AGRICULTURE TEACHER ATTITUDES REGARDING GIFTED EDUCATION
AND TEACHING GIFTED STUDENTS IN THE AGRICULTURE CLASSROOM

by

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ABSTRACT

Agriculture Teacher Attitudes Regarding Gifted Education and Teaching Gifted Students in the Agriculture Classroom

by

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Utah State University, 2019

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The agriculture industry needs talented individuals to fill highly technical, new, and emerging jobs. Gifted and talented students within the agricultural program are a population that could fill such a need within the industry. It was unclear before this research how much preservice teacher instruction agriculture teachers were receiving to prepare them to teach students identified as gifted in their classrooms. This research aimed to measure teacher attitudes, characterization of gifted students, professional development needs, and related demographic information.

Of the agriculture teachers who completed a traditional teacher preparation program, 54.50% felt that they were adequately prepared to meet the needs of gifted students in their classroom. There was a significant relationship between years of teaching and feeling threatened by the intelligence of gifted students, feeling challenged in their content knowledge by gifted students, and feeling as though gifted students were
bored in their classroom. However, these perceptions decreased as years of teaching increased. Participants characterized gifted agriculture students as outstanding problem solvers, quick to memorize information, and excellent in science. Participants did not characterize this group of students as excellent entrepreneurs, very active in FFA, and excellent leaders. These characteristics have implications for how to work with this population of students, such as using problem-based learning and integrating more science content into the classroom. By analyzing results of the importance and ability needs assessment, professional development is needed in the areas of creating challenging classroom content, differentiating instruction, and teaching problem solving skills specifically to teach gifted students in their classrooms.

(132 pages)
Agriculture Teacher Attitudes Regarding Gifted Education and Teaching Gifted Students in the Agriculture Classroom

Olivia M. Hile

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Participants characterized gifted agriculture students as outstanding problem solvers, quick to memorize information, and excellent in science. They did not characterize this group of students as excellent entrepreneurs, very active in FFA, and excellent leaders. These characteristics have implications for how to work with this population of students, such as using problem-based learning and integrating more science content into the classroom. By analyzing results of the importance and ability needs assessment, professional development is needed in creating challenging classroom content, differentiating instruction, and teaching problem solving skills specifically to teach gifted students in their classrooms.
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Agriculture teachers educate a wide range of the students in their classrooms, including students who are identified as gifted and talented (National Association of Gifted Children, 2013). Further, students in agriculture classes are varied in their ability levels, and agriculture teachers need to develop the “ability to work with diverse groups” (Roberts, Dooley, Harlin, & Murphrey, 2007), including gifted and talented students. Interestingly, gifted students recognize the difficulty that agriculture teachers undertake in teaching in mixed-ability classrooms (Gray, 2011).

To meet the needs of a diverse student population, agriculture teachers must answer a few questions. First, agriculture teachers must determine how to best help students who would like to pursue school-based agricultural education (SBAE), whether it is college or career readiness. Second, teachers need to identify careers other than production agriculture within the industry, which would help to recruit gifted students to fill highly technical jobs. Third, teachers should determine the number of gifted students in the agriculture classroom. Finally, the agriculture teacher should receive training or instruction on how to best meet the learning needs of students classified in this group.

Statement of the Problem

Currently, little is known about how school-based agriculture teachers respond to the educational needs of students identified as gifted and talented in their classrooms. It is unclear if preservice agriculture teacher preparation programs address the identification
of gifted students in the agriculture classroom setting and how to best meet their educational needs to teach this population effectively. Gray (2011) pointed out that building confidence in teachers’ ability to identify and engage gifted students, which could be addressed in preservice training programs, is an area that future research should explore.

Research suggests preservice training programs can significantly influence teacher attitudes toward different populations of students. Specifically, Lassig (2009) found that inservice training in gifted and talented significantly influenced teacher attitudes. Varying teacher attitudes toward the gifted have been identified within other disciplines, both positive attitudes (Megay-Nespoli, 2001) and negative attitudes (Geake & Gross, 2008). Beliefs about gifted and talented students do influence teaching practice (Berman, Schultz, & Weber, 2012). Researchers have not studied agriculture teacher attitudes toward gifted education and working with gifted students in the classroom.

It is important to understand how agriculture teachers view giftedness in their agriculture students. Carman (2011) found that both inservice and preservice teachers had stereotypical, as opposed to accurate, views of giftedness. In agricultural education, these attitudes can also influence how a teacher characterizes gifted agriculture students. Clark (2008) suggested that there are certain cognitive, affective, physical/sensing, and intuitive characteristics that describe gifted students, and associated problems that could arise if the needs of gifted students are not being met in the classroom (Clark, 2008). While scales exist for identifying giftedness within different subject areas, such as science, none exist for agricultural education that teachers could use to identify gifted agriculture
students (Renzulli et al., 2013).

Additionally, Geake and Gross (2008) recommend that professional development in gifted education directly address negative teacher attitudes toward giftedness. Success has been found in other disciplines when utilizing professional development to change preservice teacher attitudes toward giftedness (Megay-Nespoli, 2001). Identifying professional development needs for agriculture teachers in working with gifted students has not been previously studied. VanTassel-Baska and Stambaugh (2005) outlined possible challenges and solutions when working with gifted students. An outline of challenges and solutions for agriculture teachers in the specific programmatic areas (National FFA Organization, 2019a) of agricultural education (classroom/laboratory, Supervised Agricultural Experiences [SAE], and FFA) does not exist.

By rethinking the approach to meeting the educational needs of gifted and talented students in agriculture programs, SBAE may be able to address retention issues and meet the demands of agriculture-based employers for a well-trained and talented workforce. A greater number of jobs are predicted to be available in the areas of food, agriculture, renewable natural resources, and environment than there are college graduates within the field to fill them (Goecker, Smith, Fernandez, Ali, & Theller, 2015). To address this growing need, school-based agriculture teachers need to learn how to best work with gifted students, appropriately motivating and challenging them with the goal to direct them to appropriate post-high school training and or college programs in agriculture.
Purpose

The goal of this study was to describe school-based agriculture teachers’ attitudes and characterization of gifted students and identify professional development needs for working with gifted students in the agriculture program. By understanding agriculture teacher attitudes and how they characterize the gifted, agriculture teachers can improve their role in the developmental process of technical agriculture talent in gifted students.

Research Questions

The following research questions guided this study.

1. What is the demographic profile of school-based agriculture teachers, including preservice preparation to work with the gifted (i.e., percent of gifted students in agriculture program, method of licensure, gender, years of teaching experience, and community type)?

2. What are the attitudes of school-based agriculture teachers regarding the education of gifted students (i.e., value, teaching, focus, power struggle, agricultural education) and how do these compare by method of licensure, gender, years of teaching, and community type?

3. How do school-based agriculture teachers characterize gifted agriculture students?

4. What are the professional development needs of inservice agriculture teachers related to the education of gifted students?

Theoretical and Conceptual Framework

This study utilized the differentiated model of giftedness and talent (DMGT) by Francois Gagné, first published in 1993. The model distinguishes between the terms giftedness and talent, proposing that there is a developmental process that takes place to
transform natural abilities (i.e., gifts) into competencies (i.e., talents; Gagné, 2010). Students can be gifted in the mental areas of intellectual, creative, social, and perceptual; or the physical areas of muscular and motor control (Gagné, 2010). Students go through a developmental process that is influenced by what Gagné calls catalysts, which include individuals (e.g., teachers) and provisions (e.g., curriculum and pedagogy), that develop talent in gifted students (Gagné, 2010). It is through this developmental process that students acquire domain specific competencies in a particular field, within the technical agriculture field and career and technical education (CTE) academics. Agriculture teachers act as environmental catalysts who influence a gifted student’s development of talent in agriculture, which is why teacher attitude, characterization of gifted students, and the teacher’s professional development needs are critical.

This study conceptualized the DMGT model, infusing the three-component model of school-based agricultural education, to test within the context of SBAE (National FFA Organization, 2018). Through this study, I sought to better understand how agriculture teachers might develop the agricultural talent of gifted students based on the influence they have in the classroom. This influence was measured through (1) their attitudes toward gifted education; (2) characterization of gifted agriculture student, and (3) their professional development needs working with this population of students.

**Basic Assumptions**

The following assumptions were made to conduct this study.

1. The giftedness expressed in the cognitive function characteristics chart by Clark (2008) is adequately comprehensive in its identification of gifted
cognitive traits for utilization in this study.

2. The survey instrument in its entirety is able to sufficiently assess the constructs and concepts listed in the research questions.

3. Agriculture teachers have a professional opinion regarding the education of gifted students and are able to answer the survey questions honestly and accurately based on their attitudes.

4. The random sample provided by the National FFA Organization represents agriculture teachers nationally and the results of the study are generalizable for all agriculture teachers in the U.S. if a certain response rate is met.

Limitations of the Study

The following limitations were identified in this study.

1. The study is conducted through online survey items, and items must conform to available question formats.

2. Researcher understanding of gifted and talented education could limit and bias the results.

3. The results of the study may not be applicable to other CTE subject areas.

4. Quantitative survey methodology limits the ability to understand more deeply participants’ points of view in a nuanced way when compared to qualitative research methods.

5. After being reviewed for content validity, some questions still may not accurately measure agriculture teacher opinions.

Significance of the Problem

While there have been a few research studies assessing gifted agriculture student perceptions, agriculture teacher attitudes related to working with gifted agriculture students have not been studied before. It is also unclear to what degree preservice agriculture teachers are prepared to work with gifted agriculture students in their future
classrooms and their ability to do so once in the classroom. Results from this study could better inform teacher educators and educational professionals about inservice teacher professional development and preservice teacher preparation across the country, to better meet the educational need of gifted agriculture students, and ultimately direct gifted students towards careers in agriculture. Gagné (2000) estimates that 10% of students within a particular domain or field are gifted. Gifted students within the field of agriculture is a population that is often forgotten. Future researchers can utilize this study as a starting point to study further the attitudes of agriculture teachers regarding the education of the gifted and their ability to identify and appropriately challenge this type of student in their classroom.
CHAPTER II
REVIEW OF LITERATURE

The purpose of this study was to describe school-based agriculture teachers’ attitudes and characterization of gifted education and to identify professional development needs for working with gifted students in the agriculture program. Little is known about how agriculture teachers respond to the educational needs of gifted students, and this study aimed to better understand this interaction. It is unclear how much education preservice teachers receive regarding gifted students and how to teach students with above average ability in their classrooms. In this chapter, the literature review includes the background of gifted education, key variables associated with the study of gifted students, gifted students in SBAE, and inservice needs of agriculture teachers related to gifted students. I will expound upon the theoretical and conceptual frameworks. Through this literature review, I will evaluate the relationship between agricultural education and gifted education, as well as the critical elements of agriculture teacher education that influence an instructor’s ability to educate gifted students. Additionally, I will discuss the necessity for strengthening relationships between agricultural and gifted education to meet the demand for talented workers in the agriculture industry.

Literature Review

Research related to educating gifted students within agricultural education and agriculture-related programs is limited. There is research identifying the number of gifted
students participating in agricultural education programs (Israel, Myers, Lamm, & Galindo-Gonzalez, 2012; Pandya & Curtis, 1981). Pandya and Curtis suggested that “…agriculture teachers and their programs need to adapt to the changing needs of gifted students” (p. 11). Yet more recent studies regarding their recommendations, about how to work with gifted students in the agriculture classroom, are few. Dayton and Feldhusen (1989) stated that

…the “vocationally” talented are students who demonstrate exceptional capability within one or more of the vocational program areas. These are students who create with their hands, plan gourmet meals, design clothing, conduct business, or manage farms. (p. 357)

While SBAE is no longer considered vocational, but rather career and technical education (CTE), Dayton and Feldhusen (1989) clarify that students have talents related to specific program areas.

**School-Based Agricultural Education**

The agricultural education mission is that “agricultural education prepares students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber and natural resource systems” (National FFA Organization, 2019a). SBAE is composed of three parts, identified by the three-component model of agricultural education. These three components are classroom/laboratory, the FFA Organization, and supervised agricultural experiences (National FFA Organization, 2019a).

The agriculture classroom and laboratory are seen as the primary teaching locations where students gain the foundational knowledge to be successful in the other
two components of the program. Agricultural science can function as content, where students learn about agriculture, but also a context, where students study a variety of transferable concepts that also apply to other subject areas (Robers & Ball, 2009). Students can study weather systems, business topics, and leadership within the agriculture science context for example.

The career and technical student organization (CTSO) associated with agricultural education is the FFA. The FFA motto is “learning to do, doing to learn, earning to live, living to serve” (National FFA Organization, 2019d). Historically known as the Future Farmers of America, the official name has since been changed in 1988 to the National FFA Organization to more broadly define the agriculture industry to include “…Future Biologists, Future Chemists, Future Veterinarians, Future Engineers and Future Entrepreneurs of America, too” (National FFA Organization, 2019e). In the FFA, students have opportunities to participate in career development and leadership development competitions in areas such as agronomy, agricultural sales, and prepared public speaking (National FFA Organization, 2019f). There are also opportunities to gain leadership experience at the school, regional, state, and national level through this organization.

Supervised agricultural experiences (SAEs) are independent student projects that further engage students in the agricultural content of their choice. Students can complete projects and submit them to the FFA Organization to earn awards based on their content area and project type. There are a variety of SAE project types, such as placement, service learning, and school-based enterprise (National FFA Organization, 2019c).
Gifted and Talented Education

The Elementary and Secondary Education Act of 1965 originally defined gifted and talented individuals as

…students, children, or youth who give evidence of high achievement capabilities in areas such as intellectual, creative, artistic, or leadership capacity, or in specific academic fields, and who need services and activities not ordinarily provided by the school in order to fully develop those capabilities.

While percentages vary by state, there were approximately 6.7% of students nationally in the 2013-2014 school year who participated in gifted and talented programming (National Center for Education Statistics, 2018). However, one study found that Utah agriculture teachers estimated 22% of their students were identified as gifted (Overstreet & Straquadine, 2001), though the type of giftedness was not clarified.

Tofel-Grehl and Callahan (2017) recognized the gap in the literature related to how teacher beliefs affect instruction with regards to the giftedness of their students (Tofel-Grehl & Callahan, 2017). Beliefs about gifted and talented students influence teaching practice (Berman et al., 2012). Hansen and Feldhusen (1994) assert “there is little disagreement, for example, that a teacher who feels threatened by the intellectual abilities of children will fall short of a reasonable standard for teaching gifted students” (p. 115). Although, Caldwell (2012) found that teacher attitude toward the gifted, though positive, was a poor predictor of teacher differentiation in the classroom (p. 112). For these reasons, in this study I aimed to characterize the gifted agriculture student and identify ways of improving the education of gifted students in the school based agricultural education classroom.
Science, Technology, Engineering, and Mathematics Education in Agricultural Education

Science, Technology, Engineering, and Mathematics (STEM) programs are options for gifted high school students (Mullet, Kettler, & Sabatini, 2018; Olszewski-Kubilius, 2009). The incorporation of STEM concepts into agriculture classes has been used to attract high ability students to the SBAE program (Thompson & Balschweid, 1999). With the addition of an “A,” STEM education can now stand for science, technology, engineering, agriculture, and mathematics (STEAM; Sumida, 2017). According to Sumida,

STEM education has contributed to the modernization of agriculture and STEM education will arguably contribute to combining indigenous culture with aspects of science and technology in the education of young, gifted children. (p. 224)

Agriculture can be utilized to explain scientific concepts and “a way for young children from all over the world to be aware of a connection with modern science in their daily lives” (Sumida, 2017, p. 240).

Within agricultural education, Swafford (2017) combined STEM with the agriculture, food, and natural resources (AFNR) education concepts to create a conceptual model for use in agricultural education programs. His findings suggest that “except for Agribusiness Systems, competencies within at least two STEM content areas can be explicitly taught within the remaining pathway standards,” with science and math being the most common (Swafford, 2017, p. 308). Another option for incorporating deeper science content into the SBAE curriculum would be the integration of the Next Generation Science Standards. However, Drape, Lopez, and Radford (2016) found that teacher efficacy influenced an agriculture teacher’s “ability to integrate other subject
areas” in their SBAE program (p. 44).

With regards to how agricultural education can influence other educational programs in the school, there is some indication that science test scores can be improved by taking agri-science and/or other CTE courses (Gentry, Peters, & Mann, 2007). More specifically, there is some indication that science scores are improved for agriculture science students (Chiasson & Burnett, 2001) and those concentrating in agriculture scored higher than nonconcentrators (Israel et al., 2012). Possible reasons for this could be attributed to teacher characteristics, context in which the information is being taught, and the structure of SBAE.

**Gifted Students in Agricultural Education and Career and Technical Education**

Agriculture classes are heterogeneous in ability level, and agriculture teachers have the responsibility of teaching a wide range of students. Roberts et al. (2017) conclude that agriculture teachers need to be able to work with the diversity of students in their classrooms. However, managing a mixed ability classroom can be challenging. In fact, according to Gray (2011), agriculture students who are gifted recognize how difficult managing a mixed ability classroom can be for agriculture teachers. In general, preservice teacher education programs do not seem to adequately prepare future teachers to address the needs of gifted students (Berman et al., 2012; Hansen & Feldhusen, 1994).

Research priority three for the American Association for Agricultural Education 2016-2020 is a “sufficient scientific and professional workforce that addresses the challenges of the 21st century,” a specific priority for agriculture education on a national
level (Stripling & Ricketts, 2016, p. 29). As the number of farm operators decrease and the technology involved in agriculture increases, the agriculture industry needs talented individuals to fill highly technical jobs. It is estimated that there are a greater number of jobs available in food, agriculture, renewable natural resources, and environment (AFNR) than college graduates to fill them in the U.S. (Goecker et al., 2015). Although gifted students still perceive agricultural work as primarily manual labor with low wages (Cannon, Broyles, & Hillison, 2006), agricultural education should be promoted as a viable option for gifted students interested in agriculture, as others have argued on behalf of all of CTE (Gentry, Hu, Peters, & Rizza, 2008).

Governor’s schools are educational programs sponsored by the state that vary in duration, time of year, and content focus. Governor school programming in agriculture has been developed in multiple states for gifted students (Cannon, Broyles, Seibel, & Anderson, 2009; Cannon et al., 2006; Faulker, Baggett, Bowen, & Bowen, 2009). According to The University of Tennessee at Martin (2019), there are three Governor’s Schools specifically developed for agriculture content.

The Governor’s School for Agriculture at Virginia Polytechnic Institute and State University (2019) focuses on integrating STEM into the National Institute for Food and Agriculture (NIFA) challenge areas, stating that their mission is “to develop future leaders and scientists for careers in agriculture” (para.3). However, the week-long Food and Agricultural Science Institute at Pennsylvania State University had little effect on the career choices of academically talented high school students that participated (Faulker, Baggett, Bowen, & Bowen, 2009). Likewise, the Virginia Governor’s School for
Agriculture did not influence career choice but did influence perceptions and knowledge of agriculture in its gifted and talented participants (Cannon, Broyles, Seibel, & Anderson, 2009).

CTE is an option for gifted and talented students (Gentry et al., 2007). The 16 talented CTE students who were interviewed by Gentry et al. (2007) commented positively regarding the teacher quality, autonomy, and ability to learn relevant content at the CTE school that they attended. Further, Gentry, Hu, Peters, and Rizza (2008) identified talented CTE students by asking program managers to rate students on the following items on a 4-point scale: (1) shows outstanding talent in this domain or career pathway when compared to age peers; (2) performs or shows potential for performing at remarkably high levels of accomplishment when compared to others similar in age, experience, or environment; (3) has a desire to work advanced concepts and materials in this area; (4) is willing to explore new concepts; (5) seeks alternative ideas; (6) actively considers others’ values; and (7) often thinks “out of the box.”

While Spicker, Southern, and Davis (1987) suggest a nontraditional process for identifying gifted students living in rural settings, Gentry et al. (2008), with their study being of a rural CTE school, assert that the identification process is still an issue over 20 years later for talented CTE students. Complications of gifted education for rural youth is not a new conversation (Spicker et al., 1987). Howley (2009) suggests that greater value should be given to the rural life and rural context be incorporated into gifted education for these students. Azano, Callahan, Brodersen, and Caughey (2017) advocate for PLACE (Place, Literacy, Achievement, Community, and Engagement)-based education
School-based agricultural education (SBAE) could be a viable option for rural gifted students if teachers understood how better to meet the needs of the gifted in their classrooms and modified their curriculum accordingly. Agricultural education can positively influence the social development of rural communities (Martin & Henry, 2012), as well as provide entrepreneurship opportunities for students in the agriculture program (Heinert & Roberts, 2018). Rural agriculture teachers could utilize resources specifically addressing the education of rural gifted students. VanTassel-Baska and Hubbard (2016) highlight the use of advanced curriculum, critical thinking, problem solving, project and problem based learning, as some of the many teaching tools to utilize with rural gifted students.

**Teacher Training**

The Higher Education Opportunities Act of 2008, a federal law that, within section 201 on teacher quality enhancement, identifies desirable teaching skills and highlights the following that includes gifted and talented learners:

Focus on the identification of students’ specific learning needs, particularly students with disabilities, students who are limited English proficient, students who are gifted and talented, and students with low literacy levels, and the tailoring of academic instruction to such needs. (p. 122)

Yet according to Plucker, Giancola, Healey, Arndt, and Wang (2015) in the *Equal Talents, Unequal Opportunities: A Report Card on State Support for Academically Talented Low-Income Students* sponsored by the Jack Kent Coke Foundation, only two states are known to require coursework in gifted education for teachers.

Tomlinson (2014) examined the concept of differentiated instruction which
assumes each student is unique in their educational requirements and should be instructed in a way that meets their individual needs. Utilizing differentiation in the heterogenous classroom may be one way to reach gifted students. While some agricultural education literature exists on using differentiated instruction with students with learning disabilities (Smith & Rayfield, 2019) there is none about differentiation with gifted and talented students. Tomlinson, Tomchin, and Callahan (1994) found that preservice teachers had difficulty identifying traits common to diverse learners, including gifted and talented students. Megay-Nespoli (2001) found that preservice teachers recognize student differences but did not know how to match the teaching strategy with the associated need, and may account for the lack of clarity about differentiated instruction in the SBAE classroom.

Hansen and Feldhusen (1994) found that teachers trained in gifted education foster more creativity in their classrooms and have classroom climates that are more positive than untrained teachers. Finally, Rayfield, Croom, Stair, and Murray (2011) discovered agriculture teachers who completed traditional teacher preparation programs differentiated significantly less for their students than alternatively licensed agriculture teachers, and were “more likely than traditionally prepared teachers to emphasize critical and creative thinking, use several instructional formats, group students based on learning needs and use differentiated instructional methods when re-reaching” (Rayfield et al., 2011, p. 171). Teacher licensure was one of the many teacher demographics that were analyzed in relation to teacher attitude in this study.
Teacher Demographics

Teacher demographics may influence the teachers’ attitudes and abilities when working with gifted students. Forlin, Loreman, Sharma, and Earle (2009) found that the teacher demographics related to previous training, level of education, and gender influenced teacher attitudes toward classroom inclusion. Specifically, in gifted education, Rubenzer and Twaite (1979) found that years of teaching experience and inservice experience with gifted and talented influenced the attitudes of teachers. Having six or more years of teaching experience significantly increased a teacher’s likelihood to recognize gifted students are in his or her classroom (Rubenzer & Twaite, 1979). Although, both experienced teachers and teachers with no professional development in gifted and talented education were more likely to agree that “identification of the gifted was not difficult” (Rubenzer & Twaite, 1979, pp. 209-210). In contrast, Geake and Gross (2008) found teaching experience as non-significant in teachers’ affective attitudes toward the gifted. It is unknown if agriculture teachers’ attitudes are influenced by these types of demographics.

Method of teacher licensure may also influence teacher attitudes toward gifted students in SBAE, as license type indicates the type of preservice program that an agriculture teacher completed to obtain the license. Of the individuals obtaining licenses to teach agriculture in 2017, 72% were undergraduate completers, 7% were post-baccalaureate program completers, 9% graduate program completers, and 12% completing licensure only (i.e., they obtained their license independent of any degree program; Smith, Lawver, & Foster, 2018). Of the total number of new hires in 2017,
19.4% were alternatively licensed, which was a 2.8% increase in two years when compared with the data in 2015 consisting of 16.6% of alternatively licensed new hires (Smith, Lawver, & Foster, 2017; Smith et al., 2018). It seems there is an increase in alternatively licensed agriculture teachers which may impact exposure to gifted and talented education content.

The gender of agriculture teachers has been shifting within SBAE. In 1998, newly licensed agriculture teachers were majority male with 59% male and 41% female (Camp & Beckman, 2000). Of the individuals newly licensed to teach agriculture in 2017, 69% were female and 31% were male (Smith et al., 2018). Although, Geake and Gross (2008) found that gender did not significantly influence teacher affect toward academically gifted students amongst teachers in England, Scotland, and Australia. In Hansen and Feldhusen’s (1994) study of teachers trained or not trained in gifted education, low significant correlations were found between teaching skill and gender, where female teachers scored higher. Thus, the increasingly female agriculture teacher population may influence teacher attitudes toward gifted students in SBAE.

Community type may have an influence on the challenge for gifted students in the classroom. There is literature available that specifically addresses the unique needs when working with gifted students in the rural setting (VanTassel-Baska & Hubbard, 2016). When comparing rural and suburban gifted student perceptions, middle school gifted students in a rural setting have been found to perceive their coursework to include “less challenge and less enjoyment” (Gentry, Rizza, & Gable, 2001, p. 115). While student experiences may differ, this research sought to determine if teacher attitude differed by
Attitude Constructs

Teacher attitudes may influence the ability of teachers to work with gifted students. When studying the experiences of gifted students in STEM, Mullet et al. (2018) found that “students’ conceptions of their STEM education was more positive when their teachers were highly skilled, held high expectations, and showed personal interest in students” (p. 82) The teacher’s beliefs about giftedness can influence teaching practice as well (Berman et al., 2012). A spectrum of teacher attitudes regarding the gifted have been found, both positive attitudes (Megay-Nespoli, 2001) and negative attitudes (Geake & Gross, 2008). Geake and Gross identified three affective perceptions that teachers had toward the gifted: high cognitive abilities, social misfits, and antisocial leaders. Farkas and Duffett (2008) found that 73% of teachers in a national teacher survey agreed (26% strongly agree, 48% somewhat agree) with the statement “Too often, the brightest students are bored and under-challenged in school- we’re not giving them a sufficient chance to thrive” (p.52).

Characterization of Gifted and Talented

Teachers may have a preconceived view of giftedness that influences how they characterize gifted students. Both preservice and inservice teachers have stereotypical views of gifted students (Carman, 2011; Megay-Nespoli, 2001). Preservice teachers agreed with statements like, “Gifted students can make it on their own without teacher direction,” “an effective way to identify gifted students is to look for students with the
highest grades,” and “gifted students need longer assignments since they work faster” (Megay-Nespoli, 2001, p. 179). However, possible problems can arise if the needs of gifted students are not met based on specific characteristics of giftedness (Clark, 2008).

Clark (2008) characterized gifted students in the following areas: cognitive function, affective function, physical/sensing function, and intuitive function. Each characteristic listed within these functions is associated with a need and a concomitant problem that may occur in the classroom if the need is not being met. It is through these characteristics that gifted students can be identified in the classroom and the associated need can be met. For advanced comprehension, Clark stated that student need “to be given access to challenging curriculum and intellectual peers” if they express that gifted cognitive characteristic (p. 74).

**Professional Development**

Teacher training could influence a teacher’s ability to work with gifted and talented students. Some studies verify that training in gifted education positively influences teacher beliefs (Berman et al., 2012) and skill in the classroom (Hansen & Feldhusen, 1994), while other studies have shown less of a discrepancy between trained and untrained teachers in their perceptions of giftedness (Adams & Pierce, 2004; Guskin, Peng & Majd-Jabbari, 1988).

Professional development can be utilized to correct misinformation regarding the education of the gifted and talented. Megay-Nespoli (2001) found that confidence in “identifying, assessing, adapting and individualizing instruction for academically talented learners” increased after professional development in differentiation for preservice
elementary school teachers, whereas the confidence decreased for preservice teachers who did not receive the professional development (p. 179). Preservice teachers were also better able to identify differentiation strategies specifically for advanced learners after the professional development (Megay-Nespoli, 2001).

Professional development should also directly address negative teacher attitudes toward giftedness (Geake & Gross, 2008). Teachers who have completed professional development are “more positive about both the intellectual and social leadership characteristics of gifted children and are less negative about their potential social noncompliance” (Geake & Gross, 2008, p. 225).

Researchers in the field of gifted education have outlined challenges and possible solutions when teaching gifted students (VanTassel-Baska & Stambaugh, 2005), but research does not exist specifically for working with students in the programmatic areas of agricultural education (classroom, SAE, and FFA). More research is needed, specifically related to professional development with agriculture teachers regarding the education of gifted students in their classroom.

**Theoretical Framework**

The theoretical framework for this study was the differentiated model of giftedness and talent (DMGT). The model was developed by Francoys Gagné (Stoeger, 2004). The DMGT model (see Figure 1) is most known for its distinction between the terms *gifted* and *talented*, a dichotomy that has been met with controversy by many scholars in the field of gifted education (Borland, 1999; Hany, 1999; Robinson, 1999).
Revised in 2000, 2004 and 2008, the DMGT model has become more complex and dynamic to account for variability in gifted student performance. Gagné explains that humans simplify causality and that the DMGT identifies many variables that contribute to the complexity of giftedness and talent.

The dichotomy between giftedness and talent can be juxtaposed between the following terms Gagné (2010) used to illustrate the concept: potential/realization, aptitude/achievement, and promise/fulfillment (Gagné, 2010). To further differentiate
gifts from talents the terms potential, aptitude, and promise describe giftedness (Gagné, 2010). Realization, achievement, and fulfillment are used to describe talent (Gagné, 2010).

The model has four major components: natural abilities, catalysts, developmental process, and competencies. The catalysts consist of chance, environmental, and intrapersonal catalysts. For this study, the focus was on the environmental catalysts section of the model, which involves teachers, curriculum, pedagogy, grouping, and acceleration, as well as their influences on the developmental process. The model suggests that all of these components influence the developmental process of the gifted student.

Natural Abilities/Gifts

The model defines giftedness as “the possession and use of untrained and spontaneously expressed natural abilities (i.e., aptitudes or gifts) in at least one ability domain, to a degree that places an individual among the top 10% of age peers” (Gagné, 2000, p. 67). This model allows for variability among the gifted as well. The model incorporates the following labels to differentiate between degrees of giftedness: mildly, moderately, highly, exceptionally, and extremely; suggesting also that school programs should tailor their gifted programs to the ability and domain variability found in their gifted students (Gagné, 2000).

Giftedness includes the following domains: intellectual, creative, social, perceptual, muscular, and motor control (Gagné, 2010). Intellectual, creative, social, and perceptual are categorized as mental domains, whereas muscular, and motor control are
physical domains (Gagné, 2010). Each domain is listed in the model (see Figure 1). The list for the intellectual domain includes “general intelligence (‘g’ factor); fluid, crystalized reasoning, verbal, numerical, spatial (RADEX); memory, procedural, declarative” in the model (Gagné, 2010).

The intellectual domain in the Differentiated Model of Giftedness and Talent can be further defined by the cognitive function characteristics outlined by Clark, likewise the social domain by the affective function characteristics. For example, “advanced comprehension” and “accelerated pace of thought processes” are characteristics of giftedness in the intellectual domain (Clark, 2008).

**Developmental Process**

From natural abilities, the model flows into the developmental process (see Figure 1). The developmental process is characterized by learning that can be both formal and informal (Gagné, 2000). It is in this developmental process that giftedness is transformed into talent, influenced by intrapersonal, environmental, and chance catalysts (Gagné, 2000, 2004, 2010). Unique to the 2008 version of the model, the developmental process is made up of the following categories: activities (e.g., access, content, format), process (e.g., stages, pace, turning points), and investment (e.g., time, money, energy; Gagné, 2010).

**Intrapersonal Catalysts**

The process by which natural abilities are transformed into talents is influenced by physical and psychological factors known as intrapersonal catalysts, represented by
the middle section of the model (Gagné, 2000). These are the factors that influence the developmental process that occurs within the individual. Gagné (2000) says that factors such as a student’s self-management and motivation sustain the talent development process, whereas certain behavior and temperament can block talent development.

Intrapersonal catalysts are divided into two broader categories, traits and goal management (Gagné, 2010). Traits consist of physical traits (e.g., appearance, handicaps, health) and mental (e.g., temperament, personality, resilience; Gagné, 2010). Goal management is broken into three categories: awareness (e.g., self & others: strengths & weaknesses), motivation (e.g., values, needs, interests, passions), and volition (e.g., autonomy, effort, perseverance; Gagné, 2010).

Environmental Catalysts

Environmental catalysts are the converse of intrapersonal catalysts and involve all influences outside of the individual. They are listed as the following: milieu (e.g., physical, cultural, social, familial), individuals (e.g., parents, family, peers, teachers, mentors), and provisions (e.g., curriculum, pedagogy, grouping, acceleration; Gagné, 2010). Environmental catalysts were one of the focuses of this study. To contextualize the environmental catalysts, the three-component model of school-based agricultural education as an environmental catalyst will now be discussed.

The three-component model of school-based agricultural education. The agriculture program exists as an environmental catalyst, involving both the programmatic structure and the agriculture teacher. School-based agricultural education is made up of three components: classroom, supervised agricultural experience (SAE), and the FFA
organization (henceforth referred to as the FFA; see Figure 2; National FFA Organization, 2018). The FFA mission is to make “a positive difference in the lives of students by developing their potential for premier leadership, personal growth and career success through agricultural education” (National FFA Organization, 2019). Personal growth coincides with the DMGT model’s developmental process and career success mirrors the DMGT model’s competencies in a career field.

Figure 2. The three-component model of school-based agricultural education (National FFA Organization, 2019a).

These environmental catalysts are important to discuss because systematic learning and environmental influences can also have a negative effect on a student’s development (Gagné, 2000). A teacher’s classroom environment can have either positive catalysts, negative catalysts, or both. This concept emphasizes the role of the teacher in the talent development process.
**Chance**

The DMGT model includes chance as a factor influencing the development of gifted students (Gagné, 2010). Chance encompasses the natural abilities, environmental catalysts, intrapersonal catalysts, and the developmental process potions of the model (see Figure 1; Gagné, 2010). Chance influence is unpredictable and can either positively or negatively impact an individual’s path. Gagné provides two examples of chance, one being your family of origin and another being the programming available at your particular school.

**Competencies/Talents**

The differentiated model of giftedness and talent concludes with the section on fields of talent, known as systematically developed skills or competencies, that are divided into the following fields: academic, technical, science and technology, arts, social services, administration/sales, business operations, games, sports & athletics (see Figure 1; Gagné, 2010). Gagné defines talent as “the superior mastery of systematically developed abilities (or skills) and knowledge in at least one field of human activity, to a degree that places an individual within the top 10% of age peers who are (or have been) active in that field” (Gagné, 2000, p. 67). Talent exists across many domains, including CTE and agriculture (Gagné, 2010).

Gagné’s model is comprehensive because it includes the outside influences, as well as the internal factors that influence a student’s success, including underachievement. Gagné (2000) suggests that a gifted student must participate in a developmental process in order to be considered talented. This is an interesting
perspective to have in regards to the gifted identification process as a teacher, suggesting that if talent is seen, then a student must be gifted (Gagné, 2000).

**Agricultural Competencies**

In the 2008 update of the DMGT model, agriculture was included under a technical field that was added to the list, and vocational education has included under the academic field (see Figure 1; Gagné, 2010). This would suggest that a gifted student can participate in agricultural education but not develop talent in agriculture if the developmental process does not take place with the appropriate positive catalysts (i.e., interpersonal and environmental). Gagné states that talents are specific to a human activity or career field (Gagné, 2000). This would also suggest that gifts are not instantly compatible with a specific career field, and a developmental process must take place.

**Differentiated Model of Giftedness and Talent Analysis**

The DMGT model can be used for what Gagné describes as *DMGT-analysis* (Gagné, 2000). The model not only includes definitions of giftedness and talent but can serve additional functions as well. A researcher can evaluate research articles for the independent variables included in the model or structure a research study using the model (Gagné, 2000). This also means that individual student case studies can be evaluated by the model to determine the student’s natural abilities, interpersonal and environmental catalysts, chance factors, and competencies.
Borich Needs Assessment Model

This study utilized the Borich (1980) needs assessment model to evaluate the professional development needs of participants in the study. Borich states that “a training need can be defined as a discrepancy between an educational goal and trainee performance in relation to this goal” (p. 39). This assessment model allows items to be ranked based on the specific criteria. Items are provided to participants in a list and then participants score the items based on two criteria. Importance and ability are the two criteria most frequently used in agricultural education research (McKim & Saucier, 2011). The difference found between the two criteria is called the discrepancy. McKim and Saucier developed an Excel™-based system to aid in this calculation, allowing the data to be analyzed systematically.

Conceptual Framework

The DMGT was utilized to support the argument that theoretically, gifted students can be found in agriculture classrooms and that agricultural education can influence the development process for gifted students (see Figure 3). For this study, I focused on the influence that agriculture teachers have on the developmental process of gifted students, by studying their attitudes, characterization of gifted students, and their professional development needs.

The entire programmatic structure of agricultural education, involving the classroom, SAE, and FFA, is designed as a model that will develop students (National FFA Organization, 2018). Student development is the common factor between both the
Figure 3. The conceptual framework utilized for this study, adapted from the differentiated model of giftedness and talent (Gagné, 2010) and the three-component model of school-based agricultural education (National FFA Organization, 2019a).

three-component model of agricultural education and the differentiated model of giftedness and talent. Thus, both theoretical models were combined to constitute the conceptual framework that guided this study.

The DMGT identifies both individuals and provisions as environmental catalysts (Gagné, 2010). To mobilize the theoretical framework in the conceptual framework, *individuals* are defined as agriculture teachers and *provisions* are defined broadly as agricultural education programs. Agriculture teachers as environmental catalysts are further broken into the following categories: demographics and attitudes. Agriculture teachers vary in their method of licensure, gender, years of teaching, and community type. Additionally, teachers have a variety of attitudes toward gifted students (Berman et al., 2012; Geake & Gross, 2008; Megay-Nespoli, 2001). Each of these demographic variables could influence teacher attitudes. This study focused on identifying the attitudes...
that agriculture teachers have toward the education of gifted students in their classrooms.

To understand the characteristics of gifted and talented students in agricultural education, students can be described by both their natural abilities and competences. While teachers may have stereotypical views of gifted students (Carman, 2011; Megay-Nespoli, 2001), I aimed to identify specific characteristics that may be more descriptive of gifted agriculture students. General cognitive characteristics, such as very original thinkers, are associated with the natural abilities (i.e., gifts) portion of the conceptual framework. Characteristics that are specific to agricultural education, such as excellent in SAE programs, are associated with the competencies (i.e., talents) portion. It is through the developmental process that students develop these domain specific competencies (Gagné, 2000, 2010), which are the skills associated with agriculture and agricultural education.

Agriculture teachers have a variety of professional development needs suggested in the needs assessment literature in the field (Garton & Chung, 1997; Layfield & Dobbins, 2003; Sorensen, Tarpley, & Warnick, 2010). Because professional development in gifted education has been seen to influence teachers in other subjects (Berman et al., 2012; Geake & Gross, 2008; Hansen & Feldhusen, 1994; Megay-Nespoli, 2001), professional development needs related to agriculture teachers working with gifted students in their classrooms are of interest. Each of the professional development needs measured in this study is associated with one of the programmatic areas of agricultural education that involve gifted students, such as helping gifted students identify their agricultural interests in the classroom. Because agricultural education is based on the
three-component model, agriculture teachers may have different professional
development needs based on each component (i.e., classroom, SAE, FFA).

According to Gagné (2000), environmental catalysts can have either a positive or
a negative impact on gifted students. This study aimed to identify these potential impacts
by identifying teacher attitudes, their characterization of gifted agriculture students, and
their professional development needs in working with the gifted.
CHAPTER III
METHODS AND PROCEDURES

The purpose of this study was to describe school-based agriculture teachers’ attitudes and characterization of gifted students and identify professional development needs for working with gifted students in the agriculture program. By understanding agriculture teacher attitudes and how they characterize the gifted, agriculture teachers can improve their role in the developmental process of technical agriculture talent in gifted students.

The following research questions guided this study.

1. What is the demographic profile of school-based agriculture teachers, including preservice preparation to work with the gifted (i.e., percent of gifted students in agriculture program, method of licensure, gender, years of teaching experience, and community type)?

2. What are the attitudes of school-based agriculture teachers regarding the education of gifted students (i.e., value, teaching, focus, power struggle, agricultural education) and how do these compare by method of licensure, gender, years of teaching, and community type?

3. How do school-based agriculture teachers characterize gifted agriculture students?

4. What are the professional development needs of inservice agriculture teachers related to the education of gifted students?

Through this chapter, the methods for implementing this research study are discussed through the research design, population, sample, and instrumentation. Data collection and data analysis are outlined in detail, as well as how the data are reported at the conclusion of the study. The survey pilot study, validity, and reliability are also discussed.
Research Design

This quantitative study utilized descriptive statistics to evaluate results using an online survey method. The survey was distributed to participants using Qualtrics, an online survey software, in the spring of the 2018-2019 school year. According to Dillman (2007), online surveys are a low-cost data collection method that increases the speed at which the results from a larger sample population can be reported. Online surveys can be distributed over a large geographic area within a short period of time (Sue & Ritter, 2019).

Population and Sample

A national random sample of school-based agriculture teachers was utilized for this study. The National FFA Organization is able to generate and distribute random samples from their national database of agriculture teachers. For this study, middle and high school agriculture teachers with a chartered FFA chapter were utilized.

The random sample was requested from the National FFA Organization to minimize selection error. The National FFA Organization reports over 13,000 agriculture teachers and FFA advisors throughout the nation, including Puerto Rico and the U.S. Virgin Islands (National FFA Organization, 2019b). The sample was proportional to each of the National FFA regions (i.e., western, eastern, southern, central), so that one region was not oversampled when compared to other regions (National FFA Organization, 2018). All school-based agriculture teachers in the U.S. are required to have a chartered FFA chapter, and National FFA is in charge of the chartering process, thus having all of
their information. The potential for frame error does exist, but mostly accounted for through “bounced” emails where the email returns to the sender due to the email account that the information was sent to being no longer active. Forty-five emails bounced and were removed from the sample frame. Because this study is implemented with a national random sample, the sample obtained is representative of the entire population of school-based agriculture teachers.

The sample size determinant formulas of Dillman (2007), Krejcie and Morgan (1970), and Salant and Dillman (1994), were utilized to calculate sample size. Krejcie and Morgan list 5% as the acceptable margin of error for any sample of categorical data. To calculate a national random sample of agriculture teachers in the U.S., the Complete Sample Sizes Needed for Population Sizes and Characteristics table (Dillman, 2007; Salant & Dillman, 1994; Vaske, 2008) was utilized. To determine a sample needed for a population of 13,000 agriculture teachers with a 95% confidence level, 5% sampling error, and a 50/50 split, 370 participants were needed (Dillman, 2007; Salant & Dillman, 1994; Vaske, 2008). Because significant differences have been found between survey delivery mode for agriculture teachers (Fraze, Hardin, Brashears, Haygood, & Smith, 2003), oversampling was used to counteract a lower response rate. For this study, 370 responses were needed for the results to be generalizable, accounting for oversampling and potential error between respondents and nonrespondents. A sample of 740 agriculture teachers was generated by the National FFA Organization, including only names and email addresses, to combat low survey response rates.
Instrumentation

The survey instrument (Appendix A) was comprised of six parts: introductory demographic information, gifted education statements, gifted agriculture student characteristics, professional development needs, and general demographic information. There were 54 questions, but 51 questions for alternatively licensed participants as three of the items related to teacher preparation program. Because many of the survey question items were organized in matrices, the survey took participants approximately 10 minutes to complete.

Part One: Introductory Demographic Information

Part one of the instrument was researcher developed and guided by literature. Participants were asked if they were a current agriculture teacher, to further verify that the random sample is made up of current agriculture teachers. If participants answered “no,” the survey skipped to the end of the survey and their responses were not included in the study. Participants were asked, based on their own perception, what percentage of their agriculture students were identified as gifted by them or their school. Participants were asked how they obtained their license to teach agriculture, and if they answered “licensed undergraduate teacher preparation program” or “licensed graduate teacher preparation program,” they were asked if their teacher preparation program addressed working with gifted students and if they felt adequately prepared to meet the needs of this population using a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). Teachers were also asked about the amount of class time spent addressing gifted
education with the following options: no time, only small amount in one class, a small amount in more than one class, one whole class, or more than one class.

**Part Two: Gifted Education Statements**

Part two of the instrument was researcher developed and guided by literature. To measure agriculture teacher attitudes toward gifted education, Gagné and Nadeau’s (1991) opinions about the gifted and their education attitude questionnaire that has been used by numerous other studies (Cooper, 1999; Cross, Cross, & Frazier, 2013; Garni, 2012; Lassig, 2009; McCoach & Siegle, 2007; McCuller, 2011; Plunkett & Kronborg, 2011; Sheffield, 2018; Troxclair, 2013) and two of the items were adapted and utilized in this study. Reliability estimates using Cronbach’s Alpha coefficient for the original 34 statement questionnaire, was $\alpha = 0.73$ overall (Garni, 2012). Cross et al. had an overall reliability of $\alpha = 0.81$.

Teachers rated the researcher developed items using a 6-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = agree, 6 = strongly agree). A varying number of statements form the following constructs for value (2 statements), teaching (3 statements), focus (2 statements), power struggle (3 statements), and agricultural education (2 statements). The number of items per construct were reduced from the original attitudes questionnaire to shorten the length of the survey. This could negatively impact the reliability of the constructs, and thus caution should be taken when interpreting results based on the reliability measures.
Part Three: Gifted Agriculture Student Characteristics

Part three of the instrument was researcher developed based on the literature. A series of characteristics were adapted from gifted education literature (Clark, 2008), as well as the three programmatic areas of agricultural education (National FFA Organization, 2019a). Teachers rated the items using a 4-point Likert scale based on agreement (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree).

The items developed from Clark’s (2008) characteristics charts were: very quick to memorize information, very developed in their vocabulary, perfectionists, outstanding problem solvers, very original thinkers, very goal-oriented, excellent oral communicators, and excellent leaders. The items developed specifically with STEM (Science, Technology, Engineering, and Math) education in mind were as follows: excellent in science, excellent in mathematics, and excellent in technology use. The items developed from agricultural education were as follows: excellent working with their hands, excellent entrepreneurs, excellent in SAE programs, and very active in FFA. Clark’s (2008) characteristics, the STEM education items, and the agricultural education items were chosen for their compatibility with the three-component model of agricultural education.

Each of the items listed above were divided into the three programmatic areas of agricultural education (classroom, SAE, and FFA) by the researcher. The following student characteristics were categorized as the classroom portion of the three-component agricultural education model: excellent in science, excellent in mathematics, very quick to memorize information, very developed in their vocabulary, and perfectionists. The following student characteristics were categorized as the SAE portion of the three-
component agricultural education model: excellent working with their hands, excellent entrepreneurs, excellent in SAE programs, excellent in technology use, outstanding problem solvers, and very original thinkers. The following student characteristics were categorized as the FFA portion of the three-component agricultural education model: very active in FFA, very goal oriented, excellent oral communicators, and excellent leaders.

**Part Four: Professional Development Needs**

The Borich (1980) model of ability and importance was utilized on a 4-point Likert scale of importance (1 = *no importance*, 2 = *moderately low importance*, 3 = *moderately high importance*, 4 = *very high importance*) and ability (1 = *no ability*, 2 = *moderately low ability*, 3 = *moderately high ability*, 4 = *very high ability*). Items were generated based on previous needs assessment literature in agricultural education and adapted for this study (Garton & Chung, 1997; Layfield & Dobbins, 2003; Sorensen et al., 2010). Items were also researcher developed based on gifted education literature, pertaining to challenging content, additional content, and differentiation.

Each of the professional development items was divided into the three programmatic areas of agricultural education (i.e., classroom, SAE, and FFA) by the researcher. The following professional development items were categorized as the classroom portion of the three-component agricultural education model: helping gifted students identify agricultural interests, motivating gifted students in agriculture classes, teaching gifted students problem-solving skills, differentiating instruction for gifted students in agriculture classes, providing challenging agriculture curriculum for gifted
students, providing additional content in the curriculum for gifted students, managing the behavior of gifted students, and utilizing technology with gifted students. The following professional development items were categorized as the SAE portion of the three-component agricultural education model: helping gifted students choose an SAE project, teaching gifted students record keeping skills, helping gifted students complete SAE projects, and helping gifted students apply for proficiency awards. The following professional development items were categorized as the FFA portion of the three-component agricultural education model: motivating gifted students to join the FFA, working with gifted FFA members in the FFA chapter, working with gifted students in leadership roles, working with gifted students on Career Development Event teams, and helping gifted students apply for FFA degrees.

Part Five: General Demographic Information

General demographic information was collected with five of the survey questions at the conclusion of the survey. Participants were asked for their gender (i.e., male or female); number of years they had been teaching using whole numbers; their method of licensure (i.e., licensed undergraduate teacher preparation program, licensed graduate teacher preparation program, alternative licensure, or non-licensed); and in what type of community they teach (i.e., metro urban area: greater than 200,000 in population, urban: between 50,000 and 199,999 in population, and rural: less than 2,500 in population.

Data Collection

Dillman’s (2007) Tailored Design was utilized for communication with
participants and distribution of the survey. The first email was the presurvey email, introducing participants to the study and indicating that an email with a personalized survey link would be sent out within the next few days (see Appendix B). The presurvey email also contained the survey link if participants wanted to complete the survey early. The second email, sent out the next day, contained the survey link, encouraging participants to complete the survey in approximately 10 minutes (Appendix C). The third email, sent five days after the second email, was only sent to unfinished respondents and contained the survey link, encouraging participants to complete the survey if they had not (Appendix D). The fourth email was sent out five days after the third email to unfinished respondents containing the survey link and encouraging participation in the study (Appendix E).

Survey completion was incentivized through a drawing of two $50 Amazon gift cards and five $20 Amazon gift cards. At the conclusion of the survey, participants had the option to enter into the drawing by clicking the link on the last page of the survey that re-routed participants to a separate survey for the drawing. The survey for the drawing displayed a page for participants to record their name and email address, to be contacted after the drawing if their name was selected. A thank you email was sent to participants who completed the survey after the gift card recipients were randomly selected at the conclusion of the study (see Appendix F).

A sample frame of 741 emails was obtained from National FFA. Four emails were removed from the frame, as those individuals were included in the pilot study, and 737 pre-survey emails were sent out. Forty-five emails bounced and were removed from the
frame and five participants were not current agriculture teachers, leaving a sample frame of 687 participant emails. Utilizing Qualtrics, 119 surveys were collected. One individual did not complete the IRB consent item and exited the questionnaire. One survey was not usable, as only the IRB consent item was completed. Thus, a total of 117 usable surveys were obtained (17.03% response rate).

In order to address nonresponse bias, Lindner, Murphy, and Briers (2001) provide examples where contacting nonrespondents by phone was used to collect nonresponse data, but suggest comparing early to late responses as an alternative. Because the sample frame did not include phone numbers, nonrespondents could not be contacted by phone. To evaluate nonresponse bias, responses after the day of the first and second email (totaling 66 responses) were considered early responders. Responses received after the day of the third and fourth email (totaling 49 responses) were considered late responders and compared with the early responders using an independent samples $t$ test to determine if nonresponse error was significant. After evaluating each of the attitude constructs, no significant differences were found between groups. Thus, I assumed no nonresponse bias was present.

Participant information remained confidential throughout the entirety of the study, with all data stored in a restricted-access folder on Box.com. Surveys were not anonymous, as participants received a personalized link in order to receive reminder emails to complete the survey. Permission was obtained from the Institutional Review Board before beginning the study and all procedures of ethical research were followed, reducing the risk of psychological, emotional, or physical harm to the participants.
Pilot Study, Validity and Reliability

A panel of experts, consisting of a professor in the College of Education and Human Services specializing in gifted education and two professors in the College of Agriculture and Applied Sciences at Utah State University specializing in agricultural education, reviewed the instrument for content and face validity before it was distributed to participants. Changes to the instrument were made based on input from these experts.

A pilot test was completed before distributing the instrument to the sample. The pilot test consisted of a sample of 30 Utah agriculture teachers with names and email addresses provided by Utah State University’s School of Applied Sciences, Technology & Education, and 21 responses were received. The list of contact information for the pilot test was cross-referenced with the national random sample provided by the National FFA Organization to ensure that teachers were not in both samples. To reduce measurement error, reliability estimates Cronbach’s alpha were calculated on the attitude constructs (i.e., value, teaching, focus, power struggle, agricultural education) using the IBM Statistical Package for Social Science (SPSS). According to Nunnally and Bernstein (1994), Cronbach’s alpha reliability estimates should be greater than or equal to 0.70 to be considered acceptable. Table 1 lists the constructs and the reliability estimates of the pilot and current study (post hoc).

The value, teaching, and focus constructs were found to be reliable. The three power struggle items did not create a reliable construct and instead were analyzed by individual items. The agricultural education construct was included in the analysis, although the reliability measure produced a Cronbach’s alpha of less than 0.70. The
Table 1

*Construct Reliabilities for Pilot Study and Current Study*

<table>
<thead>
<tr>
<th>Instrument constructs</th>
<th>Pilot study</th>
<th></th>
<th>Post hoc</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>α</td>
<td>n</td>
<td>α</td>
</tr>
<tr>
<td>Value</td>
<td>21</td>
<td>.92</td>
<td>115</td>
<td>.89</td>
</tr>
<tr>
<td>Teaching</td>
<td>21</td>
<td>.33</td>
<td>115</td>
<td>.76</td>
</tr>
<tr>
<td>Focus</td>
<td>21</td>
<td>.80</td>
<td>114</td>
<td>.74</td>
</tr>
<tr>
<td>Power Struggle</td>
<td>21</td>
<td>.07</td>
<td>114</td>
<td>.51</td>
</tr>
<tr>
<td>Agricultural Education</td>
<td>21</td>
<td>.66</td>
<td>115</td>
<td>.67</td>
</tr>
<tr>
<td>Overall Attitude</td>
<td>21</td>
<td>.53</td>
<td>113</td>
<td>.82</td>
</tr>
</tbody>
</table>

construct included only two items. If the construct was larger, there would have been more potential for it to be reliable. Due to limiting the length of the survey, only two items were included in the survey for the agricultural education construct. For Cronbach’s Alpha measures, 0.90 and above is considered excellent, 0.80 and above is good, 0.70 and above is acceptable, 0.60 and above is questionable, 0.50 and above is poor, and less than 0.50 is unacceptable (George & Mallery, 2003, p.231). Because the agricultural education construct reliability was close to 0.70, the findings should be questioned and readers should be cautious of the results. More research should be conducted with the most reliable constructs of this study.

**Data Analysis**

There were four research questions, and I will describe the analysis for each question. Each research question was evaluated using the following statistical analysis (see Appendix G for data analysis tables).
Research Question One

Research Question #1 asked, “What is the demographic profile of agriculture teachers, including preservice preparation to work with the gifted?” Demographic information was collected at the beginning and end of the survey. Variables measured were the following: percentage of students identified as gifted (continuous), method of licensure (categorical), addressed/prepared to teach gifted (continuous), time spent addressing gifted (categorical), gender (dichotomous categorical), years teaching (continuous), and community type (categorical).

Percentage of students identified as gifted was analyzed using descriptive statistics and the percentage were reported. The two scaled items (addressed gifted education/prepared to teach gifted) were analyzed and reported using means and standard deviations. Method of licensure, time spent addressing gifted, gender, years of teaching, and community type were analyzed through descriptive statistics, reported as frequencies and percentages.

Research Question Two

Research Question #2 asked, “What are the attitudes of agriculture teachers regarding the education of gifted students?” Using a researcher developed questionnaire, statements were divided into the following constructs: value (continuous/scaled), teaching (continuous/scaled), focus (continuous/scaled), and agricultural education (continuous/scaled). Using descriptive statistics, means and standard deviations for the constructs were reported. High means indicate support for gifted learners in the following constructs: value, teaching, focus, and agricultural education. High means for the power
struggle items indicate a greater struggle for teachers when working with gifted students, and a lower mean is more desirable.

Relationships in the data for research question two were analyzed to determine if method of licensure, gender, years of teaching, and community type influence teachers’ attitudes of gifted education. Each of the constructs in research question two (value, teaching, focus, power struggle, agricultural education) were going to be analyzed by method of licensure (ANOVA), gender (t test), years of teaching (Pearson’s product moment correlation), and community (ANOVA). Although due to lack of normality and homogeneity of variance in portions of the data, non-parametric tests were used for method of licensure (Kruskal-Wallis), gender Mann-Whitney U), and community type (Mann-Whitney U). For each relationship, effect sizes were also reported.

For t tests, the data must be normally distributed based on the Kolmogorov-Smirnov test for normality (Ghasemi & Zahediasl, 2012; Siegel, 1957). A Mann-Whitney U test was the nonparametric test used in place of the t test that can evaluate the nonnormal attitude construct data (Siegel, 1957). Specifically, when evaluating method of licensure by the attitude constructs, all constructs failed the homogeneity of variance test based on mean and the data was not consistently normal across all constructs (i.e., at least one licensure type in each construct was not normal). Thus, a Kruskal-Wallis test was the nonparametric test used in place of the ANOVA originally planned (Siegel, 1957).

Pearson’s product moment correlation was used to represent the correlation coefficient, represented by the term r, which is reported in both magnitude and direction.
To interpret the magnitude of the correlation Davis (1971) conventions were used. Table 2 describes the correlation coefficient scale and the corresponding convention or descriptor.

Table 2

Davis’s (1971) Conventions for Interpreting Pearson’s \( r \)

<table>
<thead>
<tr>
<th>Effect Size</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very strong association</td>
<td>.70 or higher</td>
</tr>
<tr>
<td>Substantial association</td>
<td>.50 to .69</td>
</tr>
<tr>
<td>Moderate association</td>
<td>.30 to .49</td>
</tr>
<tr>
<td>Low association</td>
<td>.10 to .29</td>
</tr>
<tr>
<td>Negligible association</td>
<td>.01 to .09</td>
</tr>
</tbody>
</table>

Research Question Three

Research Question #3 asked, “How do agriculture teachers characterize gifted agriculture students?” Descriptive statistics were used to analyze the list of characteristics in the instrument (Appendix A) as continuous/scaled variables. Means and standard deviations for each individual characteristic were reported. The characteristics were ranked and placed in an ordered list based on their mean, to determine what characteristics were most and least common in gifted agriculture students.

Research Question Four

Research Question #4 asked, “What are the professional development needs of inservice agriculture teachers related to the education of gifted students?” To determine professional development needs, Borich (1980) needs assessment model was utilized. Means and standard deviations were collected based on 4-point Likert scales for
importance and ability. A mean weighted discrepancy score (MWDS) was calculated in order to determine the greatest professional development needs using the following formula:

\[
\frac{\sum [(Importance - Ability) \times Importance Mean]}{Number of Observations}
\]

*Figure 4.* Equation used for the needs assessment (Borich, 1980).

The mean ability was subtracted from the mean for importance, and then multiplied by the importance mean to determine the weighted discrepancy score. Each weighted discrepancy score was summed, and then divided by the total number of observations in order to rank the professional development items. To simplify the calculation process, the mean weighted discrepancy score calculator excel document developed by McKim and Saucier (2011) was utilized.
CHAPTER IV

RESULTS AND FINDINGS

The purpose of this study was to describe school-based agriculture teachers’ attitudes and characterization of gifted students, and identify professional development needs for working with gifted students in the agriculture program. By understanding agriculture teacher attitudes and how they characterize the gifted, agriculture teachers can improve their role in the developmental process of technical agriculture talent in gifted students.

The following research questions guided this study:

1. What is the demographic profile of school-based agriculture teachers, including preservice preparation to work with the gifted (i.e., percent of gifted students in agriculture program, method of licensure, gender, years of teaching experience, and community type)?

2. What are the attitudes of school-based agriculture teachers regarding the education of gifted students (i.e., value, teaching, focus, power struggle, agricultural education) and how do these compare by method of licensure, gender, years of teaching, and community type?

3. How do school-based agriculture teachers characterize gifted agriculture students?

4. What are the professional development needs of inservice agriculture teachers related to the education of gifted students?

Through this chapter, the results of the research study are discussed by research question, describing the general findings, trends, and significance.
Results for Research Question One

Question one was to describe the demographic profile of agriculture teachers, including the level of training in gifted and talented education within their preservice preparation program. Data were analyzed using descriptive statistics, reporting means, standard deviations, frequencies, and percentages in the findings.

Participants were asked what percentage of their students they perceived as gifted. The mean was 9.82% \((SD = 12.44)\), with the minimum of 0 and the maximum of 75%. For participants who submitted a range, the median was used as their answer, and for participants who said “less than…” the response was omitted. Six responses that reported “unknown” and “don’t know” were also omitted from analysis. One response that indicated 100% was also omitted.

For method of licensure, the majority (70.10%) completed a licensed undergraduate teacher preparation program, where 16.20% were licensed through a graduate teacher preparation program and 13.70% were alternatively licensed (Figure 5).

\[ n = 16, \quad 13.70\% \]
\[ n = 19, \quad 16.20\% \]
\[ n = 82, \quad 70.10\% \]

Figure 5. The method by which teachers received licensure \((n = 117)\).
Of the 86.30% that completed a teacher preparation program (i.e., not alternatively licensed), participants were asked if their teacher preparation program addressed working with gifted students and if their teacher preparation program adequately prepared them to meet the needs of gifted students (see Figure 6). Results were aggregated into agree-disagree for ease of reporting. Of those that competed a licensed undergraduate teacher preparation program or licensed graduate teacher preparation program, 62% agreed that their program addressed working with gifted students. Although, when asked if they were adequately prepared to meet the needs of gifted students, only 54.50% agreed.

Table 3 shows the unaggregated data. The majority (33%) of participants somewhat agreed that their teacher preparation program addressed the topic of working with gifted students. The majority (29.3%) of participants somewhat agreed that their teacher preparation program adequately prepared them to meet the needs of students.
Table 3

Extent that the Teacher Preparation Program Addressed Gifted and Prepared Teachers to Meet Needs

<table>
<thead>
<tr>
<th>Teacher preparation</th>
<th>n</th>
<th>f</th>
<th>%</th>
<th>f</th>
<th>%</th>
<th>f</th>
<th>%</th>
<th>f</th>
<th>%</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>My teacher preparation program addressed the topic of working with gifted students.</td>
<td>100</td>
<td>6</td>
<td>6.0</td>
<td>19</td>
<td>19.0</td>
<td>13</td>
<td>23.0</td>
<td>33</td>
<td>33.0</td>
<td>26</td>
<td>26.0</td>
</tr>
<tr>
<td>My teacher preparation program adequately prepared me to meet the needs of students identified as gifted in my agriculture classes.</td>
<td>99</td>
<td>7</td>
<td>7.1</td>
<td>20</td>
<td>20.2</td>
<td>18</td>
<td>18.2</td>
<td>29</td>
<td>29.3</td>
<td>23</td>
<td>23.2</td>
</tr>
</tbody>
</table>

*Note.* Real limits: 1.0-1.49 = Strongly disagree; 1.50-2.49 = Disagree; 2.50-3.49 = Somewhat disagree; 3.50-4.49 = Somewhat agree; 4.50-5.49 = Agree; 5.50-6.00 = Strongly agree.
identified as gifted in my agriculture classes. The data for teacher preparation program, by means and standard deviations, is included in Table 3. The mean for “My teacher preparation program addressed the topic of working with gifted students” was 3.63 ($n = 100, SD = 1.30$) and, by the real limits scale, can be interpreted that teacher somewhat agreed with this statement. The mean for “My teacher preparation program adequately prepared me to meet the needs of students identified as gifted in my agriculture classes” was 3.47 ($n = 99, SD = 1.30$) and, by the real limits scale, can be interpreted that teachers somewhat disagree with this statement.

Also included in research question one was the amount of time spent addressing gifted education in the teacher preparation program, analyzed as a categorical variable. The majority of teachers received their training in gifted and talented as a “small amount in more than one class” (30%; see Figure 7). Gender of participants ($n = 118$) was majority female ($n = 62, 52.54%$), followed by 35.60% male ($n = 42$), and 11.86% that did not complete the question ($n = 14$).

For number of years teaching agriculture, there were 104 responses. Data were collected as a continuous variable and then placed in 5-year ranges for ease of reporting. The mean number of years was $M = 13.54$ ($SD = 10.35, n = 104$). A majority of participants was in its first through fifth year teaching agricultural education ($n = 32, 30.78%$), with only nine participants having taught agriculture for 31 years or more (Table 4).

Community type was reported as a categorical variable with population ranges for each category. A majority of the participants taught in a rural (44.20%) or urban cluster
Figure 7. Time spent addressing gifted education in the teacher preparation program (n = 100).

Table 4

*Years of Teaching Experience in Agricultural Education Demographic*

<table>
<thead>
<tr>
<th>Number of years teaching agriculture</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>104</td>
<td>100.00</td>
</tr>
<tr>
<td>1-5</td>
<td>32</td>
<td>30.78</td>
</tr>
<tr>
<td>6-10</td>
<td>16</td>
<td>15.38</td>
</tr>
<tr>
<td>11-15</td>
<td>19</td>
<td>18.27</td>
</tr>
<tr>
<td>16-20</td>
<td>13</td>
<td>12.50</td>
</tr>
<tr>
<td>21-25</td>
<td>8</td>
<td>7.69</td>
</tr>
<tr>
<td>26-30</td>
<td>7</td>
<td>6.73</td>
</tr>
<tr>
<td>31 or more</td>
<td>9</td>
<td>8.65</td>
</tr>
</tbody>
</table>

(41.30%) community. Only 10.60% of participants taught in urban communities and 3.80% in metro-urban communities (Figure 8).

For the purpose of analysis, the urban community types (urban cluster, metro-urban, and urban) were combined in order to be compared with the larger rural community type (Figure 9).
Results for Research Question Two

Research question two addressed agriculture teacher attitudes toward the education of gifted students. Statements were placed on a 6-point scale of strongly disagree to strongly agree, and the individual item means and standard deviations are reported in Table 5. The overall attitude construct included all of the smaller constructs: value, teaching, focus, and agricultural education. The overall attitude toward gifted
students construct had a Cronbach’s Alpha of 0.82 composed of nine items receiving 114 valid responses for analysis. Power struggle items are reported as individual items, and not included in the overall attitude construct.

The top three statements that received the most agreement was: I believe gifted students are valuable to the agriculture industry ($M = 5.53$, $SD = 0.85$), I believe gifted students are a valuable part of my classroom ($M = 5.51$, $SD = 0.78$), and all students should be challenged to the level they are capable ($M = 5.32$, $SD = 0.71$). The bottom three least agreed upon statements were: I feel threatened by the intelligence of gifted students in my class ($M = 1.77$, $SD = .99$), gifted students are bored in my classroom ($M = 2.80$, $SD = 1.23$), and gifted students challenge my understanding of the content in the classroom ($M = 3.61$, $SD = 1.55$). All others can be seen in Table 5.

Table 5

*Agriculture Teacher Attitude Statements Regarding the Education of Gifted Students, with their Means and Standard Deviations*

<table>
<thead>
<tr>
<th>Attitude statements</th>
<th>$n$</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe gifted students are valuable to the agriculture industry.</td>
<td>115</td>
<td>5.53</td>
<td>.85</td>
</tr>
<tr>
<td>I believe gifted students are a valuable part of my classroom.</td>
<td>115</td>
<td>5.51</td>
<td>.78</td>
</tr>
<tr>
<td>All students should be challenged to the level they are capable.</td>
<td>114</td>
<td>5.32</td>
<td>.71</td>
</tr>
<tr>
<td>I believe it is important to differentiate instruction to meet the needs of gifted students.</td>
<td>115</td>
<td>5.14</td>
<td>.96</td>
</tr>
<tr>
<td>I think the needs of gifted students should be addressed in the classroom.</td>
<td>115</td>
<td>5.08</td>
<td>.85</td>
</tr>
<tr>
<td>My teaching takes gifted students into account.</td>
<td>115</td>
<td>4.83</td>
<td>.88</td>
</tr>
<tr>
<td>Agricultural education supports gifted learners.</td>
<td>115</td>
<td>4.73</td>
<td>.91</td>
</tr>
<tr>
<td>I differentiate instruction to meet the needs of gifted students.</td>
<td>115</td>
<td>4.59</td>
<td>.96</td>
</tr>
<tr>
<td>Agricultural education classes do a better job meeting the needs of gifted students than other classes in the school.</td>
<td>115</td>
<td>4.18</td>
<td>1.11</td>
</tr>
</tbody>
</table>

*Note.* Real limits: 1.0-1.49 = Strongly disagree; 1.50-2.49 = Disagree; 2.50-3.49 = Somewhat disagree; 3.50-4.49 = Somewhat agree; 4.50-5.49 = Agree; 5.50-6.00 = Strongly agree.
In terms of the power struggle items, participants somewhat agreed that gifted students challenge their understanding of the content in the classroom (\( M = 3.61, SD = 1.55 \)), but disagreed that they feel threatened by the intelligence of gifted students in their classes (\( M = 1.77, SD = .994 \)). They somewhat disagreed that gifted students are bored in their classes (\( M = 2.80, SD = 1.23 \); see Table 6).

**Table 6**

*Power Struggle Items Reported by Individual Item Mean and Standard Deviation*

<table>
<thead>
<tr>
<th>Power struggle statements</th>
<th>n</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gifted students challenge my understanding of the content in the classroom.</td>
<td>115</td>
<td>3.61</td>
<td>1.55</td>
</tr>
<tr>
<td>Gifted students are bored in my classroom.</td>
<td>114</td>
<td>2.80</td>
<td>1.23</td>
</tr>
<tr>
<td>I feel threatened by the intelligence of gifted students in my class.</td>
<td>115</td>
<td>1.77</td>
<td>0.99</td>
</tr>
</tbody>
</table>

*Note.* Real limits: 1.0-1.49 = Strongly disagree; 1.50-2.49 = Disagree; 2.50-3.49 = Somewhat disagree; 3.50-4.49 = Somewhat agree; 4.50-5.49 = Agree; 5.50-6.00 = Strongly agree.

Individual items were then divided into their respective constructs by the topic being measured and analyzed by means and standard deviations for the entire teacher sample (see Table 7). Overall, participants had a high value for gifted students in their classes (\( M = 5.52, SD = .77 \)). They agreed that agriculture teachers should focus on gifted students in their class (\( M = 5.20, SD = .70 \)), and also agreed that they should teach with gifted students in mind (\( M = 4.86, SD = .77 \)). Although, participants only somewhat agreed with the agricultural education meets the needs of gifted learners (\( M = 4.46, SD = .88 \)). Next, each construct was analyzed by the participant demographics of teacher licensure, gender, years of teaching, and community type.
Table 7

Means and Standard Deviations for Attitude Constructs (n = 115)

<table>
<thead>
<tr>
<th>Attitude construct</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>5.52</td>
<td>.77</td>
</tr>
<tr>
<td>Focus</td>
<td>5.20</td>
<td>.70</td>
</tr>
<tr>
<td>Teaching</td>
<td>4.86</td>
<td>.77</td>
</tr>
<tr>
<td>Agricultural Education</td>
<td>4.46</td>
<td>.88</td>
</tr>
</tbody>
</table>

Note. Real limits: 1.0-1.49 = Strongly disagree; 1.50-2.49 = Disagree; 2.50-3.49 = Somewhat disagree; 3.50-4.49 = Somewhat agree; 4.50-5.49 = Agree; 5.50-6.00 = Strongly agree.

Overall Attitude Construct

Attitudes construct data were analyzed by teacher licensure using a Kruskal-Wallis H test. The independent variables were teacher licensure were: licensed undergraduate teacher preparation, licensed graduate teacher preparation program, and alternative licensure. The dependent variable was the overall attitude construct. An analysis showed that there was not a significant effect of teacher licensure on the overall attitude construct, $\chi^2(2) = 2.20, p = 0.33$, with a mean rank score of 59.15 for licensed undergraduate teacher preparation program, 62.45 for licensed graduate teacher preparation program, and 46.97 for alternative licensure.

The overall attitude construct data was analyzed by gender using a Mann-Whitney U test. There was no statistically significant difference between the overall attitude construct and gender; $U = 1150.50, p = 0.31$. Attitude construct data was analyzed by years of teaching using a Pearson’s Product Moment correlation. There was no statistically significant correlation between years of teaching and the overall attitude construct, $r = -0.06, n = 104, p = 0.56$. According to Davis (1971), this is a negligible
association suggesting that as years of teaching increases, their overall attitude toward
gifted students decreases.

The urban \((n = 11)\) and metro urban \((n = 4)\) community types received low
response rate therefore I combined both with the urban cluster \((n = 43)\) community type,
creating an overall urban category of \(n = 58\). The attitude constructs were compared by
community type using a Mann-Whitney U test and no statistically significant difference
between urban \((n = 58)\) and rural \((n = 46)\) was found for the overall attitude construct, \(U = 1269.00, p = 0.67\).

**Value Construct**

Attitudes construct data were analyzed by teacher licensure using a Kruskal-
Wallis H test. The analysis showed that there was a no significant effect of teacher
licensure on the value construct \(\chi^2(2) = 1.90, p = 0.39\), with a mean rank score of 60.49
for licensed undergraduate teacher preparation program, 52.32 for licensed gradate
teacher preparation program, and 52.31 for alternative licensure.

Attitude construct data was analyzed by gender using a Mann-Whitney U test.
There was a statistically significant difference between the value construct and gender.
The value construct mean was greater for females \((N = 62, \text{Mean Rank} = 59.08)\) than for
males \((N = 42, \text{Mean Rank} = 42.79)\), \(U = 894.00, p = .002, r = -0.30\). This is a moderate
association (Davis, 1971).

The attitude construct data was analyzed by years of teaching using a Pearson’s
Product Moment correlation. There was not a statistically significant correlation between
years of teaching and the value construct, \(r = -0.179, n = 104, p = .070\). This is a low
association (Davis, 1971) and because the $r$ is negative, it suggests that as years of teaching increased the value that the teacher placed on gifted students decreased. When combining the urban community types and performing a Mann-Whitney U test between urban ($n = 58$) and rural ($n = 46$), the teaching construct showed no statistically significant difference based on community type, $U = 1277.00, p = 0.67$.

**Focus Construct**

A Kruskal-Wallis H test showed that there was no statistically significant of teacher licensure on the focus construct, $\chi^2(2) = 0.69, p = 0.71$, with a mean rank score of 59.61 for licensed undergraduate teacher preparation program, 54.71 for licensed graduate teacher preparation program, and 53.84 for alternative licensure. There was no statistically significant difference found between the focus construct and gender using a Mann-Whitney U test; $U = 1250.00, p = 0.72$.

A Pearson’s Product Moment correlation was used to analyze the focus construct by years of teaching. There was not a statistically significant correlation between years of teaching and the focus construct, $r = -0.07, n = 104, p = 0.47$. According to Davis (1971), this is a negligible association and because the $r$ is negative, suggests that as years of teaching increased the focus construct decreased. When combining the urban community types and analyzing urban ($n = 58$) and rural ($n = 46$) with a Mann-Whitney U, the focus construct showed no statistically significant difference based on community type, $U = 1216.50, p = 0.42$. 
Teaching Construct

A Kruskal-Wallis H test showed that there was not a significant effect for teacher licensure on the teaching construct, $\chi^2(2) = 0.92$, $p = 0.63$, with a mean rank score of 57.72 for licensed undergraduate teacher preparation program, 63.47 for licensed graduate teacher preparation program, and 52.91 for alternative licensure. There was no statistically significant difference between the teaching construct and gender using the Mann-Whitney U; $U = 1241.50$, $p = 0.68$.

Using a Pearson’s Product Moment correlation, there was not a statistically significant correlation between years of teaching and the teaching construct, $r = -0.001$, $n = 104$, $p = 0.99$. This is a negligible association (Davis, 1971) and because the $r$ is negative, suggests that as years of teaching increased the teaching construct decreased. When combining the urban community, urban ($n = 58$) and rural ($n = 46$), the teaching construct showed no significant difference based on community type using a Mann-Whitney U, $U = 1322.00$, $p = 0.94$.

Agricultural Education Construct

There was not a significant effect of teacher licensure on the agricultural education construct using the Kruskal-Wallis H test, $\chi^2(2) = 2.09$, $p = 0.35$, with a mean rank score of 57.68 for licensed undergraduate teacher preparation program, 66.03 for licensed graduate teacher preparation program, and 50.06 for alternative licensure. There was no statistically significant difference between the agricultural education construct and gender using the Mann-Whitney U test; $U = 1195.50$, $p = 0.47$.

Using a Pearson’s Product Moment correlation, there was no statistically
significant correlation between years of teaching and the agricultural education construct, $r = .05, n = 104, p = 0.62$. This is a negligible association and because the $r$ is positive, suggests that as years of teaching increased the agricultural education construct increased. The agricultural education construct showed no significant difference based on community type using the Mann-Whitney U test, $U = 1156.50, p = 0.24$.

**Power Struggle (Individual Items)**

There were no statistically significant differences found for each of the following power struggle statements by teacher licensure, gender, or community type: “I feel threatened by the intelligence of gifted students in my class,” “Gifted students challenge my understanding of the content in the classroom,” and “Gifted students are bored in my classroom.” Using a Pearson’s Product Moment correlation, there was a significant correlation between years of teaching and “I feel threatened by the intelligence of gifted students in my class,” $r = -0.22, n = 104, p = 0.03$. This is a low association correlation (Davis, 1971). The $r$ value is negative, indicating that as years of teaching increased, feeling threatened by gifted students decreased. Thus, less experienced teachers felt more threatened than more experienced teachers.

There was a significant correlation between years of teaching and “Gifted students challenge my understanding of the content in the classroom,” $r = -0.26, n = 104, p = 0.01$. This is also a low association correlation according to Davis (1971). The $r$ value is also negative, indicating that as years of teaching increased, gifted students were less likely to challenge the teacher’s content understanding in the classroom. This means that less experienced teachers felt more challenged by gifted students than did more
experienced teachers.

There was a significant correlation between years of teaching and “Gifted students are bored in my classroom,” \( r = -0.25, n = 103, p = .01 \). This is yet another low association correlation (Davis, 1971). The \( r \) value is negative, meaning that as years of teaching increased, gifted students are less likely to be bored in the teachers’ classroom. Less experienced teachers felt that the gifted students in their classes were more bored than did the more experienced teachers. All three power struggle items represent correlations with a low association, meaning that the relationship between the variables is not very strong (Davis, 1971).

**Results for Research Question Three**

Research question three sought to characterize gifted students based on the agriculture teachers’ responses. Statements were placed on a 6-point scale of strongly disagree to strongly agree, and statements were ordered based on item means (Table 8).

Agriculture teachers somewhat agreed that gifted students were outstanding problem solvers, quick to memorize information, excellent in science and mathematics, very developed in their vocabulary, very goal oriented, excellent in technology use, and very original thinkers. They somewhat disagreed that gifted students were perfectionists, excellent working with their hands, excellent oral communicators, excellent in SAE programs, excellent entrepreneurs, very active in FFA, and excellent leaders.
Table 8

Perceived Characteristics of Gifted Agriculture Students

<table>
<thead>
<tr>
<th>Gifted students are…</th>
<th>n</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding problem solvers</td>
<td>113</td>
<td>4.09</td>
<td>1.90</td>
</tr>
<tr>
<td>Very quick to memorize information</td>
<td>113</td>
<td>4.04</td>
<td>1.90</td>
</tr>
<tr>
<td>Excellent in science</td>
<td>113</td>
<td>3.99</td>
<td>1.84</td>
</tr>
<tr>
<td>Excellent in mathematics</td>
<td>113</td>
<td>3.97</td>
<td>1.85</td>
</tr>
<tr>
<td>Very developed in their vocabulary</td>
<td>111</td>
<td>3.91</td>
<td>1.89</td>
</tr>
<tr>
<td>Very goal oriented</td>
<td>113</td>
<td>3.88</td>
<td>1.93</td>
</tr>
<tr>
<td>Excellent in technology use</td>
<td>113</td>
<td>3.69</td>
<td>1.72</td>
</tr>
<tr>
<td>Very original thinkers</td>
<td>113</td>
<td>3.56</td>
<td>1.70</td>
</tr>
<tr>
<td>Perfectionists</td>
<td>113</td>
<td>3.38</td>
<td>1.72</td>
</tr>
<tr>
<td>Excellent working with their hands</td>
<td>113</td>
<td>3.25</td>
<td>1.61</td>
</tr>
<tr>
<td>Excellent oral communicators</td>
<td>113</td>
<td>3.25</td>
<td>1.61</td>
</tr>
<tr>
<td>Excellent in SAE programs</td>
<td>113</td>
<td>3.21</td>
<td>1.51</td>
</tr>
<tr>
<td>Excellent entrepreneurs</td>
<td>112</td>
<td>3.21</td>
<td>1.58</td>
</tr>
<tr>
<td>Very active in FFA</td>
<td>113</td>
<td>3.18</td>
<td>1.54</td>
</tr>
<tr>
<td>Excellent leaders</td>
<td>113</td>
<td>3.07</td>
<td>1.32</td>
</tr>
</tbody>
</table>

Note. Real limits: 1.0-1.49 = Strongly disagree; 1.50-2.49 = Disagree; 2.50-3.49 = Somewhat disagree; 3.50-4.49 = Somewhat agree; 4.50-5.49 = Agree; 5.50-6.00 = Strongly agree.

Results for Research Question Four

Question four was to evaluate the professional development needs related to teaching gifted students in the agriculture classroom. Each item was measured on a 6-point Likert-scale for importance and ability. A MWDS was calculated using the Excel-based MWDS calculator (McKim & Saucier, 2011) to identify and prioritize the inservice needs of agriculture teachers.

The top four items that agriculture teachers perceived as most important were: teaching gifted students problem-solving skills, working with gifted students in CDE teams, helping gifted students identify agricultural interests, and working with gifted
students in leadership roles (Table 9). The four items that agriculture teachers perceived apply for proficiency awards, providing additional content in the curriculum for gifted students, and helping gifted students complete SAE projects.

The top four items that agriculture teachers perceived themselves as most able in were related to the FFA organization: working with gifted students in CDE Teams, working with gifted FFA members in the FFA chapter, working with gifted students in leadership roles, and helping gifted students apply for FFA degrees (see Table 10). The

Table 9

Importance Mean Scores for the Borich Needs Assessment Model Calculation

<table>
<thead>
<tr>
<th>Items by importance</th>
<th>n</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching gifted students problem-solving skills</td>
<td>103</td>
<td>3.48</td>
<td>.54</td>
</tr>
<tr>
<td>Working with gifted students in CDE teams</td>
<td>103</td>
<td>3.45</td>
<td>.61</td>
</tr>
<tr>
<td>Helping gifted students identify agricultural interests</td>
<td>104</td>
<td>3.42</td>
<td>.59</td>
</tr>
<tr>
<td>Working with gifted students in leadership roles</td>
<td>102</td>
<td>3.41</td>
<td>.62</td>
</tr>
<tr>
<td>Providing challenging agriculture curriculum for gifted students</td>
<td>104</td>
<td>3.39</td>
<td>.63</td>
</tr>
<tr>
<td>Motivating gifted students to join the FFA</td>
<td>103</td>
<td>3.38</td>
<td>.67</td>
</tr>
<tr>
<td>Motivating gifted students in agriculture classes</td>
<td>104</td>
<td>3.37</td>
<td>.64</td>
</tr>
<tr>
<td>Working with gifted FFA members in the FFA chapter</td>
<td>102</td>
<td>3.35</td>
<td>.62</td>
</tr>
<tr>
<td>Helping gifted students apply for FFA degrees</td>
<td>103</td>
<td>3.35</td>
<td>.68</td>
</tr>
<tr>
<td>Utilizing technology with gifted students</td>
<td>102</td>
<td>3.34</td>
<td>.67</td>
</tr>
<tr>
<td>Helping gifted students choose an SAE project</td>
<td>103</td>
<td>3.31</td>
<td>.69</td>
</tr>
<tr>
<td>Differentiating instruction for gifted students in agriculture classes</td>
<td>104</td>
<td>3.30</td>
<td>.70</td>
</tr>
<tr>
<td>Teaching gifted students record keeping skills</td>
<td>103</td>
<td>3.29</td>
<td>.70</td>
</tr>
<tr>
<td>Helping gifted students complete SAE projects</td>
<td>103</td>
<td>3.26</td>
<td>.64</td>
</tr>
<tr>
<td>Providing additional content in the curriculum for gifted students</td>
<td>103</td>
<td>3.24</td>
<td>.72</td>
</tr>
<tr>
<td>Helping gifted students apply for proficiency awards</td>
<td>103</td>
<td>3.12</td>
<td>.77</td>
</tr>
<tr>
<td>Managing the behavior of gifted students</td>
<td>103</td>
<td>3.10</td>
<td>.92</td>
</tr>
</tbody>
</table>

Note. Real limits: 1.0-1.5 = No importance; 1.5-2.5 = Moderately low importance; 2.5-3.5 = Moderately high importance; 3.5-4.0 = Very high importance.
Table 10

*Ability Mean Scores for the Borich Needs Assessment Model Calculation*

<table>
<thead>
<tr>
<th>Items by ability</th>
<th>n</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working with gifted students in CDE teams</td>
<td>100</td>
<td>3.32</td>
<td>.65</td>
</tr>
<tr>
<td>Working with gifted FFA members in the FFA chapter</td>
<td>99</td>
<td>3.28</td>
<td>.59</td>
</tr>
<tr>
<td>Working with gifted students in leadership roles</td>
<td>99</td>
<td>3.27</td>
<td>.68</td>
</tr>
<tr>
<td>Helping gifted students apply for FFA degrees</td>
<td>100</td>
<td>3.20</td>
<td>.75</td>
</tr>
<tr>
<td>Managing the behavior of gifted students</td>
<td>100</td>
<td>3.18</td>
<td>.76</td>
</tr>
<tr>
<td>Teaching gifted students record keeping skills</td>
<td>100</td>
<td>3.16</td>
<td>.66</td>
</tr>
<tr>
<td>Utilizing technology with gifted students</td>
<td>100</td>
<td>3.15</td>
<td>.72</td>
</tr>
<tr>
<td>Helping gifted students choose an SAE project</td>
<td>100</td>
<td>3.12</td>
<td>.67</td>
</tr>
<tr>
<td>Teaching gifted students problem-solving skills</td>
<td>100</td>
<td>3.11</td>
<td>.65</td>
</tr>
<tr>
<td>Motivating gifted students to join the FFA</td>
<td>100</td>
<td>3.11</td>
<td>.74</td>
</tr>
<tr>
<td>Helping gifted students complete SAE projects</td>
<td>100</td>
<td>3.10</td>
<td>.64</td>
</tr>
<tr>
<td>Helping gifted students identify agricultural interests</td>
<td>101</td>
<td>3.10</td>
<td>.56</td>
</tr>
<tr>
<td>Motivating gifted students in agriculture classes</td>
<td>101</td>
<td>3.03</td>
<td>.57</td>
</tr>
<tr>
<td>Helping gifted students apply for proficiency awards</td>
<td>100</td>
<td>2.94</td>
<td>.79</td>
</tr>
<tr>
<td>Providing challenging agriculture curriculum for gifted students</td>
<td>101</td>
<td>2.92</td>
<td>.67</td>
</tr>
<tr>
<td>Providing additional content in the curriculum for gifted students</td>
<td>100</td>
<td>2.92</td>
<td>.75</td>
</tr>
<tr>
<td>Differentiating instruction for gifted students in agriculture classes</td>
<td>101</td>
<td>2.89</td>
<td>.71</td>
</tr>
</tbody>
</table>

*Note.* Real limits: 1.0-1.5 = No ability; 1.5-2.5 = Moderately low ability; 2.5-3.5 = Moderately high ability; 3.5-4.0 = Very high ability

bottom four items that agriculture teachers perceived themselves as least able were related to the agriculture classroom: differentiating instruction for gifted students in agriculture class, providing additional content in the curriculum for gifted students, providing challenging agriculture curriculum for gifted students, and motivating gifted students in agriculture classes.

Using the Borich Needs Assessment (Borich, 1980) I was able to determine the
inservice needs of teachers by determining the discrepancy between teacher ability and importance. The discrepancy scores were weighted by multiplying each score by the mean of the importance scores which was then averaged to create a MWDS (McKim & Saucier, 2011). The higher the MWDS, the more necessary the inservice. The top four areas that participants indicated needing inservice included providing challenging agriculture curriculum for gifted students, differentiating instruction for gifted students in agriculture classes, teaching gifted students problem solving skills, and motivating gifted students in agriculture classes (Table 11).

Table 11

Ranked Mean Weighted Discrepancy Scores for the Needs Assessment

<table>
<thead>
<tr>
<th>Borich needs assessment items</th>
<th>n</th>
<th>Rank</th>
<th>MWDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing challenging agriculture curriculum for gifted students</td>
<td>101</td>
<td>1</td>
<td>1.61</td>
</tr>
<tr>
<td>Differentiating instruction for gifted students in agriculture classes</td>
<td>101</td>
<td>2</td>
<td>1.34</td>
</tr>
<tr>
<td>Teaching gifted students problem-solving skills</td>
<td>100</td>
<td>3</td>
<td>1.25</td>
</tr>
<tr>
<td>Motivating gifted students in agriculture classes</td>
<td>101</td>
<td>4</td>
<td>1.10</td>
</tr>
<tr>
<td>Helping gifted students identify agricultural interests</td>
<td>101</td>
<td>5</td>
<td>1.08</td>
</tr>
<tr>
<td>Providing additional content in the in the curriculum for gifted students</td>
<td>100</td>
<td>6</td>
<td>1.00</td>
</tr>
<tr>
<td>Motivating gifted students to join the FFA</td>
<td>100</td>
<td>7</td>
<td>0.91</td>
</tr>
<tr>
<td>Utilizing technology with gifted students</td>
<td>99</td>
<td>8</td>
<td>0.64</td>
</tr>
<tr>
<td>Helping gifted students choose an SAE project</td>
<td>100</td>
<td>9</td>
<td>0.59</td>
</tr>
<tr>
<td>Helping gifted students apply for proficiency awards</td>
<td>100</td>
<td>10</td>
<td>0.53</td>
</tr>
<tr>
<td>Helping gifted students complete SAE projects</td>
<td>100</td>
<td>11</td>
<td>0.52</td>
</tr>
<tr>
<td>Helping gifted students apply for FFA degrees</td>
<td>100</td>
<td>12</td>
<td>0.47</td>
</tr>
<tr>
<td>Working with gifted students in leadership roles</td>
<td>99</td>
<td>13</td>
<td>0.45</td>
</tr>
<tr>
<td>Teaching gifted students record keeping skills</td>
<td>100</td>
<td>14</td>
<td>0.43</td>
</tr>
<tr>
<td>Working with gifted students in CDE teams</td>
<td>100</td>
<td>15</td>
<td>0.41</td>
</tr>
<tr>
<td>Working with gifted FFA members in the FFA chapter</td>
<td>99</td>
<td>16</td>
<td>0.24</td>
</tr>
<tr>
<td>Managing the behavior of gifted students</td>
<td>100</td>
<td>17</td>
<td>-0.22</td>
</tr>
</tbody>
</table>
CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to describe school-based agriculture teachers’ attitudes and characterization of gifted students and identify professional development needs for working with gifted students in the agriculture program. By understanding agriculture teacher attitudes and how they characterize the gifted, agriculture teachers can improve their role in the developmental process of technical agriculture talent in gifted students.

The following research questions guided this study.

1. What is the demographic profile of school-based agriculture teachers, including preservice preparation to work with the gifted (i.e., percent of gifted students in agriculture program, method of licensure, gender, years of teaching experience, and community type)?

2. What are the attitudes of school-based agriculture teachers regarding the education of gifted students (i.e., value, teaching, focus, power struggle, agricultural education) and how do these compare by method of licensure, gender, years of teaching, and community type?

3. How do school-based agriculture teachers characterize gifted agriculture students?

4. What are the professional development needs of inservice agriculture teachers related to the education of gifted students?

Conclusions and Discussion

Research Question One

Research Question #1 asked, “What is the demographic profile of school-based agriculture teachers, including preservice preparation to work with the gifted?”
Participants perceived that approximately 10% of their students were identified as gifted, by either themselves or their school. There was a wide range, with a minimum of 0% students identified as gifted to 75% identified as gifted. These numbers are higher than the national average that report 6.7% of students nationally participated in gifted and talented programs in 2013-2014 (National Center for Education Statistics, 2018). However, this is less than the 22% of students identified as gifted by Utah agriculture teachers (Overstreet & Straquadine, 2001). This wide range of students identified as gifted could be due to the variety of definitions and interpretations of what it means to be gifted. Not all schools identify students as gifted, and if identified not all teachers are made aware of this identification at the secondary level. Six participants in this study did not estimate a percentage of their students as gifted, but rather reported “unknown” or “I don’t know.” This could be due to either lack of knowledge about how to identify gifted students at the secondary level or lack of a consistent definition between schools and states. The DMGT model estimates that the top 10% of students are gifted in a particular area, and the top 10% of students are talented in a particular domain (Gagné, 2010).

Of the participants in this study, 13.70% were alternatively licensed to teach agriculture. This is lower than the 19.4% of alternatively licensed new hires nationally in 2017 (Smith et al., 2018). The majority of participants in this study were licensed through an undergraduate teacher preparation program. Not all traditional teacher preparation programs, whether undergraduate or graduate level, addressed working with gifted and talented students. Sixty percent of participants agreed that their teacher preparation program addressed working with gifted students but a small majority, 54.5%, agree that
they were adequately prepared to work with this population of students. This is a 7.5% difference between the percent that addressed gifted and talented, and the participants that felt adequately prepared by those programs. Just under half of agriculture teachers licensed through an undergraduate or graduate teacher preparation program do not feel as though they were adequately prepared to meet the needs of gifted and talented students in the agriculture classroom, this may present a deficiency in preservice agriculture teacher and secondary education preparation. Almost half of the respondents spent a small amount of time in class discussing gifted and talented students. Agriculture teachers as a whole are not being prepared in a consist manner from teacher preparation program to teacher preparation program. Future research should be conducted to determine how, when, and where preservice teachers are receiving education in working with gifted and talented students.

**Research Question Two**

Research Question #2 asked, “*What are the attitudes of school-based agriculture teachers regarding the education of gifted students?*” Of the attitude statements, participants strongly agreed that gifted students are valuable to the agriculture industry and that gifted students are a valuable part of their classroom. This is in contrast with Berman et al. (2012), who found that preservice teachers perceived gifted students as a problem in the classroom, even following professional development. Participants only somewhat agreed that agriculture classes do a better job meeting the needs of gifted students than other classes in the school. Perhaps honors and advanced placement courses are doing a better job challenging gifted students or those teachers are more familiar
working with this population of students. It is unclear why this is the case, and further research is needed to determine why.

Participants agreed that it is important to differentiate instruction for gifted students but less agreed that they actually differentiate to meet the needs of gifted students. This discrepancy indicates that while participants believe differentiation is important, actually differentiating in the classroom is a different story. This 0.55 difference in mean, although small, may indicate that teachers are willing to differentiate but could utilize professional development in order to put it into practice for gifted learners.

Overall, participants did not feel threatened by the intelligence of the gifted students in their classes, but they did indicate that gifted students challenge their content knowledge in the classroom. This could indicate a need for increased technical agriculture courses that preservice agriculture teachers take or the development of inservice programs in specific subject matter. There was a significant relationship between years of teaching and feeling threatened by the intelligence of gifted students, that their content knowledge was challenged, and that gifted students were bored in their classroom. As years of teaching increased, the likelihood of these perceptions decreased. Although caution should be taken when interpreting the results and drawing conclusions, as normality and homogeneity varied amongst the power struggle items that were analyzed using a Pearson’s product moment test.

However, if less experienced teachers are more likely to feel threatened by the gifted students in their classroom, how are preservice teachers being prepared to work
with and challenge gifted students if the teacher preparation programs are not adequately preparing almost half of the students that complete them? Teacher induction programs provided by state agriculture teacher associations and University teacher preparation programs should develop inservice programs to help early career teachers develop the necessary skills to work with gifted and talented students in the classroom.

Agriculture teacher gender did influence their attitude toward gifted students in the classroom. There was significant difference found between gender and the value constructs, which is inconsistent with Geake and Gross (2008), who found that gender did not influence teacher affect. Females are more cognizant of the value that gifted students have in their classroom and the agriculture industry as a whole. More research is needed to determine in what ways female teachers value gifted students differently than do their male counterparts.

Research Question Three

Research Question #3 asked, “How do agriculture teachers characterize gifted agriculture students?” Participants perceived gifted students as outstanding problem solvers but not excellent leaders. This finding could indicate that gifted students may benefit from the leadership education that is provided in agricultural education. Teachers were not given a standard definition for gifted, as this study is based on current teacher perceptions from their teacher preparation program, teaching experience, etc. without a given definition.

Overall, participants somewhat agreed that gifted students are outstanding problem solvers, very quick to memorize information, excellent in science, excellent in
mathematics, very developed in their vocabulary, very goal oriented, excellent in
technology use, and very original thinkers. Participants perceived gifted students as
outstanding problem solvers, which is described by Clark (2008) as “advanced cognitive
and affective capacity for conceptualizing and solving societal problems” or “solutions to
social and environmental problems” (pp. 7-78). Clark recommends that with this
characteristic, students learn about societal problems and problem-solving procedures, as
well as working to solve real-world problems (Clark, 2008). Problem based learning
could be a method that agriculture teachers utilize in the classroom if students are
outstanding problem solvers.

Participants perceived gifted students as very quick to memorize information.
Clark suggests that students should “be exposed to new and challenging information of
the environment and the culture, including aesthetic, economic, political, educational, and
social aspects; to acquire early mastery of foundational skills” (p. 74). For this reason,
agriculture teachers should incorporate more than rote memorization in their classes.

Participants also indicated that gifted students are excellent in science,
mathematics, and technology use. These characteristics would suggest excellence in
STEM-related fields. Thompson and Balschweid (1999) found that Oregon agriculture
science and technology teachers perceive incorporating science into the curriculum as a
way to attract high ability students to their programs. Agriculture teachers should
consider incorporating STEM activities into their agriculture classroom.

Participants perceived gifted students as very developed in their vocabulary.
Students need to be exposed to vocabulary and concepts that are more challenging (Clark,
Perhaps the use of weekly vocabulary lists could be of value, differentiating the vocabulary lists based on student ability and the course being taught. Teachers could also incorporate scientific literature at a variety of reading levels to aid in the advancement of vocabulary for their students.

Participants also perceived gifted students as very goal-oriented, described by Clark (2008) as “unusual intensity; persistent goal-directed behavior” (p. 75). It is recommended that students are given opportunities “to pursue inquires beyond allotted time spans; to set and evaluate priorities” (Clark, 2008, p.75). Independent studies and projects may also be an option for advanced students with goal-oriented behavior. Students could participate in the FFA’s agriscience fair or complete an SAE project based on their interests.

Participants somewhat agreed that gifted students are very original thinkers, described by Clark (2008) as “ability to generate original ideas and solutions” who recommends that students learn problem solving and productive thinking skills, as well as help solve real-world problems (p. 75). This could also be an implication for the use of inquiry-based learning in the agriculture classroom, where students generate questions and search for their answers. Students could also benefit from an SAE project, where students develop and manage a project of their own.

Participants somewhat disagreed that gifted students are perfectionists, excellent working with their hands, excellent oral communicators, excellent in SAE programs, excellent entrepreneurs, very active in FFA, and excellent leaders. Because participants somewhat disagreed that gifted students in agriculture are excellent working with their
hands, this may provide some evidence of a cartesian split, which Clark (2008) describes as “a lack of integration between mind and body” (p. 78).

Participants somewhat disagreed that gifted students are excellent leaders, which could indicate that participation in the FFA could be an opportune place for gifted students to develop leadership skills. Perhaps training for and participating in a public speaking FFA contest could develop oral communication skills among gifted students. Greater recruitment efforts could be made in the classroom, to encourage leadership opportunities in the FFA. Also, general participation in FFA activities should be encouraged among this population of students.

More research is needed to determine why gifted students are not known to be excellent in SAE programs. Entrepreneurship skills could be incorporated into the classroom portion of the agriculture program to encourage both SAE participation and entrepreneurship among members. Perhaps if a student is not interested in entrepreneurship, one of the other SAE categories could be encouraged. The National FFA has developed an SAE for All program that incorporates service learning, school-based enterprises, research, placement/internship, ownership/entrepreneurship, and foundational SAE categories (National).

Findings from this portion suggest the question - are agriculture teachers characterizing those students that are intellectually gifted or those students that are gifted specifically in agriculture? Gagné (2010) indicates that there are natural abilities in addition to intellectual abilities, such as social and motor control, that can then be developed into a specific domain such as agriculture. More research is needed to
determine what traits students specifically gifted in agriculture poses.

Research Question Four

Research Question #4 asked, “What are the professional development needs of inservice agriculture teachers related to the education of gifted students?” Through the Borich needs assessment model, 16 items had positive MWDS, which indicates a need for professional development. One item, “managing the behavior of gifted students,” received a negative MWDS indicating that professional development is not needed for that item.

The top five Borich needs assessment items for professional development were: providing challenging agriculture curriculum for gifted students, differentiating instruction of gifted students in agriculture classes, teaching gifted students problem solving skills, motivating gifted students in agriculture classes, helping gifted students identify agricultural interests. These results differ from Layfield and Dobbins (2003), who found that experienced and beginning teachers had inservice needs related to FFA degree applications, proficiency award applications, and SAE opportunities. Garton and Chung (1997) found that among the top five inservice needs identified, student motivation ranked 2nd, FFA degree applications ranked 3rd, and proficiency awards ranked 5th. Sorensen et al. (2010) identified inservice needs consisting of SAE opportunities ranked 2nd and proficiency awards ranked 3rd. These differences could indicate that there are differences in inservice professional development needs when the context involves working with gifted students, as gifted students may pose different needs compared to other student populations. As this was a national study, perhaps the
inservice needs differ more on a national scale, compared to individual state inservice needs.

The top six mean weighted discrepancy score items were related to working with gifted students in the classroom portion of the three-component model of agricultural education. Providing challenge and differentiating instruction can relate to the provisions section of the differentiated model of giftedness and talent, which includes enriching curriculum and enriching pedagogy (pacing), as well as administrative grouping and administrative acceleration (Gagné, 2010).

Providing challenging curriculum for gifted students was the largest identified need. Content knowledge could be a possible deficiency. Teachers need content knowledge in the area taught in order to facilitate learning for gifted students (VanTassel-Baska & Stambaugh, 2005). Differentiating instruction for gifted students in agriculture classes is the second highest need. Differentiation is a teaching tool used with students of all ability levels, including gifted students. This would not only aid in teaching gifted students in a heterogeneous classroom, but would improve teaching overall within the SBAE program. The professional development need of teaching gifted students problem solving skills seems contradictory, as in the previous section, participants indicated that gifted students were outstanding problem solvers. Additional research is needed to determine why this discrepancy exists and what type of professional development is needed to teach problem solving skills to outstanding problem solvers.

All importance means were within the range of moderately high importance 2.5-3.5 on the 4-point scale. All ability means were within the range of moderately high
ability 2.5-3.5 on a 4-point scale. The top four scoring items for ability were related to FFA: working with gifted students in CDE teams, working with gifted FFA members in the FFA chapter, working with gifted students in leadership roles, and helping gifted students apply for FFA degrees. Participants perceived themselves as more able to work with gifted students outside of the classroom, in the FFA and on CDE teams, but not as able in the classroom through challenging content, additional content, and differentiated instruction. This could be due to the more individualized nature of the FFA, where teachers are more easily able to differentiate tasks and match students with tasks according to their ability level. Perhaps if FFA is integrated into the classroom curriculum, agriculture teachers could more easily differentiate instruction with students.

Participants reported a moderately high ability working with gifted students in leadership roles, the second highest ability item mean. This appears contradictory to the previous characteristics finding where participants indicated that leadership was the characteristic receiving the lowest mean score of the characteristic items. Perhaps agriculture teachers feel confident in their ability to develop gifted agriculture students’ leadership skills if this population of students are not characteristically excellent leaders.

**Limitations**

This national study received a lower response rate than desired and should be repeated with a higher response rate. Also, a definition for gifted was not given to teachers. For further studies, clarifying a specific form of giftedness in the introduction of the survey instrument, whether intellectual, creative, social, perceptual, muscular, or
motor control (Gagné, 2010) would be useful. Construct reliabilities were lower than ideal for a few of the constructs and not all data was homogenous and normal. Caution should be taken when interpreting the statistics. Because there is limited research investigating the education of gifted students in the agriculture classroom, this study should be viewed as a starting point for further study. The low reliability for some of the constructs limits the strength of the findings and conclusions in this study.

**Recommendations for Future Research**

Based on the findings, the following are recommendations for future research.

1. Researchers should determine what topics related to gifted education should be integrated in preservice agriculture teacher preparation programs.

2. Agriculture teacher educators should identify where instruction about gifted and talented is coming from in the teacher preparation program (i.e., agriculture teacher educators, college of education, etc.).

3. Of those that received preservice preparation for educating gifted students in the agriculture classroom, investigate what is being taught and the effectiveness of the instruction.

4. Researchers should assess the current participation of gifted and talented students in the FFA (i.e., number of students, magnitude of participation, etc.).

5. Researchers should further develop the survey instrument and replicate this study with a larger response rate to determine if results are similar or different.

**Recommendations for Practice**

Based on the findings, the following recommendations are suggested for future practice.

1. Preservice teacher education programs need to address how to work with gifted students in the agriculture classroom during preservice teacher training.
2. Preservice teachers need to be equipped with resources and strategies through their teacher preparation program to reduce boredom in their classrooms, the feeling of being threatened and challenged in their content knowledge by gifted students in their earlier years of teaching.

3. Agricultural teacher education faculty should develop challenging agriculture curriculum through grants, communities of practice, and agriculture teacher educators for agriculture teachers to utilize with gifted students.

4. Professional development should be implemented for inservice teachers by agriculture teacher education faculty, the National Association of Agricultural Educators (NAAE), and state teachers’ associations based on creating challenging curriculum, differentiating instruction, and teaching problem solving skills.
REFERENCES


Gray, E. (2011). *Perspectives of students who are academically or intellectually gifted in agricultural education programs in North Carolina* (Master’s thesis). North Carolina State University, Raleigh, NC.


McCuller, B. H. (2011). *The measurement of change in pre-service teachers’ attitudes on giftedness and gifted students: A professional development approach* (doctoral Dissertation). New Mexico State University, Las Cruces, NM.


APPENDICES
Appendix A

Survey
Please fully review the Informed Consent document before deciding whether to proceed with this survey.

Letter of Information

AGRICULTURE TEACHER ATTITUDES REGARDING GIFTED EDUCATION AND TEACHING GIFTED STUDENTS IN THE AGRICULTURE CLASSROOM

Introduction
You are invited to participate in a research study conducted by Tasha Stansberry, an Assistant Professor, and Olivia Rish, a graduate student in the School of Applied Sciences, Knowledge & Education at Utah State University. The purpose of this research is to identify the attitudes of agricultural education teachers toward gifted education, their characterization of gifted agriculture students, and the professional development needs of agricultural teachers working with gifted students in their classroom. Your participation is entirely voluntary.

You are invited to read the following information on the next page to help you decide whether to participate. Please read it carefully and ask any questions you have before you agree to participate.

Procedures
Your participation will involve taking one survey that should take 20 minutes to complete. The survey consists of a variety of question types, including multiple choice and check boxes, true or false questions, and participants will be able to participate on their own computer.

Benefits
Although you will not directly benefit from this study, it has been designed to learn more about the attitudes of agricultural teachers toward gifted education, their characterization of gifted agriculture students, as well as their professional development needs associated with teaching gifted students in the agriculture classroom. This study could contribute to a more informed and comprehensive understanding of the needs of gifted agriculture students.

Confidentiality
The information you provide as part of this study remains confidential. The researchers will make every effort to ensure that the information you provide as part of this study remains confidential.

By clicking the "I Agree" radio button below, you agree to participate in this study. You indicate that you understand the risks and benefits of participation, and that you know what you will be asked to do. You also agree that you have asked any questions you might have, and are clear on how to stop your participation in the study if you choose to do so. Please be sure to retain a copy of this form for your records.

I Agree

I Disagree
Are you a current agriculture teacher?

- Yes
- No
How did you obtain your license to teach agriculture?

- Licensed undergraduate teacher preparation program
- Licensed graduate teacher preparation program
- Alternative licensure
- Non-licensed
Please indicate your level of agreement with following items regarding your teacher preparation program.

<table>
<thead>
<tr>
<th>My teacher preparation program addressed the topic of working with gifted students.</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My teacher preparation program adequately prepared me to meet the needs of students identified as gifted in my agriculture classes.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How much time did your teacher preparation program spend addressing gifted education?

- [ ] no time
- [ ] only small amount in one class
- [ ] small amount in more than one class
- [ ] one whole class
- [ ] more than one class
 Please rate your level of agreement with the following statements about gifted students in agricultural education.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe gifted students are valuable to the agriculture industry.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I believe gifted students are a valuable part of my classroom.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My teaching takes gifted students into account.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I believe it is important to differentiate instruction to meet the needs of gifted students.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Statement</td>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Somewhat disagree</td>
<td>Somewhat agree</td>
<td>Agree</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>I differentiate instruction to meet the needs of gifted students.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>All students should be challenged to the level they are capable.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I think the needs of gifted students should be addressed in the classroom.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel threatened by the intelligence of gifted students in my class.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Statement</td>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Somewhat disagree</td>
<td>Somewhat agree</td>
<td>Agree</td>
<td>Strongly agree</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
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<td>----------</td>
<td>-------------------</td>
<td>----------------</td>
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</tr>
<tr>
<td>Gifted students challenge my understanding of the content in the classroom.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Gifted students are bored in my classroom.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Agricultural education classes do a better job meeting the needs of gifted students than other classes in the school.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Agricultural education supports gifted learners.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Please rate your level of agreement with each of the following characteristics completing the following statement about gifted agriculture students.

**Gifted agriculture students are...**

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>excellent in science</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>excellent in mathematics</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>outstanding problem solvers</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>excellent working with their hands</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>excellent in technology use</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>very original thinkers</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>very quick to memorize information</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>very developed in their vocabulary</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>excellent oral communicators</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>excellent entrepreneurs</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>excellent in SAE programs</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>perfectionists</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>very active in FFA</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>very goal oriented</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>excellent leaders</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
For each item, click the bubble that best corresponds for **both ability and importance** as it applies to you.

<table>
<thead>
<tr>
<th>Importance</th>
<th>Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>No importance</td>
<td>No ability</td>
</tr>
<tr>
<td>Moderately low importance</td>
<td>Moderately low ability</td>
</tr>
<tr>
<td>Moderately high importance</td>
<td>Moderately high ability</td>
</tr>
<tr>
<td>Very high importance</td>
<td>Very high ability</td>
</tr>
</tbody>
</table>

- Helping gifted students identify agricultural interests
- Motivating gifted students in agriculture classes
- Teaching gifted students problem-solving skills
- Differentiating instruction for gifted students in agriculture classes
- Providing challenging agriculture curriculum for gifted students
- Providing additional content in the curriculum for gifted students
- Managing the behavior of gifted students
- Utilizing technology with gifted students
- Helping gifted students choose an SAE project
<table>
<thead>
<tr>
<th>Activity</th>
<th>No Importance</th>
<th>Moderately low importance</th>
<th>Moderately high importance</th>
<th>Very High Importance</th>
<th>No ability</th>
<th>Moderately low ability</th>
<th>Moderately high ability</th>
<th>Very high ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching gifted students record keeping skills</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Helping gifted students complete SAE projects</td>
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<td></td>
</tr>
<tr>
<td>Helping gifted students apply for proficiency awards</td>
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<td></td>
</tr>
<tr>
<td>Motivating gifted students to join the FFA</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Working with gifted FFA members in the FFA chapter</td>
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</tr>
<tr>
<td>Working with gifted students in leadership roles</td>
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<td></td>
</tr>
<tr>
<td>Working with gifted students on CDE teams</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Helping gifted students apply for FFA degrees</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
In the current school year, what percent of your agriculture students are identified as gifted by you or your school?

Including this year, how many years have you been teaching?
(in years - please use whole numbers)

What is your gender?

- [ ] Male
- [ ] Female

In what type of community do you teach?

- [ ] Metro Urban Area (greater than 200,000 in population)
- [ ] Urban (between 50,000 - 199,999 in population)
- [ ] Urban Cluster (between 2,500 - 49,999 in population)
- [ ] Rural (less than 2,500 in population)
Your responses have been recorded. As a token of our appreciation, you are invited to participate in the Amazon gift card drawing for five $20 gift cards and two $50 gift cards.

To enter the drawing, click here.
If you would like to enter into the drawing for 2 $50 Amazon gift cards and 5 $20 Amazon gift cards, fill out your name and email address below. Contact information will only be utilized for this drawing, and then disposed of after the drawing.

Name:

Email:

Thank you for your participation in this survey and drawing. We will notify all that enter the drawing at the conclusion of the drawing.
Appendix B

Pre-Survey E-mail to Participants
SUBJECT: Invitation to Participate in a National Agricultural Education Survey

Good Afternoon,

The agricultural education profession needs your help! You have been randomly selected to participate in an agricultural education survey with other agriculture teachers across the nation. **I want to know what you think about working with gifted students in your agriculture classroom, so that the profession can better meet the needs of gifted students interested in agriculture.**

Tomorrow you will receive a link via email inviting you to participate in the following study: **Agriculture teacher attitudes toward gifted education and teaching gifted students in the agriculture classroom.**

After accessing the link, the survey should take approximately **10 minutes** to complete and it is all based on your own opinion as an agriculture teacher. All of your responses are kept confidential and will only be shared as aggregated data at the end of the study.

As a token of our appreciation you will have the option to enter an Amazon gift card drawing for two $50 gift cards and five $20 gift cards at the end of the survey that will be distributed at the conclusion of the study. Please watch for the email with the survey link tomorrow. Contact Olivia Hile (olivia.horning@aggiemail.usu.edu) with any questions or concerns regarding your participation in the study.

Thank you in advance for your willingness to contribute to research in agricultural education! If you would like to complete the survey early, access the survey at the following link: $\{l://SurveyLink?d=Take the Survey\}$ Or copy and paste the URL below into your internet browser: $\{l://SurveyURL\}$

Sincerely,

**Olivia M. Hile**
Graduate Student
Utah State University

**Tyson J. Sorensen**
Assistant Professor
Utah State University

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

Cover Letter (E-mail) and Survey Link
SUBJECT: Link to Participate in a National Agricultural Education Survey

Good Morning,

The agricultural education profession needs your help! You have been randomly selected to participate in an agricultural education survey with other agriculture teachers across the nation. I want to know what you think about working with gifted students in your agriculture classroom, so that the profession can better meet the needs of gifted students interested in agriculture. All of your responses are kept confidential.

This email contains the link to participate in the following study: Agriculture teacher attitudes toward gifted education and teaching gifted students in the agriculture classroom.

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

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

The survey should take approximately 10 minutes to complete and it is all based on your own opinion as an agriculture teacher. After you complete the survey, you will have the option of entering an Amazon gift card drawing for two $50 gift cards and five $20 gift cards that will be distributed at the conclusion of the study.

If you have any questions or concerns regarding your participation in the study, please contact Olivia Hile at olivia.horning@aggiemail.usu.edu. Thank you in advance for your willingness to contribute to the body of research in agricultural education!

Sincerely,

Olivia M. Hile
Graduate Student
Utah State University

Tyson J. Sorensen
Assistant Professor
Utah State University

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

Follow-Up E-mail to Participants
Good Morning,

I want to extend a thank you to all that have participated in my survey about gifted students in agricultural education. To those that have not taken the survey yet, there is still time! I would like to know what you think about working with gifted students in your agriculture classroom so that the profession can better meet the needs of gifted students interested in agriculture. Access the link below if you are interested in completing the following survey: Agriculture teacher attitudes toward gifted education and teaching gifted students in the agriculture classroom. All of your responses are kept confidential.

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

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

The survey will only take approximately **10 minutes** to complete and you can exit the survey at any time. You will have the option of entering an Amazon gift card drawing for **two $50 gift cards and five $20 gift cards** at the end of the survey.

If you have any questions or concerns regarding your participation in the study, please contact Olivia Hile (olivia.horning@aggiemail.usu.edu). Your time is very important. Thank you in advance for your willingness to contribute your time to further research in agricultural education!

Sincerely,

**Olivia M. Hile**
Graduate Student
Utah State University

**Tyson J. Sorensen**
Assistant Professor
Utah State University

Follow the link to opt out of future emails:
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Appendix E

Second Follow-Up E-mail to Participants
SUBJECT: Limited Time to Participate in a National Agricultural Education Survey

Good morning,

There is a limited amount of time remaining to participate in the 10-minute survey about working with gifted students in your agriculture classroom and enter the Amazon gift card drawing for two $50 gift cards and five $20 gift cards at the end of the survey. If you plan to participate, please complete the survey by this Friday, April 3, 2019. The survey is titled: Agriculture teacher attitudes toward gifted education and teaching gifted students in the agriculture classroom. All of your responses are kept confidential.

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

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

If you have any questions or concerns regarding your participation in the study, please contact Olivia Hile (olivia.horning@aggiemail.usu.edu). We appreciate your time and effort in taking this survey. Thank you in advance for your willingness to contribute your time to further research in agricultural education!

Sincerely,

Olivia M. Hile
Graduate Student
Utah State University

Tyson J. Sorensen
Assistant Professor
Utah State University

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Appendix F

Thank You Email to Participants
SUBJECT: Thank You for Participating in the National Agricultural Education Survey

Good Morning,

Thank you for investing in agricultural education research and taking the time to complete my thesis survey about working with gifted students in your classroom. All data has been collected, and for those that entered the gift card drawing, the Amazon gift cards are in the process of being distributed. Your participation is much appreciated.

Sincerely,

Olivia M. Hile
Graduate Student
Utah State University

Tyson J. Sorensen
Assistant Professor
Utah State University

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Appendix G

Data Analysis Tables
Table G1

*Variable Analysis and Reporting of Data for Research Question #1*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable type</th>
<th>Notes/relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of gifted students</td>
<td>Continuous</td>
<td>Descriptive = ( M, SD )</td>
</tr>
<tr>
<td>Method of licensure</td>
<td>Categorical</td>
<td>Descriptive = ( f, % )</td>
</tr>
<tr>
<td>Addressed/prepared to teach gifted (2 items)</td>
<td>Continuous/scaled</td>
<td>Descriptive = ( f, %, M, SD )</td>
</tr>
<tr>
<td>Time spent addressing gifted</td>
<td>Categorical</td>
<td>Descriptive = ( f, % )</td>
</tr>
<tr>
<td>Gender</td>
<td>Dichotomous</td>
<td>Descriptive = ( f, % )</td>
</tr>
<tr>
<td>Years of teaching</td>
<td>Continuous</td>
<td>Descriptive = ( f, % )</td>
</tr>
<tr>
<td>Community type</td>
<td>Categorical</td>
<td>Descriptive = ( f, % )</td>
</tr>
</tbody>
</table>
Table G2

*Variable Analysis and Reporting of Data for Research Question #2*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable Type</th>
<th>Notes/Relationship</th>
</tr>
</thead>
</table>
| Value (construct)         | Continuous/scaled   | Descriptive = $M, SD$
|                           |                     | by method of licensure = Kruskal-Wallis<sup>a</sup>                                 |
|                           |                     | by gender = Mann-Whitney U<sup>a</sup>                                               |
|                           |                     | by years of teaching = Pearson’s product moment correlation                           |
|                           |                     | by community type = Mann-Whitney U<sup>a</sup>                                      |
| Teaching (construct)      | Continuous/scaled   | Descriptive = $M, SD$
|                           |                     | by method of licensure = Kruskal-Wallis<sup>a</sup>                                 |
|                           |                     | by gender = Mann-Whitney U<sup>a</sup>                                               |
|                           |                     | by years of teaching = Pearson’s product moment correlation                           |
|                           |                     | by community type = Mann-Whitney U<sup>a</sup>                                      |
| Focus (construct)         | Continuous/scaled   | Descriptive = $M, SD$
|                           |                     | by method of licensure = Kruskal-Wallis<sup>a</sup>                                 |
|                           |                     | by gender = Mann-Whitney U<sup>a</sup>                                               |
|                           |                     | by years of teaching = Pearson’s product moment correlation                           |
|                           |                     | by community type = Mann-Whitney U<sup>a</sup>                                      |
| Agricultural education   | Continuous/scaled   | Descriptive = $M, SD$
| (construct)               |                     | by method of licensure = Kruskal-Wallis<sup>a</sup>                                 |
|                           |                     | by gender = Mann-Whitney U<sup>a</sup>                                               |
|                           |                     | by years of teaching = Pearson’s product moment correlation                           |
|                           |                     | by community type = Mann-Whitney U<sup>a</sup>                                      |
| Power struggle (Individual Items) | Continuous/scaled   | Descriptive = $M, SD$
|                           |                     | by method of licensure = Kruskal-Wallis<sup>a</sup>                                 |
|                           |                     | by gender = Mann-Whitney U<sup>a</sup>                                               |
|                           |                     | by years of teaching = Pearson’s product moment correlation                           |
|                           |                     | by community type = Mann-Whitney U<sup>a</sup>                                      |

<sup>a</sup>Nonparametric tests due to lack of normality and homogeneity of variance in portions of the data.
Table G3

*Variable Analysis and Reporting of Data for Research Question #3*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable Type</th>
<th>Notes/Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics</td>
<td>Continuous/Scaled</td>
<td>Descriptive = $M$, $SD$</td>
</tr>
<tr>
<td>(Individual items)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table G4

*Variable Analysis and Reporting of Data for Research Question #4*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable Type</th>
<th>Notes/Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Development</td>
<td>Continuous/Scaled</td>
<td>Descriptive = $M$, $SD$, $f$, $%$ MWDS</td>
</tr>
<tr>
<td>(Individual items)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix H

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