundation. Every CDE, Proficiency, and Agriscience awards have been fully funded by the Georgia FFA Foundation for the last 3 years. Georgia FFA members receive awards and prize money for every award. (Georgia Agriculture Education, 2020).

Georgia Vocational Agriculture Teachers Association

The Georgia Vocational Agriculture Teacher Association had 518 members in 2020 (Georgia Department of Education, 2020a). Of the 518 Georgia agriculture teachers, all teachers are members of the teacher professional organization as well as members of the National Association of Agriculture Educators (Georgia Department of Education, 2020a). Georgia had 21 voting members in the NAAE conferences because of the overall membership as well as the most voting delegates in region V of NAAE (Georgia Agriculture Education, 2020). All apprentice teacher's memberships were paid for by the GVATA membership. This service allowed for students to have liability insurance while they complete their apprentice teaching experience. Students complete their apprentice teaching during their last semester before they

graduate. The student members make up 30 to 40 members of the GVATA membership each year (Georgia Department of Education, 2020a).

Georgia Testing

Basic Skills Tests

The Basic Skills Tests was administered to students before the Georgia High Graduation School Graduation Test. This test served an evaluation tool for high school seniors. The developers of this test felt that it covered the basic skills high school students should be able to perform. The Basic Skills Tests focused on Reading and Mathematics. Other subjects were not tested.

The test was administered to those students entering ninth grade in the summer of 1981 to 1991. An additional writing test was added for evaluation. BST for writing was administered to ninth graders who entered high school in the fall of 1987. The Basic Skills Test was eventually phased out in 1991 (Georgia Department of Education, 2020e).

Georgia High School Graduation Tests

The Georgia High School Graduation Test (GHSGT) replaced the Basic Skills Test in 1991. Educators developed the GHSGT. The educators were from across the state of Georgia. The test included 65 to 90 multiple-choice questions. Students were allotted three hours to complete the test for each section. The test was administered to students who entered the ninth grade after the summer of 1991. The students took the test for the first in eleventh grade. The students had four other opportunities to pass the test in order to receive a high school diploma. If the students did not pass the test, they received a certificate of attendance but not a diploma. These tests aligned with new curriculum developed by the state in 1994. This new curriculum

was called the Quality Core Curriculum (QCC). QCCs were mandated the same year as the GHSGT. In 1994, the standard pass rate was set for English Language Arts and Mathematics. The pass rate was set for each section of the test by administering the test over the next three years. The test was administered to the eleventh-grade students from across the state and the base line was set for passage of the test. The pass rate for Social Studies was set in 1996, and Science in 1997. The continuation of the test went on until the summer of 2011. The Graduation test were implemented one to two subjects at a time. The graduating class of 1995 and 1996 were required to pass the English Language Arts, Mathematics and Writing portions of the tests. The graduating class of 1997 had to pass the Social Studies portion along with Mathematics, ELA, and Writing. The graduating class of 1998 had to pass all portions with the addition of Science (Georgia Department of Education, 2020f).

No Child Left Behind

No Child Left Behind (NCLB) legislation changed how the GHSGT was administered. Math and Science evaluation levels changed from pass, to not pass to Below Basic, Basic, Proficient, and Advanced. NCLB also caused a change from QCCs to Georgia Performance Standards (GPS). This change occurred in 2008. These changes greatly affected GPS-ELA and Science. The rollout once again was over a couple of years. ELA and Science of course were first but 2010 GPSs were set for Social Studies and then 2011 saw GPSs for Mathematics. The GHSGT changed along with the change of standards. With NCLB standards and Georgia's adoption the four-tier evaluation of Below Basic, Basic, Proficient and Advanced, the scoring had to be changed for the test. The test rolled out in 2008 for eleventh graders in Science and ELA, in 2010 for Social Studies and Mathematics rolled out in 2011 (Georgia Department of Education, 2020f).

The GHSGT had finally met its demise by the time the final mathematics test rolled out in the spring of 2011. As the final tests were given on April 5-6, 2011, the Georgia State Board was preparing to phase out the GHSGT the next week. The Board voted to phase out the GHSGT on April 13, 2011 and to require students who started ninth grade between July 1, 2008 and June 30, 2011 to only pass two subject areas of the graduation test in order to graduate (Georgia Department of Education, 2020f). This allowed students who wearing still taking the GHSGT in order to pass all sections to finally graduate with a diploma.

Graduation Test Outcomes

The deletion of the Georgia High School Graduation Tests has had a direct correlation to an increase in graduation rates. The Georgia graduation rate has increased steadily since 2012. The rate has increased by twelve percentage points. Graduation rates were below seventy percent in 2012 just before the GHSGT was phased out (Georgia Department of Education, 2020f). The rates have increased to over ninety percent in seventy-one schools and over ninety-five percent in twenty–four school districts. The Georgia legislator's removal of the GHSGT has proved as a positive movement for education in the public school system.

The Georgia High School Graduation Tests had caused much pain and agony to Georgia high school students and many had only received certificates of attendance for completing 13 years of school because of not passing the GHSGT. In 2015, Georgia's governor Nathan Deal signed House Bill 91 into law (Georgia Department of Education, 2020f). The law gave diplomas to students who did not receive a diploma for not passing any type of graduation test. This law covered all graduation including the Basic Skills Test, and the GHSGT. The law covered anyone who enrolled in ninth grade after July 1, 1981 (Georgia Department of Education, 2020f).

End of Course Test

With the deletion of the GHSGT Georgia, educators developed a new form of evaluation for students. In the 2011-12 school year, the State Board of Education adopted the End Of Course Test for Elementary through High School grade levels. The tests were administered in the winter spring and summer. The tests administered in sixty minutes intervals. The test were given over two-day increments but no more than sixty minutes at a time. The content areas to were tested at the high school levels in Coordinate Algebra, Analytic Geometry, United States History, Economics, Biology, Physical Science, Ninth Grade Literature, and American Literature. The EOCT's purpose was to align closely to Georgia Performance Standards and be included in the students overall grade for the course. The EOC is to count for 15% of the final grade. In most school systems, this test serves as the final for the course. Just as the student's scores on the graduation test helped evaluate schools under Adequate Yearly Progress (AYP), the EOCT scores are to serve as an accountability assessment for the new school assessment criteria once the College and Career Readiness Performance Index (CCRPI) was rolled out to schools (Georgia Department of Education, 2020d). The EOCTs helped determine the Progress, Content Mastery and Closing the Gap components.

Georgia Milestone Assessment System

The Georgia Milestone Assessment system is the most recent form of evaluation for the Georgia Department of Education. Schools were evaluated on the student performance on the test in order to formulate part of the school's CCRPI. The Georgia Milestone test was administered at three levels. The elementary, middle and high school levels were evaluated through the Georgia Milestone Assessment System. The Milestone assesses student's readiness for the next level of education- the next grade, next course, or college and career. In grades,

three through eight, students were evaluated in ELA and Mathematics. In grades fifth and eighth students were evaluated in Science and eighth graders are tested in Social Studies as well. High school course evaluation falls on American Literature, Algebra I and Coordinate Algebra, Biology, and U.S. History. High school students completed the test at the end of each class. If the students are on the block system of scheduling the student will take the Assessment in the corresponding semester.

Each ELA test included open ended (construction response) items in all grades. The assessments are summative and include a technology-enhanced item in each test at all grade levels. A writing component was added in the English portion of the test. The Georgia Milestone Assessment Test created a Lexile or score for each student that takes the test. Like the old EOCT, the Georgia Milestone Assessment counted for a portion of the student's final grade in the course being evaluated. The assessment score counted for 20% of the final grade in each course. The Georgia Milestone Assessment put more pressure on the student by counting a higher portion of the final grade but more closely aligned to the curriculum than test in the past. The Georgia Milestone Assessment was created by using the Georgia Performance Standard for each course that is evaluated (Georgia Department of Education, 2020d).

Agricultural Education Pathways

Georgia agriculture education had thirty-five career pathways. Each career pathway starts with a common course, which is Basic Agriculture Science. This course is the foundation course in which students were introduced to all aspects of the agriculture education program. Many diversified agriculture pathways include federal cluster crossover. This allowed to single teacher high school programs the ability to offer many diverse courses and still allowed student to complete a pathway. This flexibility affected more than just the agriculture teacher. The

school CCRPI looked at pathway completers in its formulation for the school score as well as pathway testers. Offering these diversified pathways, allowed students freedom to explore different areas of agriculture. Students were able to combine various courses and still complete a career pathway and take an End of Pathway test. The diversified courses in Georgia agricultural education were- Horticulture and Forest Science, Horticulture and Animal Science, Forestry and Animal Science, Animal Mechanical, Forest Mechanical, Ag Leadership in Animal Production, Ag Leadership in Plant Science, Ag Leadership in Horticulture, Ag Leadership in Forestry, Horticultural Mechanical, Plant Mechanical, Ag Leadership in Food Product Processing, and Ag Leadership in Aquaculture (Georgia Department of Education, 2020h). These courses all had test through Precision Exams in which students could become a pathway tester.

Many of the traditional pathways have been broken down to more specific in the content area. The Agribusiness Systems Diversified Pathway included the introductory course and a Marketing and Agribusiness course and was the only agribusiness pathway in the program. The Agriscience pathway combined Animal Science and Plant Science with Basic agriculture to focus in on the science side of agriculture. In addition, a Food Products and Processing pathway covered Meat and Dairy along with other food product processing. Agriculture Mechanics was broken down into four area pathways: Agriculture Mechanics Systems, Agriculture Mechanics and Electrical Systems, Agriculture Mechanics and Metal Fabrication, and Energy Systems. The Animal Science pathways included four areas: Food Animal Systems, Companion Animal Systems, Equine Science, and Animal Production and Processing. The Forestry pathways included Forestry/Wildlife Systems, Forestry Renewable Energy, Forestry/Natural Resource Management, Forest Management, and Environmental Agriculture. The Plant Science pathways

included Plant and Landscape Systems, Landscape Management Systems, Plant and Floral Design Systems and Plant and Floriculture Systems (Georgia Department of Education, 2020g).

Non-Agriculture CTAE Pathway Groups

They are many pathways inside the Career Technical and Agricultural Education department in Georgia. Agriculture Education was one of the broadest departments inside the CTAE department at the Georgia Department of Education. Many of the original areas were now down broken into smaller groups to specialize into specific career fields. The other areas included: Architecture and Construction, Arts, AV/Technology and Communications, Business, Management, and Administration, Education and Training, Energy, Finance, Government and Public Administration, Health Science, Hospitality and Tourism, Human Services, Information Technology, Law, Public Safety, Corrections, and Security, Manufacturing, Marketing, Science, Technology, Engineering, Mathematics, and Transportation, Distribution and Logistics. Each of these areas had at least one pathway and many have numerous pathways inside of the department. End of Pathway Test were available through NOCTI and Precision Exams for most Pathways (Georgia Department of Education, 2020g). Students in Georgia had many options to choose from in the Career Technical and Agriculture Education department.

College Career Ready Performance Index

The new school evaluation tool was the College Career Ready Performance Index (CCRPI). CCRPI replaced the Adequate Yearly Progress (AYP) that had been adopted during NCLB. CCRPI evaluated school and systems in five areas, content mastery, progress, closing the gap, readiness, and graduate rate. The schools were scored on a scale for 0-100. Each percentage point could make a significant difference in the total score.

Content mastery

Content mastery looked at student scores in the Georgia Milestone Assessments from the previous year. Content mastery accounted for 30% of a high school's CCRPI total score. Students fell into four categories under content mastery. The four categories were: beginning learners, developing learners, proficient learner and distinguished learners (Georgia Department of Education, 2020b).

Progress

Progress looked at the student's growth from year to year. For example, if a student scored in the beginning learner range the last time they took a Georgia Milestone Assessment in Math, the student should show progress which would mean that the student advanced to a developing learner section of scoring this time. Scores were compared from eighth grade to their ninth or tenth grade year, whenever the student takes that test in that subject area again. Point values were in place for each advancement that students make. The progress took the scores of all of the students taking the test in the school in compares their scores with students with similar demographics from across the state. Progress accounted for 30% of a high school's CCRPI total score (Georgia Department of Education, 2020b).

Closing the Gap

Closing the Gap looked at subgroups inside of the student's population. This segment of the evaluation looked at how every student's needs are being met. All subgroups and demographics were compared to those of students inside different subgroups. These subgroups included African-American students, American Indian/ Alaskan Native, Asian Pacific Islander, Hispanic, Multiracial, White, Economically Disadvantaged, English Learners and Students with

Disabilities (Georgia Department of Education, 2020b). The Students with Disability group was subdivided into ethnic groups as well. Closing the Gap accounted for 10% of a high school's CCRPI total score (Georgia Department of Education, 2020b).

Readiness

Readiness looked at the career readiness and advancement to the next level of education. The readiness score accounted for 15% of the total CCRPI score (Georgia Department of Education, 2020b). This section of CCRPI effected the CTAE department the most of any segment. Readiness looked at the number of students who completed a career pathway and students completed and passed an End of Pathway Assessment, an EOPA.

Graduation Rate

Graduation rate figured in for 15% of the total CCRPI score (Georgia Department of Education, 2020b). The graduation rate was calculated by using to different cohorts. The first cohort was comprised of a four-year segment. By taking the total number of students that started ninth grade and calculating the percentage number of students that graduated four years later. The second cohort was calculated using a five-year calculation. These two percentages were combined for the total graduation rate percentage for CCRPI (Georgia Department of Education, 2020b).

Georgia Testing

The 2019 public school class finished seventh nationally in Advanced Placement (AP) performance. 23.2 percent of students taking AP exams earned a three or higher on the AP exams for their subject area (All on Georgia, 2020b). Performance increased in the low-income demographic from forty-three to 43.7 percent obtaining three or higher (All on Georgia, 2020b).

Students received college credit at certain colleges with a score of three or higher. Thirty percent of Georgia high school students completed an AP course and were tested during the 2019-20. Georgia ranks fifteenth in AP participation in the nation (All on Georgia, 2020b).

SAT testing in Georgia continued to surpass the national average for the third year in a row (All on Georgia, 2020a). The average 1043 was the mean score for Georgia students in the 2019-20 school year (All on Georgia, 2020a). Sixty-four percent of the 2020 graduating class took the SAT during high school, which was down from the class of 2019 where sixty-seven percent participated. (All on Georgia, 2020a)

COVID-19 and Testing

When schools began to shut down in Georgia in March of 2020, students, teachers, and parents began to worry about standardized test. As teachers and schools relied on funding through CCRPI, where would the data come from for the scores? Panic began to run wild as administrators started looking at funding drops and determining what budgets would look like after the recession. COVID 19 not only shut down schools it shut down testing as well.

State Superintendent Woods began to ease the minds of teachers as he applied for waivers from the United States Department of Education (USDE). These waivers nullified testing for the 2019-20 school year, but what about the 2020-21 school year that would be filled with students that are quarantined or sick from contracting the virus? 98,252 Georgians weighed in on what should happen to standardized testing for the 2020-21 school year (Standardized Testing, 2020). Their answer was clear. They wanted State Superintendent Woods to ask for a waiver. Superintendent Woods understood that there was not an adequate way to administer the

test during the COVID outbreak and asked the USDE to waive testing during the 2020-21 school year as well, but was turned down (Standardized Testing, 2020).

Superintendent Woods took action on testing in regards to the weight the test would count. Woods lowered the final percentage rate from 20% of the final grade to 10% of the final grade and no remediation for scoring poorly on the Georgia Milestones during the 2020-21 school year (Standardized Testing 2020). Teachers were relieved after hearing the results from Superintendent Woods. Students have been learning at home with no teacher in some instances and others have missed many days from being sick themselves or quarantined because someone in the family has the virus.

CHAPTER III

METHODOLOGY

The purpose of this study was to determine the effect of agriculture education and CTE on student achievement on Georgia Milestone Tests in algebra, biology, and geometry. Within Chapter III, the methodology explained and a description given of the instruments used to perform, collect, and disaggregated the research. This study utilized IBM SPSS program to disaggregate data.

Research Design

This study was a non-experimental research study. It was a causal comparative research focusing on cause and effect of agriculture education and CTAE courses on student achievement. This study focused on students that have taken agriculture education and CTAE courses and students who have not taken any at Brantley County High School as well as statewide scores. The study compared Georgia Milestone Tests scores in geometry, algebra, and biology of students who have taken CTAE and agriculture courses to those students who have not. There were three concerns for validity in this study, direct cause and effect, sampling error because of COVID-19 reduction of testers, and selection error. The direct cause and effect error could have been influenced by the time allotment of when students participated in the agriculture and CTAE courses and when they completed the Georgia Milestone Test. Student's schedules may have affected the direct impact of the CTAE and agriculture courses on the student's achievement on the state Milestones. Schools closure to face-to-face learning in the spring of 2020, reduced the access to the most current data and implements a break in traditional learning for students that were tested in the fall of 2020. Access to the scores came through the Georgia Agriculture Education Program Manager and the Georgia Department of Education.

Purpose of the study

The purpose of this study was to determine if there is a significant difference in student achievement for students that completed agriculture education and CTAE courses compared to their contemporaries that enrolled in other elective courses at the state level and students at Brantley County High School, BCHS. The results of this study could be used to validate the importance of CTAE and agriculture education courses on student achievement. Lobbyist for agriculture education and CTAE could use this data to lobby for state funding for CTAE and agriculture education programs. Guidance counselors, scheduling specialist, and administrators could see the impact that agriculture education and CTAE courses had on academic standardized test.

If results show lower performance on tests for agricultural education and CTAE students, the CTAE and agricultural education departments could use data to begin to address where improvements could be made. The departments could then begin to focus on how they can assist in the improvement of their student's scores in academic classes.

Research Questions and/or hypothesis

Research Question 1: Was there a significant difference in student achievement of agricultural education students in Georgia compared to non-agricultural education CTAE students on the Georgia Milestone Tests in biology, geometry and algebra?

Research Question 2: Was there a significant difference in student achievement of agricultural education students in Georgia compared to non-CTAE students on the Georgia Milestone Tests in biology, geometry and algebra?

Research Question 3: Was there a significant difference in student achievement of agricultural education students at Brantley County High School and Non-agricultural education students on the Georgia Milestone Tests in biology, geometry and algebra?

H1=There was a significant difference of Georgia agricultural education male and females students' scores on Georgia Milestone Tests in biology, geometry, and algebra compared to Non-agricultural education CTAE students.

$H_0$1= There was no significant difference of agricultural education male and female students' scores on Georgia Milestone Tests in biology, geometry, and algebra compared to Non-CTAE students.

H2=There was a significant difference of agricultural education students' scores on Georgia Milestone Tests in biology, geometry, and algebra compared to non-CTAE students.

$H_0$2= There was no significant difference of CTAE students' scores on Georgia Milestone Tests in biology, geometry, and algebra compared to non-CTAE students.

H3=There was a significant difference of BCHS agricultural education students' scores on Georgia Milestone Test in biology, geometry, algebra and physical science compared to Non-agricultural education students.

$H_0$3= There was no significant difference of BCHS agricultural education students' scores on Georgia Milestone Test in biology, geometry, algebra, and physical science compared to Non-agricultural education students.

IRB approval

Researcher took the CITI training and completed the application for the Institutional Review Board. The Determination was the individual students were not identifiable and the activity did not involve human subjects as defined in 45 CFR 46.102€(1). The study received IRB approval #21-175 appendix A.

Population, participants, sampling procedures, description of risk, confidentiality, and anonymity

Population and Participants

The target population for this study was Brantley County High School and Georgia high school students who have enrolled in agricultural education or CTAE classes, and students who chose other electives outside of the CTAE and agriculture pathways who took the Georgia Milestone Test in biology, geometry, and algebra during the 2017-18, 2018-19 and, 2019-20 school year. Student scores based on enrollment factors in high school courses prior to the current year for BCHS students and students chosen from statewide selection sample.

Sampling Procedures

The Georgia Milestone Tests were an end of course test that serves as the federal standardized test evaluation. These tests replaced the End of Course Test, which was introduced during the No Child Left Behind era (Georgia DOE. n.d.). Students elected to enroll in agricultural education, CTAE courses, or non-enrollment in such courses who have taken the Georgia Milestone Tests in biology, geometry, or algebra. IBM SPSS Statistics 24 was used to analyze scores and determine statistical data. The instrument calculated if there is significant

difference in student achievement in academic areas in relation to CTAE and agriculture courses completion by using an independent two sample *t*-tests.

Description of Risk

There was no risk pertaining to participants of the study. These scores were collected through a system that did not have any personal information nor identification of the students involved.

Confidentiality/Anonymity

All participants were classified as a number and no personal information was available for individual students.

Description of Instruments

The Georgia Milestone Tests in biology, geometry, and algebra evaluation instruments were used for the study. Test scores were loaded into SPSS to complete various test, formulate data, and provide charts and graphs as needed to complete the study.

Data Security

Data was collected utilizing the Georgia Department of Education website and the BCHS Power School software. All information and was kept on the researcher's computer which was password protected. The data will be kept for three years and then removed after use. No personal student information was used and all data was loaded into SPSS to run all test.

Procedures

The Georgia Milestone Tests scores in biology, geometry and algebra for agricultural education, CTAE, Non-agricultural education and non-CTAE students was collected with

assistance from the Georgia Agricultural Education Curriculum Coordinator Christa Steinkamp for overall state scores. BCHS Georgia Milestone Tests scores was collected with the assistance of Assistant Principal/ Technology Director Blake Johns, Assistant Principal/CTAE Director Celia Horne and Brantley County Testing Coordinator Dr. Angela Haney from the Power School software used by the high school. The researcher collected those scores with assistance from those three individuals.

Data analysis

The Georgia Milestone Tests scores in biology, geometry and algebra were calculated to determine a mean for each of the subgroups: state agricultural education students, Non-agricultural education students, state CTAE students, state non-CTAE students, BCHS agriculture education students, and BCHS Non-agricultural education students.

The data was loaded into the SPSS data analysis program to complete disaggregation of data and completed an independent two sample *t*-test on different subgroups in the study.

Summary

Chapter III explained the methods and procedures used in a quantitative study that evaluated the effectiveness of agriculture education and CTAE on student achievement on the Georgia Milestone Tests in biology, geometry and algebra at the state level and at Brantley County High School. The research method used was non-experimental and casual-comparative. An independent two sample *t*-tests of each subgroup's means was conducted to assist in evaluation of data. Data collections was outlined within the chapter as well as a description of each subgroup evaluated.

CHAPTER IV
FINDINGS

Data Collection

In Chapter I the research was introduced, the problem stated, the research questions were identified and the significance of the study was explained. Chapter II gave a literature review explaining the history agricultural education and testing in Georgia as well as provided an in depth study of the two areas. Chapter III provided methodology, purpose of the study, research questions and hypothesis, description of the participants and the sampling procedures. This study utilized data for Brantley County High School Georgia Milestone Test in algebra, geometry, biology, and physical science for the 2017-18, 2018-19, and 2019-20 school years. The study used statewide data for biology, geometry and algebra for the same years as the district level study.

The Georgia Milestone Tests scores for Brantley County students were collected using the students' GTID numbers for student's enrollment in agricultural education courses and non-agricultural education courses. All Brantley County High School students were enrolled in a CTAE pathway so there was not a sub group of non-CTAE students. The subgroups for BCHS students were further broken in gender subgroups for disaggregation of data in each of the subject areas. The BCHS data included biology, algebra and geometry scores for 2017-2019 school years.

The BCHS data included 687 algebra students (248 agricultural education and 439 non-agricultural), 708 biology (277 agricultural education and 431 non-agricultural), 691 geometry (304 agricultural education and 387 non-agricultural), and 640 physical science (220 agricultural and 440 non-agricultural) students. 345 of the students (50.2%) taking the algebra assessment,

305 of the students (44.1%) taking the geometry assessment, 346 of the students (48.9%) taking the biology and 306 of the students (47.8%) taking the physical science assessment were female.

Table 4.1

Summary of Gender for Brantley County High School Students

Gender	Frequency	Percent
Female	1312	48.1
Male	1414	51.9
Total	2726	100.0

The state data was requested on May 10, 2021 from Mr. Billy Hughes State Program Manager of Georgia Agricultural Education Program Manager (see appendix B) to request state data for agricultural education students from the Georgia Department of Education. Mr. Hughes sent a link to apply for data request. On May 18, 2021, researcher emailed Nicholas Handville Director of Data Collections, Analysis, and Reporting Technology Services, Georgia Department of Education to check on progress of data collection from GA DOE. (see Appendix C) On June 8, 2021 the researcher received data from Mark Vignati Systems Analyst, Technology Services, Georgia Department of Education (appendix D).

The state data included 449,825 algebra students, 396,102 biology students and 323,335 geometry students with 1,169,277 (Table 4.2) student scores for the Georgia Milestone Assessment. Agricultural education students made up 9.6% of the total students tested. The state data was broken down into Beginning, Developing, Proficient, and Distinguished. Scores were not available for each student, only in which category their scores fell. Scores were

assigned for the category by the taking the mean of the highest possible score and the lowest possible score in the category. For all student scores falling in the Beginning category received a 33.5, student's scores falling in the Developing category received a 74.5, student scores falling in the Proficient category received a 85.5 and the student scores falling in the Distinguished category received a 96. Exact scores of students are not disaggregated because of use in CCRPI evaluations for school districts.

Table 4.2

Summary of Georgia Milestone Assessments Administered From 2017-2019

Students	Agricultural Ed.	CTAE Non-ag	Non-CTAE	Total
Algebra	35,791	297,637	116,397	449,825
Biology	41,638	270,058	84,326	396,022
Geometry	35,905	232,698	54,732	323,335
Total	113,334	800,393	255,455	1,169,182

Results from Research Question 1:

Was there a significant difference in student achievement of agricultural education students in Georgia compared to non-agricultural education CTAE students on the Georgia Milestone Tests in biology, geometry and algebra?

Agricultural education vs non-agricultural education CTAE

During the 2017-19 school years, 913,727 agricultural education and non-agriculture CTAE students completed Georgia Milestone Assessments in biology, algebra, and geometry.

The 800,393 non-agricultural education CTAE students (M=68.89, SD=22.94) compared to the 113,334 agricultural education students (M=66.26, SD=22.73) using the scoring procedure listed earlier in the chapter demonstrated significantly better scores on the Georgia Milestones test in all subjects, $t(913727)$ $p<.001$ (Table 4.3) for the independent two sample *t*-test for all Georgia Milestone Assessments for agricultural education and non-agricultural education CTAE students.

Table 4.3

Agricultural Education Student Achievement vs. CTAE Non-agricultural Education on All subjects

Georgia Milestones	N	Mean	Std. Deviation	*t*-value	P-value
Ag. Education	113,334	66.26	22.73		
Non-Ag. CTAE	800,393	68.89	22.94		
Total				*t*(913,727)	p < .01

Biology

Of the 41,638 agricultural education students who took the biology Georgia Milestone Assessment, 32 % failed the exam with a score of 67 or lower and only 7.5% made a 90 or higher on the assessment (Table 4.4). The non-agricultural education CTAE students performed much better with a lower percentage failing the exam and 19.5 % of the students excelled into the Distinguished Learner category. See Table 4.4 for complete results.

Table 4.4

311,696 Georgia Biology Student Achievement Levels 2017-2019 Georgia Milestone Assessments

	Beginning	Developing	Proficient	Distinguished
Ag, Education	32%	27.6%	32.8%	7.5%
Non-Ag CTAE	27.3%	18.2%	34.9%	19.5%

The 270,058 non-agricultural education CTAE students (M=68.76, SD=23.64) compared to the 113,334 agricultural education students (M=66.53, SD=23.46) using the scoring procedure listed earlier in the chapter demonstrated significantly better scores on the Georgia Milestones test in biology, $t(311{,}694)$, $p<.001$ (Table 4.5) on the independent two sample *t*-test for all Georgia Milestone Assessments for agricultural education and non-agricultural education CTAE students.

Table 4.5

Agricultural Education Student Achievement vs. CTAE Non-agricultural Education

Biology	N	Mean	Std. Deviation	*t* value	*p* value
Ag. Education	41,638	66.63	23.46		
Non-Ag. CTAE	270,058	68.75	23.64		
Total	311,696			t(311,694)	p < .001

Geometry

Of the 35,905 students that took the geometry Georgia Milestone Assessment 30.8 % (Table 4.7) failed the exam with an additional 35.8% falling into the developing category where scores range from score of 68 to 82 and only 6.3% made a 90 or higher on the assessment. The non-agricultural education CTAE students performed much better with 73.5% passing the exam and 12.9 % of the students reaching the Distinguished Leaner category. According to table 4.6.

Table 4.6

Geometry Student Achievement levels

	Beginning	Developing	Proficient	Distinguished
Ag, Education	30.8%	35.8%	27.0%	6.3%
Non-Ag CTAE	26.5%	31.4%	29.1%	12.9%

The 232,698 non-agricultural education CTAE students (M=69.60, SD=22.75) compared to the 35,905 agricultural education students (M=66.20, SD=22.62) and using the same scoring procedure for all subjects demonstrated significantly better scores on the Georgia Milestones test in geometry, $t(268{,}601)$, $p<.001$ (Table 4.7) on the independent two sample *t*-test for all Georgia Milestone Assessments for agricultural education and non-agricultural education CTAE students.

There were almost seven times as many non-agriculture CTAE students completing the Geometry test than agricultural education students. There was a difference in the mean of the two groups of over three and half points. The geometry test results only showed a difference of two points in the mean score. Standard deviation on the test only showed a difference of just over a tenth of point.

Table 4.7

Agricultural Education Student Achievement vs. CTAE Non-agricultural Education

Geometry	N	Mean	Std. Deviation	*t* value	P value
Ag. Education	35,905	66.20	22.62		
Non-Ag. CTAE	232,698	69.60	22.75		
Total	268,603			*t*(268,601)	p < .001

Algebra

Agricultural education students struggled on the algebra assessment with only 4.7% (Table 4.9) receiving a grade of 90 to 100. The non-agricultural students performed much better but still had 60.5 % fall into the Beginning to Developing categories.

Table 4.8

Algebra Student Achievement levels

	Beginning	Developing	Proficient	Distinguished
Ag, Education	30.8%	39.7%	24.8%	4.7%
Non-Ag CTAE	26.3%	34.2%	28.3%	11.1%

The 297,637 non-agricultural education CTAE students (M=71.24, SD=21.61) compared to the 35,791 agricultural education students (M=65.62, SD=22.16) and using the same scoring procedure for all subjects demonstrated significantly better scores on the Georgia Milestones test in algebra, *t*(333,426)= -46.38 , *p.*=000 (Table 4.9) on the independent two sample *t*-test for all

Georgia Milestone Assessments for agricultural education and non-agricultural education CTAE students. Agricultural education students struggle to score higher scores on the algebra test than their fellow CTAE classmates do.

Table 4.9

Agricultural Education Student Achievement vs. CTAE Non-agricultural Education

Algebra	N	Mean	Std. Deviation	*t* value	P value
Ag. Education	35,791	65.62	22.16		
Non-Ag. CTAE	297,637	71.24	21.61		
Total	333,428			*t*(333,426)= -46.38	p.= 000

Results from Research Question 2:

Is there a significant difference in student achievement of agricultural education students in Georgia compared to non-CTAE students on the Georgia Milestone Tests in biology, geometry and algebra?

Overall: During the 2017-19 school years, 368,789 agricultural education and non-CTAE students completed Georgia Milestone Assessments in biology, algebra, and geometry. The 255,455 non-CTAE students (M=72.82, SD=23.04) compared to the 113,334 agricultural education students (M=66.26, SD=22.73) using the scoring procedure listed earlier in the chapter demonstrated significantly better scores on the Georgia Milestones test in all subjects *t*(368,787) $p<.000$ (Table 4.10) for the independent two sample *t*-test for all Georgia Milestone Assessments for agricultural education and non-CTAE students.

Table 4.10

Agricultural Education Student Achievement vs. Non-CTAE

Georgia Milestone Test	N	Mean	Std. Deviation	t value	P value
Ag. Education	113,334	66.26	22.73		
Non-CTAE	255,455	72.82	23.04		
Total	368,789			t(368,787)	p= .000

Biology: Twice as many non-CTAE students completed the Georgia Milestone test in biology in the previous three school years. The mean of those student scores is significantly greater than that of the agricultural education students. The means show a difference of 4.89 points between agricultural education students and non-CTAE students. The 84,326 non-CTAE students (M=71.43, SD=23.74) compared to the 41,638 agricultural education students (M=66.63, SD=23.46) using the scoring procedure listed previously in the chapter demonstrated significantly better scores on the test in biology $t(125{,}962)$, $p < .001$ (Table 4.11) for the independent two sample *t*-test for all Georgia Milestone Assessments for agricultural education and non-CTAE students.

Table 4.11

Agricultural Education Student Achievement vs. Non-CTAE

Biology	N	Mean	Std. Deviation	*t* value	P value
Ag. Education	41,638	66.63	23.46		
Non-CTAE	84,326	71.43	23.74		
Total	125,964			*t*(125962)	p < .001

Agricultural education students had much lower achievement levels compared to the non-CTAE students on the biology test. 54.5 % (Table 4.12) of non-CTAE students received grades that placed them in the Proficient or Distinguished category where agricultural education students only had 40.3% score in the Proficient and Distinguished category. Almost one-third of the agricultural education students failed the biology tests.

Table 4.12

Biology Agricultural Education Student Achievement vs. Non-CTAE

	Beginning	Developing	Proficient	Distinguished
Ag, Education	32.0%	27.6%	32.8%	7.5%
Non-CTAE	27.3%	18.2%	34.9%	19.5%

Geometry: Non-CTAE students performed at a much higher level in Georgia Milestone Assessment Tests in geometry than agricultural education students did. The non-CTAE students excelled with a mean score classifying the group into the proficient category. Their scores on an average were 9.48 points higher on the standardized tests for non-CTAE students than that of the

agricultural education students. The 54,732 non-CTAE students (M=74.68, SD=22.03) compared to the 35,905 agricultural education students (M=66.20, SD=22.03) using the scoring procedure listed earlier in the chapter demonstrated significantly better scores on the Georgia Milestones test in geometry $t(90,635)$, $p < .001$ (Table 4.13) for the independent two sample *t*-test for all Georgia Milestone Assessments for agricultural education and non-CTAE students.

The geometry tests results produced the greatest difference in student achievement between agricultural education students and Non-CTAE students of the three Georgia Milestone Assessment tests.

Table 4.13

Agricultural Education Student Achievement vs. Non-CTAE T-tests for Geometry

Geometry	N	Mean	Std. Deviation	*t* value	P value
Ag. Education	35,905	66.20	22.62		
Non-CTAE	54,732	74.68	22.03		
Total	90,637			$t(90,635)$	$p < .001$

Non-CTAE students excelled agricultural education students on the Georgia Milestone Assessment in geometry. Over 66% (Table 4.14) of agricultural education students scored grades that fell into the Beginning or Developing Categories versus the non-CTAE students just over 40% landing in the lower two brackets of achievement. 25.7 % of the non-CTAE students made grades of over 90 to be grouped into the Distinguished category.

Table 4.14

Geometry Agricultural Education Student Achievement vs. Non-CTAE

	Beginning	Developing	Proficient	Distinguished
Ag, Education	30.8%	35.8%	27%	6.3%
Non-CTAE	19.4%	21.7%	33%	25.7%

Algebra: When comparing the results of agricultural education students and non-CTAE students on the Georgia Milestone Tests in algebra, the agricultural education scored drastically lower. However, the sample size of the agriculture students is one third of that of the non-CTAE the mean is significantly lower. The 116,397 non-CTAE students (M=73.69, SD=23.19) compared to the 35,791 agricultural education students (M=65.62, SD=22.16) using the scoring procedure listed earlier in the chapter demonstrated significantly better scores on the Georgia Milestones test in algebra $t(152{,}186)$, $p < .001$ (Table 4.13) for the independent two sample *t*-test for all Georgia Milestone Assessments for agricultural education and non-CTAE students. The geometry tests results produced the greatest difference in student achievement between agricultural education students and non-CTAE students of the three Georgia Milestone Assessment tests. The mean for the non-CATE students was a difference of over eight points. Students enrolled in agriculture education did not perform as well in algebra as the students that chose Non-CTAE courses.

Table 4.15

Algebra Agricultural Education vs. Non-CTAE T-Tests

	N	Mean	Std. Deviation	*t* value	P value
Ag. Education	35,791	65.62	22.16		
Non-CTAE	116,397	73.69	23.18		
Total	152,188			*t*(152,186)	p< .001

Agricultural Education students struggled on the algebra test much more than the non-CTAE students during the 2017-19 school years. 70% (Table 4.16) of agricultural education student taking the algebra test scored below an 82 or lower on the exam. 52.6 % of the non-CTAE students higher than 82 on the Georgia Milestone test in algebra.

Table 4.16

Brantley County High School Algebra Student Achievement levels

	Beginning	Developing	Proficient	Distinguished
Ag, Education	30.8%	39.7%	24.8%	4.7%
Non-CTAE	21.5%	25%	33.6%	19.9%

Results from research question 3:

Is there a significant difference in student achievement of agricultural education male and female students at Brantley County High School and non-agricultural education male and female students on the Georgia Milestone Tests in biology, geometry and algebra?

BCHS Biology Male: During the 2017-19 Georgia Milestone Tests in biology at Brantley County High, male agricultural education students scored very similar to non-agricultural education CTAE students. The 176 non-agricultural education students (M=78.89, SD=12.87) compared to the 186 agricultural education students (M=77.9, SD=11.08) using the scoring procedure listed earlier in the chapter demonstrated significantly better scores on the Georgia Milestones test in biology $t(360)$, $p < .005$ (Table 4.17) for the independent two sample *t*-test. There was 362 Brantley County High school male students tested on the Georgia Milestone Assessment tests in Biology during the 2017-20 school years.

Table 4.17

Brantley County High School Agricultural Education Student Achievement vs. CTAE Non-Agricultural Education

Male Biology	N	Mean	Std. Deviation	*t* value	P value
Ag. Education	186	77.9	11.08		
Non-Ag. CTAE	176	78.89	12.87		
Total	362			*t*(360)	p <.005

BCHS Female Biology: During the 2017-19 Georgia Milestone Tests in biology at Brantley County High, female agricultural education students scored very similar to non-agricultural education CTAE students. The 255 Non-agricultural education students (M=76.93, SD=10.90) compared to the 91 agricultural education students (M=73.49, SD=11.77) using the scoring procedure listed, there was not a significance in scores on the Georgia Milestones test in biology $t(344)$, $p=.254$ (Table 4.18) for the independent two sample *t*-test. There was 346 Brantley

County High school female students tested on the Georgia Milestone Assessment tests in Biology during the 2017-20 school years.

When comparing this *p*-value of the female students to the male students, there is a huge difference. The male students showed a significant difference in student achievement between agricultural education and non-agricultural education students but the females did not show a significant difference in student's achievement. Just as the state scores exhibited, the Non-agricultural education students outperformed the agricultural education students at the local level.

Table 4.18

Brantley County High School Agricultural Education Student Achievement vs. CTAE Non-Agricultural Education

Female Biology	N	Mean	Std. Deviation	*t* value	P value
Ag. Education	91	73.49	11.77		
Non-Ag. CTAE	255	76.93	10.90		
Total	346			*t*(344)	p=.254

BCHS Male Geometry: During the 2017-19 Georgia Milestone Tests in geometry at Brantley County High, male agricultural education students scored very similar to non-agricultural education CTAE students. The 159 Non-agricultural education students (M=77.58, SD=11.6) compared to the 217 agricultural education students (M=75.60, SD=9.6) using the scoring procedure listed, there was a significance in scores on the Georgia Milestones test in biology *t*(374), *p*=.002 (Table 4.19) for the independent two sample *t*-test. There was 376 Brantley

County High school male students tested on the Georgia Milestone Assessment tests in geometry during the 2017-20 school years. There was almost a two-point difference in the mean of the scores for the three years. The local system continues to follow the State data with Non-agricultural education students scoring higher on the standardized tests.

Table 4.19

Brantley County High School Agricultural Education Student Achievement vs. CTAE Non-Agricultural Education

Male Geometry	N	Mean	Std. Deviation	*t* value	P value
Ag. Education	217	75.60	9.6		
Non-Ag. CTAE	159	77.58	11.6		
Total	376			*t*(374)	.002

BCHS Female Geometry: During the 2017-19 Georgia Milestone Tests in geometry at Brantley County High, female agricultural education students scored similar to Non-agricultural education CTAE students. The 228 Non-agricultural education students (M=76.59, SD=10.50) compared to the 87 agricultural education students (M=74.48, SD=9.84) using the scoring procedure listed, there was a not significance in scores on the Georgia Milestones test in biology *t*(313), *p*=.368 (Table 4.20) for the independent two sample *t*-test. There was 315 Brantley County High school female students tested on the Georgia Milestone Assessment tests in geometry during the 2017-20 school years. The *t*-tests show that enrollment in agricultural education or in other Non-agricultural education CTAE courses did not affect the female student achievement on the Georgia Milestone test in geometry.

Table 4.20

Brantley County High School Agricultural Education Student Achievement vs. CTAE Non-Agricultural Education

Female Geometry	N	Mean	Std. Deviation	P value
Ag. Education	87	74.84	9.84	
Non-Ag. CTAE	228	76.59	10.50	
Total	315			.368

BCHS Male Algebra: During the 2017-19 Georgia Milestone Tests in algebra at Brantley County High, male agricultural education students scored very similar to Non-agricultural education CTAE students. The 174 Non-agricultural education students (M=75.58, SD=11.23) compared to the 168 agricultural education students (M=73.07, SD=11.22) using the scoring procedure listed, there was a not significance in scores on the Georgia Milestones test in algebra $t(342)$, $p=.500$ (Table 4.21) for the independent two sample *t*-test. There was 346 Brantley County High school male students tested on the Georgia Milestone Assessment tests in algebra during the 2017-20 school years. The *t*-tests show that enrollment in agricultural education or in other Non-agricultural education CTAE courses did not affect the male student achievement on the Georgia Milestone test in algebra.

Table 4.21

Brantley County High School Agricultural Education Student Achievement vs. CTAE Non-Agricultural Education

Male Algebra	N	Mean	Std. Deviation	t value	P value
Ag. Education	168	73.07	11.22		
Non-Ag. CTAE	174	75.58	11.23		
Total	346			*t*(344)	*p*=.500

BCHS Female Algebra: During the 2017-19 Georgia Milestone Tests in algebra at Brantley County High, female agricultural education students did not score as similar to Non-agricultural education CTAE students. The 265 Non-agricultural education students (M=76.11, SD=9.98) compared to the 80 agricultural education students (M=71.60, SD=9.17) using the scoring procedure listed, there was a not significance in scores on the Georgia Milestones test in algebra *t*(343), *p*=.112 (Table 4.22) for the independent two sample *t*-test. There was 345 Brantley County High school female students tested on the Georgia Milestone Assessment tests in algebra during the 2017-20 school years. The *t*-tests show that enrollment in agricultural education or in other Non-agricultural education CTAE courses did not affect the female student achievement on the Georgia Milestone test in algebra.

The mean for the two groups showed a difference of four and half points. Just at the state data showed the Non-agricultural education CTAE students scored higher on the Georgia Milestone algebra tests.

Table 4.22

Brantley County High School Agricultural Education Student Achievement vs. CTAE Non-Agricultural Education

Female Algebra	N	Mean	Std. Deviation	t value	P value
Ag. Education	80	71.6	9.17		
Non-Ag. CTAE	265	76.11	9.98		
Total	345			*t*(343)	*p*=.112

Brantley County High School Complete Algebra: When comparing gender specific data the findings were different for the males and females Brantley County High School students during 2017-2019 school years on the Georgia Milestone Assessments. Running the data for the entire population together shows different *p* values than were found when separating the gender's data. In the Georgia Milestone Tests in algebra, the 248 agricultural education students (M=72.60, SD=10.61) for the 439 Non-agricultural education CTAE students (M=75.9, SD=10.49). Using the scoring procedure listed, there was a not significance in scores on the Georgia Milestones test in algebra *t*(685), *p*=.488 (Table 4.23) for the independent two sample *t*-test. The Standard Deviation for the two groups was very close for the two groups with a difference of just over one tenth. There was no significance in student achievement to enrollment of agriculture education classes or Non-agricultural classes at Brantley County High School on the algebra test among the Brantley County High School population.

Table 4.23

Brantley County High School Agricultural Education Student Achievement vs. CTAE Non-Agricultural Education

Algebra	N	Mean	Std. Deviation	P value
Ag. Education	248	72.60	10.61	
Non-Ag. CTAE	439	75.90	10.49	
Total	687			.488

Brantley County High School Complete Biology: In the Georgia Milestone Tests in biology, the 277 agricultural education students (M=76.11, SD=11.44) for the 431 Non-agricultural education CTAE students (M=77.72, SD=11.77). Using the scoring procedure listed, there was a not significance in scores on the Georgia Milestones test in algebra $t(706)$, $p=.392$ (Table 4.24) for the independent two sample *t*-test. The Standard Deviation for the two groups was very close for the two groups with a difference of just over two tenth. There was no significance in student achievement to enrollment of agriculture education classes or Non-agricultural classes at Brantley County High School on the biology test among the Brantley County High School population. The means in biology were much closer than the other subjects tested. All Brantley County High School students scored higher on the biology tests than in geometry or algebra.

Table 4.24

Brantley County High School Agricultural Education Student Achievement vs. CTAE Non-Agricultural Education

Biology	N	Mean	Std. Deviation	t value	P value
Ag. Education	277	76.11	11.44		
Non-Ag. CTAE	431	77.72	11.77		
Total	708			*t*(706)	*p*=.392

Brantley County High School Complete Geometry: In the Georgia Milestone Tests in geometry, the 268 agricultural education students (M=75.56, SD=9.75) for the 387 Non-agricultural education CTAE students (M=76.99, SD=10.90). Using the scoring procedure listed, there was a not significance in scores on the Georgia Milestones test in algebra $t(653)$, $p < .01$ (Table 4.25) for the independent two sample *t*-test. There was a significance in student achievement to enrollment of agriculture education classes or Non-agricultural classes at Brantley County High School on the geometry test among the Brantley County High School population.

Table 4.25

Brantley County High School Agricultural Education Student Achievement vs. CTAE Non-Agricultural Education

Geometry	N	Mean	Std. Deviation	*t* value	P value
Ag. Education	268	75.56	9.75		
Non-Ag. CTAE	387	76.99	10.90		
Total	655			*t*(653)	p < .01

Summary

Independent two sample t-tests were conducted on agricultural education student's achievement and Non-agricultural education CTAE student's achievement on the Georgia Milestone Tests in biology, geometry and algebra for the state level and local level. Independent two sample t-tests were also conducted on agricultural education students vs Non-CTAE students for the same state tests. A p-value was calculated for each subject and significance was determined for student achievement based upon enrollment in agricultural education courses, Non-agricultural education CTAE courses, and Non-CTAE courses at the state level and district level for Brantley County High School.

Chapter V
CONCLUSIONS, IMPLICATIONS, RECOMMENDATIONS

This study was based on the effects on student achievement for agricultural education students versus Non-agricultural education CTAE students and Non-CTAE students.

In today's world of accountability, all programs need to be striving to improve student achievement on test scores and assist in helping the schools meet standards set forth by the state department of education. Agricultural education faces many battles such as teacher shortages, funding, and relevance. This study evaluates the role agricultural education plays in state standardized test in biology, geometry, and algebra during the 2017-2019 school years at the state level and the Brantley County High School district level.

Data was collected from the Brantley County School Board of Education through the Testing Coordinator for the school system. The data was pulled by identifying all students who had completed an agricultural education class during anytime during their high school career. Then taking those students GTID number and loading their scores in a document to be transferred into the SPSS system to run independent two sample *t*-tests for the mean and Sig. or p-value. This data was broken down by gender.

The state data was collected from the Georgia Department of Education Data Analysis department. The data was pulled for agricultural education students, Non-agriculture education CTAE students and Non-CTAE students. Scores were not individualized but instead grouped into achievement categories based on a range on grades. The four categories of Beginning (0-67), Developing (68-82), Proficient (83-89), and Distinguished (90-100). Each student represented in the category received the mean of the highest and lowest possible grade for the category.

Summary of Conclusions for Research Question Number 1

Was there a significant difference in student achievement of agricultural education students in Georgia compared to non-agricultural education CTAE students on the Georgia Milestone Tests in biology, geometry and algebra?

There is a significant difference in student achievement on Georgia Milestone Tests and student's enrollment in non-agricultural education CTAE and students enrolled in agricultural education. Students that completed at least one Non-agricultural education CTAE course scored higher on Georgia Milestones Test in biology, geometry and algebra with a mean of 68.89 compared to agricultural education students who had a mean of 66.25. The significance for the independent two sample *t*-tests conducted for the entire agricultural education students and non-agricultural CTAE students was $p<.001$.

Biology scores showed the closest mean scores for the two groups with a mean of 66.6285 for 41,638 agricultural education students and a mean of 68.7514 for the 270,058 non-agricultural education CTAE students. Even though the mean was within two points, the independent two sample *t*-tests still produced a p value of $p<.001$ which shows a significant increase in student achievement on the biology tests for those students enrolled in non-agricultural education CTAE courses over agricultural education enrolled students. 19.5% of the non-agricultural education students scored in the Distinguished category which means they scored a 90 or higher on the assessment compared to the only 7.5% of the agricultural education students.

In geometry, the results were similar. The non-agricultural education students had a mean three point higher than that of the agricultural education students. The *t*-tests showed a

significant difference in student achievement with *p*-value<.001. Enrollment in non-agricultural education CTAE courses rather than agricultural education improved student achievement on the Georgia Milestone Assessment in geometry.

The greatest difference in student achievement is evident when comparing non-agricultural CTAE students to agricultural education students in algebra. There were 35,791 agricultural education students and 297,627 Non-agricultural CTAE students who completed the Georgia Milestone Tests in algebra during the 2017-19 school years. The mean for the agricultural education students on the algebra test was 65.62 and the mean for the non-agricultural CTAE students was 71.24. The difference in the mean was five and a half points. The *t*-tests for comparing the agricultural education students and the non-agricultural education CTAE students in algebra produced a *p*<.000 showing a significance in student achievement between students who enrolled in agricultural education courses and students who enrolled in other Non-agricultural education CTAE courses. 39.45 of the non-agricultural education CTAE students scored in the Proficient and Distinguished category compared to only 29.5% of the agricultural education students.

Summary of Conclusions for Research Question Number 2

Was there a significant difference in student achievement of agricultural education students in Georgia compared to non-CTAE students on the Georgia Milestone Tests in biology, geometry and algebra?

There is a difference in student achievement on Georgia Milestone Tests and student's enrollment Non-CTAE courses and students enrolled in agricultural education. Students enrolled

in Non-CTAE courses scored higher on Georgia Milestones Tests in biology, geometry, and algebra.

Biology scores showed the closest mean scores for the two groups with a mean of 66.63 for 41,638 agricultural education students and a mean of 71.43 for the 84,326 Non- CTAE students. The *t*-tests produced a $p<.001$ which shows a significant difference in student achievement on the biology tests for those students enrolled in Non-CTAE courses over agricultural education enrolled students. 19.5% of the Non-CTAE students scored in the Distinguished category which means they scored a 90 or higher on the assessment compared to the only 7.5% of the agricultural education students.

In geometry, the 54,732 Non-CTAE students had a mean of 74,68 and the agricultural education students had mean score of 66.20 almost eight and a half points lower. The *t*-tests shows a significant difference in student achievement with *p*-value<.001. Enrollment in Non-CTAE courses rather than agricultural education improved student achievement on the Georgia Milestone Assessment in geometry. 58.7% of the Non-CTAE students scored in the Proficient or Distinguished category compared to the 33.3 % of agricultural education students reaching the same mark.

When comparing Non-CTAE students to agricultural education students in algebra the results are consistent with other subject areas. There were 35,791 agricultural education students and 116,397 Non-agricultural CTAE students who completed the Georgia Milestone Tests in algebra during the 2017-19 school years. The mean for the agricultural education students on the algebra test was 65.62 and the mean for the Non-CTAE students was 73.69. The difference in the mean was eight points. The *t*-tests for comparing the agricultural education students and the Non-agricultural education CTAE students in algebra produced a $p<.001$ showing a significant

difference in student achievement between students who enrolled in agricultural education courses and students who enrolled in other Non-CTAE courses. 53.5% of the Non-CTAE students scored in the Proficient and Distinguished category compared to only 29.5% of the agricultural education students.

Summary of Conclusions for Research Question Number 3

Was there a significant difference in student achievement of agricultural education students at Brantley County High School and Non-agricultural education students on the Georgia Milestone Tests in biology, geometry and algebra?

The results of the t-tests for students who have taken at least one agricultural education courses and students who have not taken any agricultural education courses have mixed results between genders. When comparing male students who completed the Georgia Milestone Assessment in biology, 186 agricultural education students had a mean of 77.9 on the exam and the 176 Non-agricultural education students had a mean of 78.89. The *t*-tests resulted with a $p<.005$ showing a significant difference in student achievement based off of student in agricultural education courses and Non-agricultural courses. While with female students completing the biology test 91 agricultural education students and 255 Non-agricultural education students, there was no significant difference in student achievement when enrollment in agricultural or Non-agricultural classes.

On the Georgia Milestone Assessment in geometry the *t*-tests showed a significant difference with $p<.05$ in students achievement between agricultural education students and Non-agricultural education students. The male agricultural students had mean of 75.60 and the Non-agricultural education students had mean of 77.58. Once again there was a difference between

gender results in geometry just as in biology. The Sig. for the *t*-test in geometry between female agricultural education and Non-agricultural education was .368 showing no significant correlation between agricultural education student's achievement and Non-agricultural education student's achievement on the Georgia Milestone assessment in geometry.

When evaluating male and female scores of agricultural education students at Brantley County High School in algebra, there was no significant difference in student's achievement for agricultural education students or Non-agricultural education students. The independent two sample *t*-tests for males resulted with a significance of .500 and the female *t*-tests resulted with significance score of 112.

Non-agricultural education students as a whole scored higher than students who enrolled in agricultural education classes but males showed a significant difference in student achievement in two subject areas. They exhibited a significant difference in student achievement directly linked to course enrollment in geometry and biology but did not show a significant difference in algebra. The female students did not show a significant difference in student achievement in any of the subject tests when independent two sample *t*-tests for agricultural education and Non-agricultural education students conducted.

As a whole, male agricultural education students scored higher than the female agricultural education students that were selected for this study. The male students enrolled in agricultural education had a mean that was closer to that of the Non-agricultural education students.

Recommendations/Discussions

Evaluating the results from the given data, one could determine that students in agricultural education are not performing academically as well as students who enroll in other CTAE courses and other Non-CTAE courses. The data shows agricultural education students scoring lower in every subgroup evaluated. There could many reasons for agricultural education students to score lower on the Georgia Milestone Assessments. The selection of participants could greatly affect the results of the data. Students were chosen that had taken at least one agricultural education course and may not represent a true agricultural education student who goes through an entire pathway. For example, a student that took only a basic agricultural science course would be included in the data as an agricultural education student. Basic agriculture science curriculum involves elementary science and is the beginning course for all agricultural education pathways. The course provides a snapshot of all areas of the agricultural pathways without going into depth the science of the other courses involved in the various pathways.

Scheduling for agricultural education greatly affects the students who end up enrolled in classes. Students are placed into agricultural education classes because of scheduling conflicts and the counselors do not have anywhere to place them. This is true for many elective classes. Higher performing academic students do not have an opportunity to enroll in agricultural education classes many times because of scheduling conflicts. In Brantley County High School, students who take an Accelerated Placement course must take an honors course for that subject directly prior to taking the AP class in the spring. This scheduling problem takes one elective away for each AP course the student decides to take, lowering the opportunity to enroll in agricultural education courses. This reduces the amount of higher achieving students enrolled.

Timing could influence the effects of agricultural education on student achievement as well. Student who take Georgia Milestone Test in biology the first semester of their ninth grade year may not have had an agricultural education course until spring semester. An another student takes the Georgia Milestone Test in geometry at the end of their eleventh grade year but they covered land measurement and geometry angles when they were in ninth forestry class.

Agricultural education courses should mirror Georgia Performance Standards in as many courses as possible. Agricultural educators, science, and math teachers should collaborate to highlight math and science principles in action. Collaboration between academic teachers and agricultural education teachers only helps increase learning for students.

Implications

This study will be used as a measuring stick for agricultural education in Georgia. The study gives a snapshot of where agricultural education students are academically and where the program needs to improve. In Brantley County High School, this information allows the agricultural education teachers to adjust curriculum to help their students achieve academically. This study serves as a wakeup call to the Georgia agricultural educators. It will educate state agricultural education staff that the curriculum needs to be revised to improve student achievement. Agricultural education students are scoring lower than other groups of students under CTAE. This needs sharing and improvements need to be made to the program.

The State Agricultural Education Staff will use this as a guide of where the program needs to go in moving forward. The future curriculum writing needs to focus more toward standards inside biology, geometry and algebra to reinforce standards and help in student achievement.

Needs for Further Study

This data leaves a few questions unanswered. The first area that needs to be studied is scheduling of students involved in the research. Defining which agricultural education courses that the students in the study completed. Additionally, if students were placed into the agricultural courses or were they placed in there by a guidance counselor or administrator. What type of agricultural classes were enrolled in as a student? Were they agricultural mechanics classes where students use more hands on technical skills or did the student complete an animal or plant science class that incorporated science principles on a daily basis. More knowledge is needed in how many courses did the students complete in agricultural education and did they complete a pathway, thus looking at those who only take a couple of agricultural education courses vs those who are pathway completers. Studies could also be conducted to identify which pathway completers had higher student achievement scores inside agricultural education. Do pathway completers that take an end of pathway exam, score higher after completing the series of courses? The state data could be broken down further to determine the gender, socio-economic group and special needs students.

When dissecting the Brantley County High School data, many questions become known. The first is why the male students scored higher on the tests than the female students. Further investigation into this finding would be a great addition to the data. The next question needing further investigation would be why the female's tests score showed no significant difference in student achievement in any of the subjects for agricultural education and Non-agricultural education students, but the males showed significance in two of the three subjects. Do the male students gain as much science math skills in agricultural education as Non-agricultural education students do other CTAE courses? Determining which areas of CTAE do students excel

agricultural education students could further explain findings in this study. Does health care students have an advantage in biology with mostly science curriculum of anatomy taught in the course? On the other hand, does pre-engineering students have the advantage on agricultural students in algebra and geometry?

Further study could include tracking students back to their middle school Georgia Milestone scores to determine if students have advanced in their learning or digressed because of agricultural education courses? Thus conducting a correlation study through middle school and high school to compared to Non-agricultural education students.

P-20 Implications

Individual learning and increase achievement in an area learning whether it be in elementary, middle school, high school, college or in the community, that is always good. Increased student achievement on state assessments is of increasing importance. Agricultural education involves community leaders in the agricultural fields to help in teaching classes and training FFA teams for competition. Improvement in agricultural education through evaluating where it is academically helps the entire school community as agricultural education involves community stakeholders and leaders in community. When agricultural education programs thrive, the community receives continuing education through adult classes offered through agricultural programs. This study evaluates where agricultural education programs are academically compared to other electives in the school when it comes to student achievement. The agricultural education programs must stay relevant in the minds of administrators, board members, and parents in order to maximize the benefit to the school and community. If agricultural education programs are increasing student achievement on state test like the Georgia

Milestone Test and helping students succeed academically the program will remain a relevant part of the P-20 Community of learners.

Summary

This study evaluated students achievement on the Georgia Milestone Assessment test in biology, geometry, and algebra for the 2017-2019 school years both statewide and at the local level at Brantley County High School in Nahunta, GA. At the state level agricultural education students scores were compared to Non-agricultural education CTAE students and Non-CTAE students. In total 1,169,182 scores were compared and ran through independent *t*-tests for each group and subject. In the statewide data, agricultural education students performed lower in each of the three subject areas than the Non-agricultural education CTAE students and the Non-CTAE students. There was a statistically significant difference between academic achievement on the chosen test and students enrolled in agricultural education and Non-agricultural courses. Biology showed the similar results for agricultural education students compared to their fellow Non-agricultural students. These results are not surprising. Many biology principals are taught in agricultural education courses. The greatest difference came in algebra in which very few standards duplicate in the agricultural education courses. Georgia agricultural education needs to reevaluate its curriculum to include more science and math standards.

In the local data, Brantley County High School male agricultural students outperformed the female students on all three subject areas but still fell behind their Non-agricultural education peers. The females scored lower as well. At the local level, the agricultural education students are not as far behind as the students statewide but need to improve to match the academic achievement of their peers. The state agricultural education program finds themselves facing a challenge to incorporate more algebra, geometry and biology standards into their curriculum.

Through adaptations in the curriculum, Georgia agricultural education programs can find themselves leading the charge in increasing student achievement on state standardized tests.

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Appendix A

IRB Approval

MURRAY STATE UNIVERSITY

Institutional Review Board

328 Wells Hall
Murray, KY 42071-3318
270-809-2916• msu.irb@murraystate.edu

TO: Kristie Guffey, Agricultural Sciences

FROM: Jonathan Baskin, IRB Coordinator JB

DATE: May 7, 2021

RE: Determination for IRB # 21-175

Project Title: *The Effects of Agricultural Education on Student Achievement on Georgia Milestone Assessments*
Principal Investigator(s): E. Chad Crews
Determination: Individuals not Identifiable - Activity does not involve human subjects as defined in 45 CFR 46.102(e)(1)

The Murray State University IRB has reviewed the information you supplied for the project named above. Based on that information, it has been determined that this project does not involve activities and/or subjects that would require IRB review and oversight. The IRB will keep your determination form on file for a period of 3 years.

Please note that there may be other Federal, State, or local laws and/or regulations that may apply to your project and any changes to the subjects, intent, or methodology of your project could change this determination. You are responsible for informing the IRB of any such changes so that an updated determination can be made. If you have any questions or require guidance, please contact the IRB Coordinator for assistance.

Thank you for providing information concerning your project.

Opportunity *afforded*

murraystate.edu

Equal education and employment opportunities M/F/D, AA employer. Murray State University supports a clean and healthy campus. Please refrain from personal tobacco use.

Appendix B

Email to Billy Hughes State Program Manager for Ag. Ed.

Chad Crews <chad.crews@brantley.k12.ga.us>

Request for Georgia Milestone Data for Ag. Students

2 messages

Chad Crews <chad.crews@brantley.k12.ga.us>
To: bhughes@doe.k12.ga.us

Mr. Hughes,

I am currently conducting research on the effects of agricultural education on student achievement when completing the Georgia Milestone Tests in algebra, geometry and biol

I will need the scores of one thousand agricultural education students, a thousand Non-agricultural education students, a thousand CTE students and a thousand non-CTE stud

I will not need student's names or personal id numbers. I only need scores from the select groups for calculations. The student's confidentiality will not be at risk and all infor

Thanks

--
Chad Crews Ed. S.
Ag. Education/FFA Advisor
Brantley County High School
(912)462-5121 Cell(912) 670-0129
10804 Hwy 82.
Nahunta, GA 31553

Billy Hughes <BHughes@doe.k12.ga.us>
To: Chad Crews <chad.crews@brantley.k12.ga.us>

Mon, May 10, 2021 at 1:09 PM

Chad,

You will have to submit a data request form.

https://www.gadoe.org/Technology-Services/Data-Collections/Pages/Requesting-Data.aspx

Hope this helps.

Billy Hughes

Program Manager, Agricultural Education

Georgia Department of Education

Suite 2053 Twin Towers East

205 Jesse Hill, Jr. Drive SE

Atlanta, GA 30334

Cell: 678.346.5545

Email: bhughes@doe.k12.ga.us

"Educating Georgia's Future"

-

-

From: Chad Crews <chad.crews@brantley.k12.ga.us>
Sent: Monday, May 10, 2021 9:09 AM
To: Billy Hughes <BHughes@doe.k12.ga.us>
Subject: Request for Georgia Milestone Data for Ag. Students

Appendix C

Emails Requesting State Data

Nicholas Handville

Director of Data Collections, Analysis, and Reporting

Chad Crews <chad.crews@brantley.k12.ga.us>

Data Request

2 messages

Chad Crews <chad.crews@brantley.k12.ga.us> Tue, May 18, 2021 at 11:23 AM
To: nhandville@doe.k12.ga.us

Mr. Handville,

I had requested some data through the request site and wanted to speak with someone about the request, but the number on the website is not a working number. Can you give me a number that I can call and speak with someone?

--
Chad Crews Ed. S.
Ag. Education/FFA Advisor
Brantley County High School
(912)462-5121 Cell(912) 670-0129
10804 Hwy 82.
Nahunta, GA 31553

Nicholas Handville <nhandville@doe.k12.ga.us> Tue, May 18, 2021 at 11:31 AM
To: Chad Crews <chad.crews@brantley.k12.ga.us>
Cc: Mark Vignati <mvignati@doe.k12.ga.us>

Chad,

Please send an email to Mark Vignati (copied here).

Nicholas L. Handville
Director of Data Collections, Analysis, and Reporting
Technology Services
Georgia Department of Education
nhandville@doe.k12.ga.us | (678) 378-2866

Educating Georgia's Future

From: Chad Crews <chad.crews@brantley.k12.ga.us>
Sent: Tuesday, May 18, 2021 11:23 AM
To: Nicholas Handville <nhandville@doe.k12.ga.us>
Subject: Data Request

CAUTION: This email originated from outside of the GaDOE Mail System. Use caution replying or supplying information, clicking links, or opening attachments. If you suspect the message is fraudulent, please utilize the **Report Phish** button.

[Quoted text hidden]

Appendix D

Emails with Mark Vignati

Systems Analyst

GA Dept. of Education

Chad Crews <chad.crews@brantley.k12.ga.us>

Data request

9 messages

Chad Crews <chad.crews@brantley.k12.ga.us> Tue, May 18, 2021 at 11:42 AM
To: mvignati@doe.k12.ga.us

Mark,

My name is Chad Crews and I sent in a data request about a week ago. I wanted to speak to someone about the request. Can you give me the name and number of someone I can speak with about this?

Thanks in advance for your help,

Chad Crews <chad.crews@brantley.k12.ga.us> Tue, May 25, 2021 at 1:40 PM
To: mvignati@doe.k12.ga.us

Mark,

I still haven't heard from you. Can you please reply to my previous email?

Thank you
Chad Crews
[Quoted text hidden]

Mark Vignati <mvignati@doe.k12.ga.us> Tue, May 25, 2021 at 1:59 PM
To: Chad Crews <chad.crews@brantley.k12.ga.us>

Your email also made its way to my supervisor, Nicholas Handville, the director of Data Collections, Analysis, and Reporting, and he will be responding to you as his time permits.

Mark Vignati

Systems Analyst

Technology Services

Georgia Department of Education

mvignati@doe.k12.ga.us

Educating Georgia's Future

From: Chad Crews <chad.crews@brantley.k12.ga.us>
Sent: Tuesday, May 25, 2021 1:40 PM
To: Mark Vignati <mvignati@doe.k12.ga.us>
Subject: Re: Data request

CAUTION: This email originated from outside of the GaDOE Mail System. Use caution replying or supplying information, clicking links, or opening attachments. If you suspect the message is fraudulent, please utilize the **Report Phish** button.

[Quoted text hidden]

Chad Crews <chad.crews@brantley.k12.ga.us> Tue, May 25, 2021 at 2:10 PM
To: Mark Vignati <mvignati@doe.k12.ga.us>

Thank you very much.
[Quoted text hidden]

Chad Crews <chad.crews@brantley.k12.ga.us> Wed, Jun 2, 2021 at 2:51 PM
To: Mark Vignati <mvignati@doe.k12.ga.us>

Mr. Vinatieri,

I was checking on the data collection process. I haven't heard anything yet on the process. I submitted my data request back around May 10th. I am trying to collect data for my dissertation this month so I can finish this summer. Can you please give me some type of timeline or directions on what steps I need to take?

Thank you for your help,

Chad Crews

On Tue, May 25, 2021, 1:59 PM Mark Vignati <mvignati@doe.k12.ga.us> wrote:
[Quoted text hidden]

Mark Vignati <mvignati@doe.k12.ga.us> Wed, Jun 2, 2021 at 3:05 PM
To: Chad Crews <chad.crews@brantley.k12.ga.us>

Mr. Crews:

Nicholas Handville and I have discussed your request in detail and the outcome of that discussion is as follows. First, a restatement of the text of your original request:

Request Description:

The scores on the Georgia Milestone Tests in Algebra, Geometry, and Biology of 1,000 students who have taken agricultural education courses, 1,000 students who have not taken any CTAE courses, and 1,000 students scores who have enrolled in other CTAE courses.

Requested Years: 2019-20,2018-19,2017-18,2016-17

Our original decision on the request as written will stand – without an existing Memorandum of Understanding or explicit Data Sharing Agreement describing in detail the purpose and goals of the study in question, we do not share detail-level assessment data, and secondarily we either provide all data requested or an explicit, discrete, and well-defined selection of data – we do not perform random sampling of data.

That said, the scope of your analysis is relatively well-targeted, and as such we can propose this alternate output file which we feel will meet these interpreted needs: For the available years of assessment data, we can provide state-level and district level overall assessment performance for the three listed Milestones EOC subjects (total tested plus breakouts of counts scoring in each performance level, allowing a calculation of percentage of test takers scoring in each performance level) for the total set of test takers for each year along with breakouts into the subgroups of students meeting your stated course-taking requirements:

1) Students who have taken high-school level CTAE Agricultural Education courses
2) Students who have taken other, non-agricultural high-school level CTAE courses

3) Students who have not taken any high-school level CTAE courses

By providing these data in aggregate form at system level for each of these course-history groups, we can give you data

which will allow you to see the relative performance of students with each course-taking history while still allowing adequate FERPA protections for students. Regarding available years, given that the Milestones EOC and EOG tests were cancelled for the 2019-20 school year due to COVID-19, these data can only be calculated for the other three years listed: school years 2017, 2018, and 2019.

If this is acceptable, please let me know and we can place this request in queue for processing.

[Quoted text hidden]

Chad Crews <chad.crews@brantley.k12.ga.us> Wed, Jun 2, 2021 at 4:47 PM
To: ecrews@murraystate.edu

[Quoted text hidden]

Chad Crews <chad.crews@brantley.k12.ga.us> Wed, Jun 2, 2021 at 5:08 PM
To: Mark Vignati <mvignati@doe.k12.ga.us>

Mr. Vignati,

This will work great. Please place this request in queue.

Thank you very much,

Chad Crews
[Quoted text hidden]

Mark Vignati <mvignati@doe.k12.ga.us> Tue, Jun 8, 2021 at 2:52 PM
To: Chad Crews <chad.crews@brantley.k12.ga.us>

Mr. Crews –

The attached files contain the aggregated Milestones assessment data for years 2017-2019, compiled in the manner I described below. State-level totals are in one file and by-system totals in the other. At each level of aggregation, I provided rows for each combination of [school year], [state/system], [Assessment Subject], and [student group].

For assessment subjects, there are actually a total of five test subject codes given. Biology (BIO) is its own group, but due to the changing mathematics subject standards over the years each math subject has two separate test codes: for Algebra, there is Algebra (ALG) and Coordinate Algebra (CAL), and for Geometry there is Geometry (GEO) and Analytic Geometry (AGE). Some systems have students taking both alternatives (that is, some students take ALG, others take CAL, not the same students taking both), so you may see up to five test rows per system/state in some cases.

For student groups, the groups given are Total Students (everyone taking the given test in the given year in the given system/state), Agricultural CTAE students (students taking and passing at least one high-school-level Agricultural CTAE course), non-Agricultural CTAE students (students taking and passing at least one HS-level non-Agricultural CTAE course), and Non-CTAE students (students who did not take any CTAE courses in high school). The CTAE distinction only goes in one direction – I flagged all students separately for Ag-CTAE and Non-CTAE, where the status was determined by taking and passing a course that is either ag-CTAE (course number 01.x, 02.x, 03.x, derived from the Main Subject Area fields as stored in our main course table and reported in the Course Board Rule IDA(3)) or non-AG-CTAE (any other CTAE course that is NOT in the 01/02/03 families). So, while non-agricultural CTAE students are confirmed to NOT have any ag-CTAE courses, students in the Ag-CTAE student group often do also have other non-ag-CTAE courses in their schedules. The numbers of exclusively ag-only-CTAE were pretty small and I thought the extra numbers of student groups (one would have to add both a 'ag-ONLY-CTAE' group as well as a group for 'both ag-and-non-ag-CTAE') would make these files even more cumbersome. Keep in mind that, given that there is an overlap between the ag-CTAE and non-ag-CTAE groups, this means that those groups overlap and thus you should not treat these subgroups as subtotals of the 'total' group.

Regarding the performance of each group, for each group of students given there is a column for Total Students and then four separate columns which give the counts of students scoring in the four Performance Levels – I labeled them here

numerically from PL1 (lowest) through PL4 (highest), corresponding respectively to Beginning, Developing, Proficient, and Distinguished (BEG, DEV, PRO, and DIS) as they are reported in student reports and on Accountability/CCRPI reports.

Let me know if you have any other questions or need more information.

[Quoted text hidden]

2 attachments

gmas2017-2019_ag-ctae-comparison_state-level.xlsx
10K

gmas2017-2019_ag-ctae-comparison_system-level.xlsx
449K

Appendix E

Email to Dr. Angela Haney

Assistant Superintendent Brantley County School Systems

Chad Crews <chad.crews@brantley.k12.ga.us>

Data request

1 message

Chad Crews <chad.crews@brantley.k12.ga.us> Fri, Jun 25, 2021 at 4:43 PM
To: Angela Haney <angela.haney@brantley.k12.ga.us>

Dr. Haney,

I am currently conducting research on agricultural education student achievement. I would like to use data from the Georgia Milestone Assessments at the high school for the previous years.
I am requesting the data for agricultural education and Non-agricultural student scores on the Georgia Milestone Assessment in algebra, geometry, biology and physical science for the 2017-18,2018-19 and 2019-2020 school years.
Please let me know how to go about dissecting the data.

Thank You
--
Chad Crews Ed. S.
Ag. Education/FFA Advisor
Brantley County High School
(912)462-5121 Cell(912) 670-0129
10804 Hwy 82.
Nahunta, GA 31553

Appendix F

State Wide Data 2017-19

SCHOOL_YEAR	ASSESSMENT_SUBJECT_CODE	STUDENT_GROUP	TOTAL_TESTED_COUNT		PL_1_COUNT		PL_2_COUNT		PL_3_COUNT		PL_4_COUNT
2017	ALG	Agricultural CTAE Students	13155		4148		5462		3057		491
2017	ALG	Agricultural CTAE Students	12985		4018		5060		3217		694
2017	ALG	Agricultural CTAE Students	9643		2860		3667		2592		525
			35783	30.8	11026	39.7	14189	24.8	8866	4.7	1710
2017	ALG	Non-Agricultural CTAE Students	92356		24436		32189		25790		9955
2018	ALG	Non-Agricultural CTAE Students	91479		23706		30930		25867		10999
2018	ALG	Non-Agricultural CTAE Students	71054		18926		24096		20546		7504
			254889	26.3	67068	34.2	87215	28.3	72203	11.1	28458
2018	ALG	Non-CTAE Students	24184		5755		6029		7963		4440
2018	ALG	Non-CTAE Students	32788		7273		8257		10655		6609
2019	ALG	Non-CTAE Students	59507		12017		14848		20527		12125
			116479	21.5	25045	25	29134	33.6	39145	19.9	23174
2017	BIO	Agricultural CTAE Students	15444		5190		4381		4909		965
2017	BIO	Agricultural CTAE Students	14360		4465		3923		4726		1249
2017	BIO	Agricultural CTAE Students	11829		3661		3195		4031		943
			41633	32	13316	27.6	11499	32.8	13666	7.5	3157
2017	BIO	Non-Agricultural CTAE Students	96007		29129		24490		32284		10114
2018	BIO	Non-Agricultural CTAE Students	91535		26345		21952		30878		12373
2018	BIO	Non-Agricultural CTAE Students	82561		24068		19944		28396		10165
			270103	29.4	79542	24.6	66386	33.9	91558	12.1	32652
2018	BIO	Non-CTAE Students	19983		5673		3602		7085		3628
2018	BIO	Non-CTAE Students	24677		6595		4377		8301		5406
2019	BIO	Non-CTAE Students	36953		10047		6900		13126		6886
			81613	27.3	22315	18.2	14879	34.9	28512	19.5	15920
2017	GEO	Agricultural CTAE Students	12331		3397		4930		3305		702

2017	GEO	Agricultural CTAE Students	12095		4013		4040		3253		789
2017	GEO	Agricultural CTAE Students	11476		3664		3877		3133		802
			35902	30.8	11074	35.8	12847	27	9691	6.3	2293
2017	GEO	Non-Agricultural CTAE Students	77856		18644		26380		23103		9738
2018	GEO	Non-Agricultural CTAE Students	79450		22354		23935		22773		10399
2018	GEO	Non-Agricultural CTAE Students	75361		20792		22718		21897		9965
			232667	26.5	61790	31.4	73033	29.1	67773	12.9	30102
2018	GEO	Non-CTAE Students	12944		2327		2896		4409		3313
2018	GEO	Non-CTAE Students	17375		3503		3651		5667		4555
2019	GEO	Non-CTAE Students	24406		4834		5341		8002		6234
			54725	19.4	10664	21.7	11888	33	18078	25.7	14102

Appendix G

Program at Work for Agricultural Education

Georgia Agricultural Education
Program of Work and Performance Evaluation

2021-2022 High School Program of Work

Chad Crews
chad.crews@brantley.k12.ga.us

Brantley County High School
Brantley County Schools
912-462-5121
912-462-5121

Employment Begin Date
7/1/2021

Employment End Date
6/30/2022

Program of Work
Teacher Meets Standards: **YES**
System Meets Standards: **YES**

Evaluation
Teacher Meets Standards: **NO**
System Meets Standards: **NO**

POW	Item	POW Professional Accomplishments/Requirements	Evaluation
Yes	1	The teacher holds a valid teaching certificate in agricultural education or a provisional certificate in agricultural education.	No
Yes	2	The Teacher does not have any after school duties and responsibilities that would conflict with the FFA and SAE activities. *The Agricultural Education Program has three components. The classroom, FFA, and SAE combine to make the complete and balanced program. Students must be trained for Career Development Events and supervised at these activities. The students must have an SAE that requires home and worksite visits by the Agriculture Teacher. These activities occur throughout the school year and during the summer. As a result the Agricultural Education Teacher should not have any after school duties and responsibilities that would conflict with the FFA and SAE activities for which they receive extended day and extended year. This would include athletic and administrative duties or assignments.	No
Yes	3	The teacher will comply with the Agricultural Education Teachers Creed.	No
Yes	4	The teacher will be actively involved in the professional teacher organization, Georgia Vocational Agricultural Teachers Association (GVATA), which is dedicated specifically to agricultural educators in the state.	No
Yes	5	The teacher will attend all area meetings for agricultural education teachers (summer, fall, winter, spring).	No
Yes	6	The teacher will attend and participate in the GVATA Summer Leadership Staff Development Conference.	No
Yes	7	The teacher will attend and participate in the GVATA Mid-Winter Staff Development Conference.	No
Yes	8	The teacher will conduct at least two advisory committee meetings. Membership of the advisory committee will include agricultural industry and community leaders (minimum of seven). The teacher will keep proper advisory committee minutes.	No
	8A	Proposed advisory committee meeting location/dates. **October 2021 March 2022**	
	8B	List Advisory Committee Members. Name/Title/Occupation (Minimum of Seven). **Tim Burchall Coastal Pines welding instructor David Lake Blueberry farmer Ben Lang Welding shop owner BArry Chesser Retired GFC Bo CHesser GFC Robert Horan DNR Hunter Gowen Welding shop owner**	
Yes	9	The teacher will complete and submit detailed monthly reports by the 10th day of each month. Reports should include contacts, extended day and extended year hours which reflect participation in the 3-Component Model.	No
	10	The teacher will attend a minimum of one Professional Learning activity conducted by the Agricultural Education Staff (minimum of 8 contact hours) in which the teacher registered for the PLU through the CTAERN. The Summer Leadership Conference and Mid-Winter Leadership Conference do not satisfy this requirement. Please list AgEd related PLU classes that they have taken the previous 2 years. **don't know yet**	

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Yes	11	All agricultural courses taught will be listed on the Agricultural Education Courses list approved by the Georgia Department of Education.	No
Yes	12	The teacher will teach no more than 1 out-of-field segment.	No
Yes	13	The teacher will develop a course calendar and syllabus for each course.	No
Yes	14	The teacher will develop practical lesson plans and file plans for each course taught.	No
Yes	15	The teacher will include systematic instruction on FFA in the instructional program.	No
Yes	16	Each course taught will include a minimum of one unit on leadership and personal development.	No
Yes	17	The teacher will provide students with systematic instruction on record keeping.	No
Yes	18	The teacher will insure that a minimum of 60 percent of students have in place an approved Supervised Agricultural Experience Program.	No
Yes	19	The teacher will provide students with a state approved SAEP recordbook appropriate for their Supervised Agricultural Experience Program. The AET Record Book is an approved option.	No
Yes	20	The teacher will provide project supervision for each student with an approved Supervised Agricultural Experience Program per Monthly Report documentation.	No
Yes	21	The teacher will submit at least one proficiency application for regional consideration by the due date on the state calendar.	No
Yes	22	The teacher will maintain an FFA Chapter & serve as advisor.	No
Yes	23	Each teacher will comply with FFA Affiliation standards by including each student enrolled in their agricultural education classes on their FFA roster and pay their chapter's Affiliation fee by the due date on the state calendar.	No
Yes	24	The chapter and current year fiscal officers will complete an FFA Program of Activities and Budget and submit to the Region office by the due date on the state calendar.	No
Yes	25	The chapter officers will participate in the Georgia FFA Official Chapter Officer Leadership Training Workshop or conduct a chapter officer leadership planning retreat.	No
Yes	26	The chapter will hold a minimum of ten chapter meetings during the year using the official opening and closing ceremonies. Official minutes should be recorded for each meeting.	No
Yes	27	The chapter will conduct activities in recognition of National FFA Week.	No
Yes	28	The chapter will conduct a community service project.	No
Yes	29	The teacher will have two official delegates that register for and participate in the entire State FFA Convention.	No
Yes	30	The chapter will have at least one qualified applicant per teacher for the State FFA Degree (newly established departments will have three years to fulfill).	No
Yes	31	The chapter will conduct an FFA parent/member awards banquet.	No
Yes	32	The Chapter will submit a National Chapter Form I application and two of the following applications to the region office:	No
Yes		American FFA Degree	No
No		National Chapter Application (Form II)	No
Yes		National FFA Week Recognition	No
No		WLC Scholarship Application	No
No		State Star Application	No
No		American Star Application	No
Yes	33	Each teacher will have students participate in a minimum of five CDEs. (A minimum of two CDEs must be Leadership CDEs (*); and a minimum of two CDEs must be team events.)	No
No		Agricultural Communications CDE	No
No		Agriculture Education CDE*	No
No		Agricultural Marketing Plan CDE*	No
No		Agricultural Sales CDE*	No
No		Agricultural Technology & Equipment ID CDE	No
No		Agricultural Mechanics CDE	No
Yes		Area Forestry Field Day	No

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No		Agriscience Fair	No
Yes		Creed Speaking CDE*	No
No		Conduct of Chapter Meetings CDE*	No
No		Dairy Cattle Judging CDE	No
Yes		Discussion Meet CDE*	No
No		EMC Wiring CDE	No
No		Environmental Natural Resources CDE	No
No		Extemporaneous Public Speaking CDE*	No
No		Farm Business Management CDE	No
No		FFA Quiz CDE	No
No		Floriculture CDE	No
No		Floral Design CDE	No
Yes		Forestry CDE	No
No		Horse Judging CDE	No
Yes		Employment Skills CDE*	No
No		Land Judging CDE	No
No		Lawnmower Driving CDE	No
No		Livestock Judging CDE	No
No		Meats Judging CDE	No
No		Nursery / Landscape CDE	No
No		Parliamentary Procedure CDE*	No
Yes		Poultry Judging CDE	No
No		Prepared Public Speaking CDE*	No
No		Tractor Operation & Maintenance CDE	No
No		Wildlife Management CDE	No
No		Vet Science CDE	No
Yes	34	The teacher will participate with students in one or more of the following FFA Leadership activities. Please indicate projected number in attendance.	No
		Area Awards Banquet **12**	
		Greenhand Jamboree	
		National FFA Convention	
		FFA Success Conference	
		Georgia FFA Summer Leadership Camp	
		Region Rally	
Yes	35	The teacher will maintain all facilities in a safe, neat, and aesthetically pleasing condition.	No
Yes	36	Local system will provide transportation and/or travel funds to meet the Agricultural Education program of work standards at no expense to the local FFA Chapter.	No
Yes	37	Teacher will have a planning period during school hours.	No
Yes	38	The local system will provide adequate budget for supplies.	No
Yes	39	The local system will provide adequate budget for equipment.	No
Yes	40	The local system will provide adequate computers.	No

Yes	41	The local system will provide adequate office space.	No
Yes	42	The local system will provide access to audio/video equipment.	No
Yes	43	The local system will provide for specialized facilities or have an approved plan for addressing specialized facility needs.	No
Yes	44	The local system will provide adequate classroom facilities.	No
Yes	45	The local system will provide adequate funding for facility maintenance.	No
Yes	46	The teacher will maintain an FFA Chapter & serve as advisor.	No
Yes	47	The teacher will not teach more than one segment out of field per grading period.	No
Yes	48	The local system will compensate teacher at minimum hourly rate for extended day.	No

Teacher Signature _____ Date _____

Approve by: _____ Title _____ Date _____

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