A Case Study of an Agriculture Teacher's Planned Behavior When Working With Students With Special Needs

Michelle L. Greaud

Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
In
Agricultural, Leadership, and Community Education

Donna M. Westfall-Rudd, Chair
Curtis R. Friedel
Hannah H. Scherer
John C. Ricketts

June 2, 2021
Blacksburg, VA

Keywords: Agricultural Education, Special Needs Students, Planned Behavior, Universal Design for Learning (UDL), Individualized Education Program (IEP)

A Case Study of an Agriculture Teacher's Planned Behavior When Working With Students With Special Needs

Michelle Greaud

ABSTRACT

Students with special needs are often placed in agriculture and other CTE classes. Literature has shown that teachers often feel unprepared to deal with this population of students. The Theory of Planned Behavior framed this case study of an exemplar agriculture teacher. Evidence of the teacher's planned behavior was supported by triangulation of interviews with the teacher, special education coordinator, special education aide, and lesson plans. This triangulation also showed that the teacher is an exemplar agriculture teacher in his work with students with special needs. Multiple themes emerged from the analysis of the interviews. An important theme was the need for agriculture teachers to participate in IEP meeting either by attending in person or by providing feedback prior to the meeting. Another important theme was the need for materials to be adapted for students with special needs both within lesson plans and as needed while the teacher is teaching the lesson. Recommendations for practice include providing information about special education laws, disabling conditions, and information on utilizing Universal Design for Learning (UDL) to pre-service and in-service teachers. It is also recommended that teacher preparation programs include having pre-service teachers work with students with special needs. Professional development workshops that discuss best practices for teachers when working with students with special needs can be beneficial. It is important for teachers to realize that not all students are the same but that everyone is better served if all teachers do their best at helping students achieve their highest potential. Because in the end, we all just want to be accepted for who we are.

A Case Study of an Agriculture Teacher's Planned Behavior When Working With Students With Special Needs

Michelle Greaud

GENERAL AUDIENCE ABSTRACT

Students with special needs are often placed in agriculture and other CTE classes. This dissertation was a case study of a model agriculture teacher. It looked at the teacher's behavior to determine if his work with students with special needs was planned. The importance of a teacher planning their behavior towards students with special needs is important from both a lesson planning viewpoint and also while the teacher is teaching. Multiple recommendations came out of the study. One recommendation included the need for programs that prepare agriculture teachers to have these individuals work with students with special needs while they are still in their teacher preparation program. Professional development workshops for current agriculture teachers should include information on best practices for working with students with special needs. It is important for teachers to realize that not all students are the same but that everyone is better served if all teachers do their best at helping students achieve their highest potential. Because in the end, we all just want to be accepted for who we are.

Acknowledgments

There are so many people that have helped me along this journey. I definitely could not have done it without their support and encouragement. I would like to thank Dr. Donna Westfall-Rudd for serving as my committee chair. I also want to thank Drs. Curtis Friedel, Hannah Scherer, and John Rickets for serving on my committee. I also am very grateful to my case study participant "Mike" for agreeing to participate in my case study even as it evolved and changed multiple times due to COVID-19.

First and foremost, to Eric, I could not have done this without your love and support. You pushed me to start this journey and provided continual encouragement and support throughout. You started by encouraging me to get my Masters and then my PhD. You always told me that I could do it even when I doubted my ability. Without your help, I never would have been able to complete this journey. To Samantha, I hope that I have been an example that you can accomplish anything once you put your mind to it. Thank you for telling me that you knew I could finish this journey on the days I questioned what I was doing. To Logan, you are the reason I am so passionate about wanting to change the world to ensure that all students with special needs can reach their highest potential. You have shown me that it is possible to overcome all obstacles with the right people there to help you. To Marleigh, thank you for giving me a hug when I needed one and for understanding when I had to do school work. You are one of the most caring people I know. To Makaela, thank you for telling me you understood when I couldn't play with you because I had to work on my dissertation. I hope that one day you will really understand. To Markus, thank you for providing comic relief. To JoJo, your sweet snuggles when I was having a bad day helped make it all better.

To my mom, Carolyn, thank you for telling me that I made you proud by accomplishing this goal and for reminding me on a regular basis that I could do this. To my dad, John, thank

you for checking on me as I went through this journey. To my siblings, Valerie, John, Denise, and Joanna, your support and encouragement over the years has been so valuable to me. To Dianne, thank you for being my cheerleader and confident. I cannot tell you how much help you have been by watching the girls so I could work without interruption.

To all of the ALCE graduate students who went through this journey with me, I appreciate the time you took to make me a part of the graduate student community. You never made me feel like an outsider even though I was on a different path, as we all had the same goal. A special thank to Sarah Bush and Kelly Robinson for all the chat sessions at my desk to try to figure out the correct way to word my research questions. To Lane Woodward and Kathleen Carper, thank you for listening to me vent when I was frustrated. To Debbie Carroll, thank you for being there for me through the years. I value your friendship. To Tracy Rutherford, thank you for encouraging me and pushing me to reach my goal.

Table of Contents

Chapter One: Introduction

Background & Setting

"How to best meet the educational needs of students with special needs has been the elephant in the room for agricultural education for some time" (Easterly & Myers, 2011, p. 36). Historically, students with special needs have taken agricultural or other Career and Technical Education (CTE) courses to prepare for future careers. Due to the hands-on nature of CTE courses, students with special needs have benefited as they become engaged in the curriculum and practice skills that may be helpful as they transition from school to employment. Research has shown that students involved in CTE courses are more likely to be employed and less likely to drop out of school. "Expert teachers apply beneficial instructional modification and employ a variety of instructional modifications to meet the needs of learners with special needs" (Easterly & Myers, 2011, p. 37). Some examples of modifications that expert teachers make for students with special needs include curricular, environmental, and instructional adaptions (Richardson, 2005). According to Richardson (2005), additional strategies expert teachers utilize are asking probing questions, assistive technology, audiovisual aids, cooperative learning strategies dividing work into smaller units, following up on directions, helping students focus, and highlighting key points.

The Virginia Department of Education (2019b) reports that for the 2020 – 2021 school year, there were a total of 1,252,756 students in all grades. Of these students, 167,893 (13.4%) have a diagnosed disability. When looking at students in grades nine through twelve (high school), the percentage of students with a diagnosed disability is slightly more at 13.50%. During the 2018 – 2019 school year, 10.03% of students with special needs were enrolled in an agricultural class. During this same time frame, 63.77% of students with special needs were enrolled in a CTE class (B. Watson, personal communication, December 2, 2019). These

numbers dropped slightly for the 2020-2021 school year with 9.4% of students with special needs enrolled in an agricultural class and 60.19% of students with special needs in a CTE class (B. Watson, personal communication, June 30, 2021). The U. S. Department of Education found that students with special needs are a higher proportion of student enrollment in agricultural education courses as compared to other non-CTE courses (Giffing, 2009).

It is necessary for CTE teacher educators to prepare pre-service teachers to understand Individualized Education Program (IEP) development and special education laws as well as the ability to teach CTE courses (Kessell, Wingenbach, & Lawver, 2005; Kessell, 2005). It would be helpful for teacher educators to have units in their teacher preparation classes on special education laws and disabling conditions. While most certification courses require the completion of a course on instructing students with special needs, it would be helpful to have this topic embedded across multiple courses (Kessell, Wingenbach, & Lawver, 2005; Kessell, 2005). The most important thing that teacher educators can do to have student teachers better prepared to accommodate and teach students with special needs is to construct an assignment where the student teacher is required to monitor and assess a student with a disability during a classroom visitation. It is more desirable for this to occur before beginning to student teach (Kessell, Wingenbach, & Lawver, 2005). Faculty can develop a graduate course concerning education and the law and include topics related to special education and the liability in regards to negligence which might occur in agricultural education laboratories and classrooms (Kessell, 2005).

There are different methods that can be used to obtain teacher licensure in Virginia. A person can complete a traditional teacher certification program, complete the career switch alternative route to licensure program, obtain a technical professional license, or apply for a provisional license (Teacher-Certification Degrees, 2019). Additionally, an individual can obtain

teacher licensure in Virginia by transferring their teaching license from another state (Teacher-Certification Degrees, 2019).

Challenges for Pre-service Teacher Preparation Programs

It is argued that the responsibility for preparing pre-service teachers to meet the needs of students with special needs' in a general education classroom rests with the teacher-preparation program (Conderman & Johnston-Rodriguez, 2009). Pre-service teachers who have completed coursework related to working with students with disabilities feel more confident in their ability to be successful when working with students with special needs if they have the ability to practice the skills they have learned (Conderman & Johnston-Rodriguez, 2009). The better the quality of the pre-service experiences that a teacher receives, the greater the job satisfaction they have when working with students with special needs and the more positive perception they have in regard to working with these students (Forlin, Sharma, & Loreman, 2007). Evidence suggests that teaching quality is related to the pre-service education experience (Kessell, 2005).

The experience of student teaching is fundamental to preparing future teachers to work with students with special needs in the general education classroom. It is recommended that pre-service teachers obtain more hands-on experience working with students with special needs. It has been recommended that a course is planned for pre-service general educators instead of using a current course that is intended for pre-service teachers in special education (Kessell, 2005). It is recommended pre-service teachers to act as an aid in a class with students with special needs, conduct case studies of students with disabilities, observe teachers with students with disabilities in their classroom, and teach a lesson to a class that includes students with disabilities (Bobbitt, 2011) prior to completing their licensure programs.

Challenges for Agricultural Education Teachers with Students with Special Needs

According to Seay, Hilsmier, & Duncan (2010), teachers who have an increased understanding of inclusion are more likely to be confident in their ability to influence students positively. It is necessary for schools to maximize the general education teachers' participation in the education plans for students with disabilities. Since this plan will impact the general education classroom, this is especially important. General education teachers lack confidence in participating in the Individualized Education Program (IEP) conferences and in writing IEPs. Although this is not surprising, what is more disconcerting is that these teachers also lack confidence in adapting curriculum and materials, giving assistance to individuals, managing students' behavior problems, and writing the behavioral objectives for students. Research has shown that teachers feel they need training in the areas of adapting curriculum, assessing academic progress, developing IEPs, managing student behavior, program modifications, and using technology. It is important for coursework to contain information on teaching students with special needs and special needs in general (Seay, Hilsmier, & Duncan, 2010).

Further research indicated that teachers needed assistance in the areas of evaluating students with special needs, inclusion, IEPs, and teaching strategies (Elbert & Baggett, 2003). Another research study indicated that beginning agricultural education teachers had moderate problems in the areas of adapting instruction for low academic students, the high number of students who have low academic ability, keeping students interested, and motivating students (Boone & Boone, 2007). According to Kessell, Wingenback, & Lawver (2005), current teachers would benefit from in-service training on special education laws and disabling conditions. Agricultural education can benefit from better-quality instruction and practice for inclusion strategies and techniques (Kessell, Wingenbach, & Lawver, 2005). Stair (2009) indicates that

training and in-service should be provided to help teachers to learn to implement recommended teaching strategies and to find ways to use these strategies effectively in their classrooms. Also, in-service and training need to be developed for older teachers within the field to help build total confidence when working with students with special needs (Stair, 2009).

It is important for agricultural education and other CTE teachers to learn techniques on how to work with both individuals with special needs and groups of students with special needs to help them reach their maximum potential (Elbert & Baggett, 2003). According to Elbert and Baggett (2003), teachers felt least capable in completing Individual Vocational Education Plans (IVEP) and IEPs. It is necessary to provide additional training in these areas. To better develop IVEPs and IEPs, it is suggested that the teacher conducts a student analysis. This analysis should include basic skills (numerical and computational skills, reading, and writing), career and technical aptitudes (manual dexterity and work capacity), and occupational aspirations and interests. By completing this analysis, the teacher is better able to determine the strengths and weaknesses of the student. It is best if the analysis is completed by a team including CTE educators, CTE evaluators, CTE support services personnel, guidance counselors, rehabilitation professionals, special education teachers, school psychologists, and social workers (Elbert & Baggett, 2003).

It is helpful to provide instruction for pre-service teachers about SMART goals for IEPs. SMART goals are: Specific, Measurable, use Action words, Realistic and Relevant, and Time-limited (Wright & Wright, 2008). Specific means that the IEP goals target areas of functional performance and academic achievement. These goals and objectives need to include clear descriptions regarding how skills are going to be taught and how the student's progress is going to be determined — measurable means that the goals and objectives can be observed or counted.

By utilizing SMART goals, teachers can determine how much progress a student has made. Action words include three components: 1. Area of need; 2. The direction of behavior; and 3. Level of attainment. Realistic and relevant means that the student's individual needs will be addressed. Time-limited refers to the time frame during which the student will achieve the goal (Wright & Wright, 2008).

According to Harvey (1999), vocational educators need to be included in IEP meetings. There needs to be communication and collaboration between CTE instructors and special educators (Harvey, 2003). There are several strategies that can be utilized to help students with special need reach their highest potential. Some of the strategies that can be useful include: STEM, Universal Design for Learning, and backward design. Inclusive pedagogy gives teachers the ability to acknowledge that they have the needed skills to help all learners (Florian & Linklater, 2010).

Statement of the Problem

According to Haber and Sutherland (2008), many teachers view CTE course as a reasonable placement for students with special needs. Unfortunately, CTE teachers are frequently not prepared to teach students with special needs. Alternatively certified CTE teachers are often ineffective and unsure how to help this population of students (Haber and Sutherland, 2008).

Teachers have different styles of teaching. According to Fishbein and Ajzen (2015), a specific behavior is more likely to be conducted if the intention is stronger. Teachers may fail to act on their good intentions because they forgot. Some teachers may have good intentions to provide high-quality teaching to students with special needs but lack the knowledge or ability to be successful. Modeling strategy can be utilized so that teachers who lack the expertise to work

with students with special needs can observe teachers who possess this skill (Fishbein and Ajzen, 2015).

A study using the theory of planned behavior found that the teachers studied intended to teach students with special needs in their inclusive classes (Hodge, Ammah, Casebolt, Lamaster, and O'Sullivan 2004). Some of the teachers had difficulty teaching students with special needs, and this difficulty seemed to be related to both the severity and nature of the disabilities of the students and to the teacher's level of preparedness. Additionally, most teachers did not make appropriate modifications to their instruction to teach students with special needs. Hodge et al. (2004) speculated that this may have been because the teachers did not feel adequately prepared to teach students with special needs (the teachers in the study actually stated that they felt inadequately prepared).

Teaching Online Policy Change – Spring 2020

On March 13, 2020, Governor Northam (the Governor of Virginia) ordered all K-12 schools in the state closed from March 16 – March 27 due to COVID-19. On March 23, 2020, Governor Northam mandated all K-12 schools in the state to remain closed for the remainder of the current school year. This closure has left school trying to figure out how or if they will be continuing instruction for their students. According to the Virginia Department of Education (2020):

> "Division leaders will be making decisions about how learning will continue and when/how students will make up the rest of the content from this year. The Virginia Department of Education (VDOE) will issue guidance to help divisions execute plans to continue instruction, while ensuring students are served equitably, regardless of income

> level, access to technology, English learner status or special needs. This includes options for virtual learning, additional instruction through summer programming and integrating instruction into coursework next year."

With all schools in Virginia transitioning to an online format for the remainder of the 2019-2020 academic year, there is a concern that students that are already struggling may fall even further behind.

What does this information mean for teachers and students, especially students with special needs? Virginia Department of Education (2020) also states that:

> "If a school closure causes educational services for all students to pause within a school or division, then the school/division is not required to provide services to the affected students eligible for special education services during that same period of time. If a division has extended school closures, VDOE has advised that school divisions should consider options and ideas to engage students in reading, thinking and learning. Creating such opportunities should be done with careful consideration of providing equitable access and support for a variety of students. Due to the waivers that are likely to be granted for school closures related to COVID-19, schools should not consider these strategies for continuity of learning as make-up days or hours. Positive proactive strategies to continue engagement in learning are not a form of instruction/instructional day and thus would not require school divisions to offer FAPE. If a school division does begin to offer instructional services by alternative means the division will remain responsible for the free appropriate public education (FAPE) of its students eligible for special education services with an individualized education program (IEP). Accessible technology may afford students, including students with disabilities, an opportunity to

have access to high-quality educational instruction during an extended school closure, especially when continuing education must be provided through distance learning." Students with special needs may fall behind in courses if they do not have someone at home that can help them with their coursework.

Nadworny and Kamenetz (2020) argue that instruction for students with special needs should be provided through distance learning. They argue that accommodations such as extended times for testing and audiovisual aids can and should be utilized (Nadworny and Kamenetz, 2020). According to the United States Department of Education (2020), some educators assume that providing distance education to students with special needs is not possible because the expectation to follow federal disability law poses overwhelming barriers. It is incorrect to assume that it is impossible to provide distance education to students with special needs. There are multiple formats for delivering special education through distance instruction that include: online, telephonically, or virtually (United States Department of Education, 2020).

Purpose

This research study was conducted to investigate the planned behavior of an exemplar agriculture teacher when teaching students with special needs. The focus of the study was how an exemplar agriculture teacher works with students with cognitive impairments. This design sought to inform the following research questions:

Research Questions

1. How does an exemplar agriculture teacher who works with students with special needs and the special education coordinator, describe the teacher's knowledge of special education practices and implementation?

2. How does an exemplar agriculture teacher integrate their knowledge of special education practices in their lessons?
3. How does an exemplar agriculture teacher's knowledge of special education practices reflect in their observed teaching behavior?

Theoretical Framework

The framework that informs this study is the Theory of Planned Behavior (TPB) (Figure 1). According to Fishbein and Ajzen (2015), the Theory of Planned Behavior considers that intentions control all actions. Many factors, both internal and external, can control intention. Individuals may lack the ability, information, or skill to carry out their intended behavior. Some people may believe that they lack these resources. When a modeling strategy is utilized, individuals have the opportunity to observe how someone else performs a certain behavior. The observer can then acquire the skill necessary to perform the behavior themselves. Two additional methods that can be utilized to help someone practice the intended behavior are simulation and role playing (Fishbein and Ajzen, 2015). According to a study on the theory of planned behavior by de Nooijer, J., Lechner, L., & De Vries, H. (2003), knowledge strongly correlates to intended behavior.

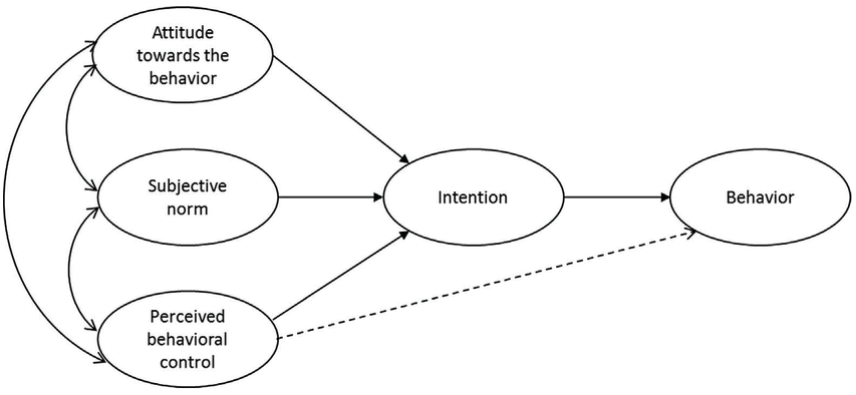


Figure 1: Theory of planned behavior (Ajzen, 1991, p. 182).

Reflexivity Statement

As a parent of a child with special needs, ensuring that teachers help students reach their highest potential is very important to me. My son has a very rare genitive anomaly. This anomaly is so rare that they do not have a name for it. When my son was born, the doctor that diagnosed him told me that he would never be able to do anything for himself and furthermore that he would do nothing but sit and drool. My attitude was such that I was going to do whatever was necessary to prove that doctor wrong. I was able to acquire early intervention services for my son. He started speech therapy in the public school when he turned three years old. I have advocated for him since the day he was born to help guarantee that he will be able to reach his highest potential.

My son is now eighteen years old. He is finishing his junior year in high school and has loved taking agricultural classes since he was in eighth grade. Throughout school, he has had teachers that have wanted to help him succeed and other teachers that just seemed to be going through the motions of helping students so that they could get a paycheck. I have collaborated with his teachers and school administrators to ensure he is in classes that challenge him and allow him to succeed.

I know that there are things that my son will never be able to accomplish. He will never be able to drive a car (he is legally blind). He will most likely never be able to live by himself. He will most likely never marry and have children. But, my son will reach his highest potential and he will succeed in school and in life!

Unfortunately, not all parents know how to advocate for their children. In a perfect world, all parents and teachers would know how to and want to support children with special needs. I

want to help agriculture teachers know how to encourage their students with special needs so that they can all reach their highest potential and succeed.

I am working to help agriculture teachers because my son has a passion for agriculture and will continue to take agricultural classes while he is in high school. I want to help ensure that his agriculture teachers know how to encourage him and other students with special needs so that they can all succeed in their classes. I eventually would like to expand my research so that I can help all CTE teachers support their students with special needs so that the students can reach their highest potential in their classrooms.

Significance of the Study

This study contributed to the literature on agricultural education teachers and how they work with students with special needs. Specifically, it contributed to the planned behavior of agriculture teachers when working with student with special needs. According to MacFarlane and Woolfson (2013), teachers with higher levels of perceived behavioral control had greater levels of behavioral intentions to utilize inclusive practices when working with students with social, emotional and behavioral difficulties. Zint (2002) found that the most important predictor of intention to act in a specific manner was past behavior, attitude toward behavior, perceived behavioral control, and subjective norm (in that order).

Limitations of the Study

The major limitation of this study is the lack of generalizability of the findings, since it is a case study with one teacher. It is difficult to generalize the information gained from a case study to a larger population (Whipp, 1998). A major limitation of qualitative research is that the findings are not transferable (Drisko, 1997). Another limitation to qualitative research is that the participants may say what they believe the researcher wants to hear (Bowen, 2005).

Conclusion

According to Darling-Hammond (2003), there is evidence to suggest that teachers who are not adequately prepared are more likely to leave the profession. A better comprehension of the knowledge of the abilities, attitudes, and needs of in-service agriculture teachers when working with students with special needs is an important step in determining which programs should be offered to address these issues. Aiding in-service teachers with tools they can use in their classroom will assist the teachers in helping students with special needs reach their highest potential.

Definition of Terms

Agricultural education. "Agricultural Education includes programs of study designed to prepare students for occupations in horticulture, agricultural business, natural resources management, agricultural machinery, and production agriculture. Agricultural Education stresses the development of skills in all aspects of agricultural businesses and industries, including planning, management, safety, finances and leadership" (Virginia Department of Education, 2018a, para. 1).

Career and technical education (CTE). "Career and technical education (CTE) programs in Virginia public schools serve more than 640,000 students in one or more CTE courses in grades 6-12. These programs are designed to prepare young people for productive futures while meeting the commonwealth's need for well-trained and industry-certified technical workers" (Virginia Department of Education, 2019a, para. 7).

Direct assistance. "Reading printed materials…providing guided instruction…adjusting the pace…teaching prerequisite information…monitoring student understanding…reteaching" (TeacherVision, 2001, p. 1).

Direct questions. "Direct question has long been the standard tool for eliciting information from respondents" (Snow, Zurcher, & Sjoberg, 1982, p. 287).

General education. "General Education is the program of education that typically developing children should receive, based on state standards and evaluated by the annual state educational standards test" (Webster, 2017, para. 1).

Individualized Education Plan (IEP). "Plan or program developed to ensure that a child who has a disability identified under the law and is attending an elementary or secondary educational institution receives specialized instruction and related services" (University of Washington, 2017, para. 1).

Individuals with Disabilities Education Act (IDEA). "The Individuals with Disabilities Education Act (IDEA) is a federal law ensuring services to children with disabilities throughout the nation" (Virginia Department of Education, 2018b, para. 1).

Interstate Teacher Assessment and Support Consortium (InTASC). "A consortium of state education agencies and national educational organizations dedicated to the reform of the preparation, licensing, and ongoing professional development of teachers" (Stockard, 2006, p. 80).

Modeling. "The teacher engages students by showing them how to perform a skill while describing each step with a rationale" (University of Louisville, 2017, para. 1).

Proximity. "Most research has defined effective proximity as within about three feet of the student" (Gunter, Shores, Jack, Rasmussen, & Flowers, 1995, p. 13).

Redirection. "Redirection is the act of helping a student to focus on whatever your class is being asked to do at a given point in time" (Panico, 2008, p.3).

Response to Intervention (RTI). "Provides tiered levels of support to all students and allows for increasingly more intensive and individualized instruction" (Basham, Israel, Graden, Poth, & Winston, 2010, p. 76).

Scaffolding. "Building off the information that is already mastered" (LaJoie, slide 3).

Science, Technology, Engineering, and Mathematics (STEM). "The disciplines of science, technology, engineering, and mathematics taught and applied either in a traditional and discipline-specific manner or through a multidisciplinary, interconnected and integrative approach." (Siekmann and Korbel, 2016, p. 17).

Section 504. "A part of the Rehabilitation Act of 1973 that prohibits discrimination based upon disability. Section 504 is an anti-discrimination, civil rights statute that requires the needs of students with disabilities to be met as adequately as the needs of the non-disabled are met" (Durheim, 2017, para. 2).

Self-Efficacy. "People's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1994, para. 1).

Universal Design for Learning (UDL). "A set of principles and instructional strategies designed to improve the academic experience of the student with disabilities by making instruction and instructional materials, more accessible to all students. In other words, the UDL model predicts that strategies designed to improve learning for students with disabilities will have equal benefit for other students in the class" (Roll, 2007, slide 6).

Chapter Two: Literature Review

Many general education teachers lack the self-confidence to adapt their curriculum to meet the educational goals of students with special needs in their classrooms (Seay, Hilsmier, & Duncan, 2010). In a study by Myers, Dyer, and Washburn (2005), many agriculture teachers identify working with special needs students as a major problem area. Agriculture teachers may identify this as a major problem area because they do not feel adequately prepared.

Teachers with university-based professional development who have been implementing inclusive programs have a more positive attitude and are more confident in meeting the IEP requirements of students with special needs (Avramidis, Bayliss, Burden, 2000). According to Buell, Hallam, Gamel-McCormick, and Scheer (1999), the professional development needs of teachers is very important. Harvey (1999) recommends career and technical education teachers should be required to take six credits of university coursework in the area of career and special technical needs, school improvement plans should emphasize staff development efforts, there should be clear articulation of career and technical education opportunities to special needs students and their families, and career and technical education teachers need to be included in IEP meetings.

Harvey and Pellock (2003) conducted a 2001 study of 127 career and technical education instructors in Pennsylvania regarding educator perceptions using the *Student Characteristics and Career and Technical Education Instructional Expectations Assessment Survey*. The design was quasi-experimental and used non-random survey methods along with student cases. Of those surveyed, 19% had no university coursework in the area of special needs. During the previous two years, only 38% had a university course in special needs. Twenty-two percent had no training through continuing education. Twenty-five percent had taken continuing education

credits during the previous six months. Sixty-seven percent had received in-service training in special needs within the previous year. Eight percent had no in-service training in the area of special needs. Several recommendations were suggested from the study, including:

1. CTE instructors should take full advantage of training opportunities available,
2. Partnerships should be developed to offer in-service training and coursework for career and technical education professionals,
3. Career and technical educators need a broad-based network of support to assist students with special needs in secondary CTE courses,
4. Research should be continued on attitudes and perceptions of career and technical educators regarding expectations for students with special needs in CTE courses, and
5. Families and educators should work together to support students with special needs for gaining occupational skills (Harvey & Pellock, 2003).

Harvey and Pellock (2004) suggest that training efforts need to provide comprehensive professional development for secondary CTE instructors leading to skills that support all students, including those with special needs by the use of best practices. CTE training efforts should be ongoing and provide sustainable professional development that directly influences CTE programming concerning special needs students (Harvey & Pellock, 2004). Also, training efforts at the university and local education agency level for secondary CTE educators need to focus on research-based educational best practices (Harvey, Cotton, & Kock, 2005).

Theoretical Framework

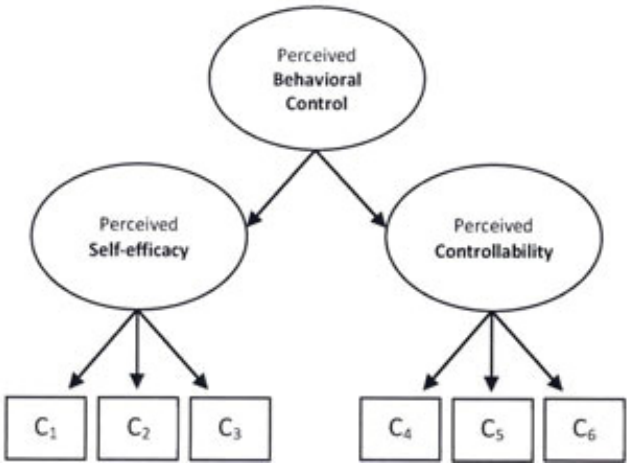


Figure 2: Hierarchical model of perceived behavioral control (Ajzen, 2002, p. 679).

Ajzen (2002) asserts that three things guide human behavior: behavioral beliefs, control beliefs, and normative beliefs (Figure 2). Behavioral beliefs are the attitude toward the behavior, control beliefs are the perceived behavioral control, and normative beliefs are subjective norms. When you combine the three of these, behavioral intention is formed. Control beliefs are rooted in self-efficacy. According to the hierarchical model, even though self-efficacy and self-controllability are easily distinguished, they need to remain correlated (Ajzen, 2002). According to Bandura, self-efficacy is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" (1995, p. 2). Performance accomplishment, vicarious learning, verbal encouragement, and emotional states all interact to produce behavior and performance based on self-efficacy (Bandura, 1997). Self-efficacy, therefore, is the confidence someone has about their competence in a specific setting (Cherry, 2013). A person's self-system includes their abilities, attitudes, and cognitive skills (Cherry, 2013). According to Bandura (1994), people who have a strong sense of self-efficacy have stronger personal accomplishments, lower stress, and lower depression susceptibility. One of the best ways to create strong self-efficacy is by accomplishment (Bandura, 1994). Bandura (1994) believes that

if a person has a stronger perceived self-efficacy, they set higher goals and have a stronger commitment to those goals.

According to Ajzen's (1991) theory of planned behavior maintains that an individual's intentions can be predicted with a high degree of accuracy by their attitudes, subjective norms, and perceived control. Teacher's with a positive attitude are more likely to include students with special needs, based on Ajzen's theory (Ajzen, 1991). Johnson, Wilson, Flowers, and Croom (2012) completed a study with 77 agriculture teachers in North Carolina to look at the opinions teachers had available to successfully engage students who have special needs in Supervised Agricultural Experience (SAE) and FFA activities. The study found that teachers see involvement in SAE programs and FFA as valuable to students with special needs. The opinions of these teachers suggested that they have a favorable attitude regarding the influence of agricultural education on students with special needs. Based on Ajzen's theory of planned behavior, teachers with a positive attitude are more likely to include students with special needs in their programs (Johnson, et al., 2012).

A study by Lancaster and Bain (2007) found that preservice teachers who have applied experience in inclusive and special education can have higher levels of self-efficacy once they are teaching students with special needs. According to Brownell and Pajares (1999), general education teachers who feel that they received adequate preservice preparation have greater self-efficacy in including and teaching students with special needs. Perceived preservice teacher preparation strongly predicts teachers' self-efficacy and indirectly impacts identified success through efficacy (Brownell & Pajares, 1999).

Attitude towards the behavior is the level that the behavior is valued (Ajzen, 1991). This level can be positive or negative. A study by Zint (2002), indicated that the strongest predictor of

the intentions of a teacher is attitude. Crawley (1990) found in another study that the only predictor of behavioral intention was attitude among female teachers and teachers between the ages of 24 and 33. It was not a predictor with teachers between the ages of 34 and 53 or male teachers (Crawley, 1990). From these studies, it appears that improving a teacher's attitude can have a positive impact on their behavior.

Subjective norm means the identified social pressure to complete or not complete the behavior (Ajzen, 1991). Zint (2002) found that subjective norm had the least impact on intention to behave in a specific manner by science teachers. According to Crawley (1990), subjective norm did not have an impact on intention with teachers between the ages of 34 and 53 or male teachers. He did find however that there was a significant interaction between attitude and subjective norm (Crawley, 1990). Ajzen (1991) found that subjective norm was more important with teachers than with other populations.

Finally, the perceived behavioral control is the understood ease or difficulty of accomplishing the behavior (Ajzen, 1991). According to Zint (2002), the relationship between perceived behavioral control and intention is the perceived control the individual has over the behavior. The relationship between perceived behavioral control and the behavior is the actual control the individual has over the behavior (Zint, 2002).

According to a study by Kor and Mullan (2011), the strongest predictor of behavior was attitude. In the TPB model, intention is predicted by attitudes, perceived behavioral control, and subjective norms. The correlation in the study between intention and behavior was only 0.17 (Kor and Mullan, 2011). Ajzen (1991) indicates that someone's intention to perform a specific behavior is the central factor of TPB. Generally, if a person has a stronger intention to perform a specific behavior, they will be more likely to engage in the action. If an individual has the

needed resources and opportunities and intends to accomplish a certain behavior, then they should succeed in carrying it out (Ajzen, 1991). Zint (2002) found that the most important predictor of intention to act in a specific manner was past behavior, attitude toward behavior, perceived behavioral control, and subjective norm (in that order).

The theory of planned behavior was used in a study of 99 university students by Theodorakis, Bagiatis, and Goudas (1995), examined the attitudes toward teaching individuals with special needs. None of the students studied had prior experience with people with special needs. They found significant correlations in the following areas: intention and attitudes toward behavior, intention and perceived behavioral control, intention and role identity, and intention and attitude strength. These researchers determined that planned behavior model variables successfully predict planned behavior for teaching students with special needs in the future. They concluded that people with a stronger attitude and intention for teaching are more prone to work with those who have special needs (Theodorakis et al., 1995).

Routes to CTE licensure in Virginia

The number of non-certified teachers in the classrooms is increasing. During the 2013 – 2014 school year, 3.5% of the teachers in Virginia were not certified (Department of Education, 2016). By the 2016-2017 school year, this amount had increased to 7.4% (Learning Policy Institute, 2019). According to the Virginia Department of Education (n.d.), during the 2018-2019 school year 6.8% of the teachers were provisionally certified. This number does not include teachers who are hired as long-term substitutes. Additionally, 6.2% of teachers were inexperienced. Inexperienced teachers have been in the classroom for under one year. Virginia also had 3% of the teachers who are not fully endorsed for the matter they are teaching (Virginia Department of Education, n.d.). These teachers are using alternative routes to licensure, and they

may not have had any coursework related to working with students with special needs in their classrooms (Virginia Department of Education, 2018d). Individuals in Virginia must pass the Praxis I Core Academic Skills for Educators Tests. This test measures the skills needed by teacher educators in the areas of mathematics, reading, and writing (Educational Testing Service, 2019). They must also take the Virginia Communication and Literacy Assessment (VCLA) to obtain alternative certification (Virginia Department of Education, 2018c). There are different options available to obtain alternative teacher certification in Virginia (Virginia Department of Education, 2018c). To use the career switcher alternative route, an individual must already have a bachelor's degree, must complete an application with a certified career switcher program, have a minimum of full-time work experience of three years, necessary scores on professional teacher's assessments, and requirements for endorsement in the teaching area through academic study or verifiable experience (Virginia Department of Education, 2019). Individuals can also obtain a Provisional License. To obtain a provisional license in Agricultural Education, an individual must complete a minimum of three hours in Agricultural economics and management, agricultural mechanics and applied technology with a lab component, animal science, forestry and wildlife management, horticulture, and plant science. The individual must have at least nine hours in one of the areas listed. Additionally, the individual must have a supervised occupational experience. If the individual has not met these requirements, the provisional license gives them time to meet the requirements (Commonwealth of Virginia, 2019). Also, individuals can use the Technical Professional License as a path to alternative licensure (Virginia Department of Education, 2018c). To obtain a Technical Professional License, an individual needs to be recommended by a Virginia educational agency, have a minimum of two years occupational experience in the last five years, have completed at least three credit hours in the areas of:

classroom and behavior management or applications of instructional technology, curriculum and instruction in career and technical education, and human development and learning. They must also have finished an associate degree program or agricultural education certificate in the teaching specialty area they are pursuing (Commonwealth of Virginia, 2019).

There are several options available to obtain alternative teacher certification in Virginia (Virginia Department of Education, 2018c). The Career Switcher Alternative Route to Licensure Program requires that individuals have at least five years of work experience and a bachelor's degree. The individual must then complete an approved career switcher preparation program. During the first year, the individual must complete 180 instructional hours, which includes a field experience. At the end of this first year, the individual will receive a Provisional Career Switcher License. The individual must then be hired into a teaching position, and they will be assigned a mentor. After completing the second year, the individual may be recommended to receive a Five-Year Renewable License. The Five-Year Renewable License is Virginia's standard teaching certificate (Virginia Department of Education, 2018c).

Another method of alternative teacher certification in Virginia is to obtain a Provisional License (Virginia Department of Education, 2018c). An individual may be eligible to obtain a three-year Provisional License if they do not meet all standard teacher licensure requirements in Virginia. The individual needs to have a bachelor's degree and must be hired by a school district that will request the Provisional License on their behalf. To be eligible for a five-year license, the individual must finish the remaining requirements (coursework, teacher assessments, endorsement deficiencies, etc.) (Virginia Department of Education, 2018c).

Individuals who would like to teach career and technical education (CTE) subjects, can also use a Technical Professional License as a path to alternative licensure in Virginia (Virginia

Department of Education, 2018c). Individuals who wish to follow this path need to have a minimum of nine semester hours of coursework related to a specific field and a high school diploma. The individual needs to also have an industry certification credential in the field they wish to teach, two years of entry-level experience, and a minimum of four years of supervisory or management experience in the career field (Virginia Department of Education, 2018c).

To obtain traditional teacher licensure in Virginia, you can attend one of three higher education locations in the state. A prospective teacher can obtain a Bachelor's degree from Ferrum College (Ferrum College, 2019). All of the programs require a major in Agricultural Sciences and can have an emphasis in any of the following for your Bachelor of Science degree: agribusiness, animal science, crop science, equine studies, or horticulture (Ferrum College, 2019). You are also required to have a teacher education minor. Ferrum College requires as part of the minor that all students must take Survey of Exceptional and Special Education which includes a forty-hour internship (Ferrum College, 2019a). Virginia State University requires a major in agriculture (Bachelor of Science) with a minor in secondary education (Virginia State University, 2019). The minor does require Curriculum and Instruction which addresses teaching methods for exceptional students along with several other components. While other courses such as Characteristics of Exceptional Learners, Survey of Exceptional Children, and Curriculum and Instruction for Exceptional Learners are offered, none of these courses is required as part of the curriculum (Virginia State University, 2018). Virginia Tech requires an M.S. in Career and Technical Education with a specialization in agricultural education (Virginia Tech, School of Education, 2013). The curriculum for this degree does require Educating Exceptional Learners as one of the courses (Virginia Tech, 2017).

Preparation for Pre-service Teachers

Stair (2009) recommends that teacher-training programs should ensure that numerous opportunities are available to provide pre-service teachers with experience in working with students with special needs. Training and in-service should also be provided to help teachers to learn to implement recommended teaching strategies and to find ways to use these strategies effectively in their classrooms. Also, in-service and training need to be developed for older teachers within the field to help build total confidence when working with students with special needs (Stair, 2009). Extensive preparation in pedagogy and practice teaching contributed to two of the key No Child Left Behind indicators for highly qualified teachers: full certification and in-field teaching (Boe, Shin, Cook, 2007). A special education teacher needs support in the areas of assistance with discipline, curriculum, instructional resources, and professional development (Billingsley, Cross, 1991). Professional development should be used as an instrument to educate teachers in research-based practices to improve classroom practice. Evaluation of student progress while participating in professional development is recommended (Boardman, Arguelles, Vaughn, Hughes, Klingner, 2005).

A study by Shade and Stewart (2001) found that the attitudes of pre-service teachers towards inclusion of students with special needs increased positively after introductory coursework in special education. Jobling and Moni (2004) conducted a study with pre-service teachers to determine their understanding about working with students with special needs. An integrated approach was developed to offer experiences that would assist pre-service teachers in developing their knowledge and skills to work with students in their classroom who have special needs. Initial interviews with the pre-service teachers indicated that they lacked experience, knowledge, and understanding associated with working with students with special needs.

Additionally, these pre-service teachers indicated that they believed their teacher education program was missing emphasis in this area. A conclusion of the study was that more creative approaches needed to be developed so that pre-service teachers had real experiences. At the end of the integrated approach, the pre-service teachers gained information related to teaching and learning approaches that they could utilize in the classroom (Jobling & Moni, 2004).

Additionally, universities should include in-service education or coursework in the area of IEPs and IVEPs to increase competency in these areas (Elbert & Baggett, 2003). One research study surveyed 57 agricultural education programs to determine if a course on working with students with special needs was included. Of these programs, 75.4% required a course in special needs, and 31.6% had elective or optional courses in special needs. Furthermore, 15.8% had special needs topics integrated into their agricultural education courses a little, 56.1% had them integrated somewhat, and 28.1% had them integrated to a great extent (Talbert & Edwin, 2008). The fact that they are integrating topics on students with special needs into their programs is a move in the right direction to assist pre-service teachers. When these same universities were asked if they or their university-provided graduate courses about students with special needs, 70.2% of them indicated they did provide these courses, 26.3% indicated they did not, and 3.5% were unsure if they provided them. When asked if the agricultural education departments provided workshops on working with students with special needs, 47.4% indicated that they did provide workshops, 45.6% indicated they did not, and 7% were not sure if they provided workshops (Talbert & Edwin, 2008).

Professional Development for CTE educators

According to Lohrmann and Bambara (2006), the professional development needs of teachers is very important. Professional development should be used as an instrument to educate

teachers in research-based practices to improve classroom practice. Evaluation of student progress while participating in professional development is recommended (Boardman, Arguelles, Vaughn, Hughes, & Klingner, 2005). Harvey, Cotton, & Kock (2005) recommend that both regional and local training need to be accessible to secondary CTE instructors to help them best serve students with special needs.

According to Harvey, Cotton, & Kock (2005), training efforts by career and technical education faculty need to provide comprehensive professional development for secondary CTE instructors leading to skills that support all students, including those with special needs by the use of best practices. CTE training efforts should be ongoing and provide sustainable professional development that directly influences CTE programming concerning special needs students. Also, training efforts at the university and local education agency level for secondary CTE educators need to focus on research-based educational best practices (Harvey, Cotton, & Kock, 2005).

A study by Cooc (2019) found that almost one-fourth of the teachers communicated a high need for professional development in the area of special education. Teachers may be encouraged to find more training if the professional development in special education is effective. Professional development that has a focus on changing attitudes and perceptions towards students with special needs may especially benefit those general education teachers who do not prefer having students with special needs in their classroom (Cooc, 2019).

Policy

Brand (2008) says it is helpful to look at federal and state policy related to students with special needs to determine their stance on this subject. Federal and state policy leaders must break down silos between academic, general, CTE, and special education, so all perspectives and

stakeholders are involved in policy development (Brand, 2008). Important aspects of full inclusion include: allow parents and professional advocates of children with severe behavior problems, hearing impairments, learning disabilities, etc. to speak on behalf of the children they know the best (Fuchs & Fuchs, 1994).

State and federal governments have not held educators responsible for educational success for students with special needs through their IEP (Hardman & Dawson, 2008). There are some policymakers and educators who believe when all students are required to meet the same standard, that the standard may decline so that those with less aptitude are accommodated. Alternatively, if the standard is not decreased then students with special needs will regularly fail to reach the standard. Policy changes are many years ahead of changes in practice. The role of all educators needs to be redefined as the differences between special education and general education become more unclear (Hardman & Dawson, 2008). For these reasons, it is important that pre-service teachers learn about policies. Additionally, teacher professional development can help teachers keep abreast of policy changes.

Individuals with Disabilities Education Act (IDEA)

According to Yell (Section 504, 1998), the main provision of Individuals with Disabilities Education Act (IDEA) is that all states must ensure that eligible students receive free appropriate public education which has been uniquely designed to meet their specific needs. Section 504 of the Rehabilitation Act of 1973 prohibits organizations which receive federal financial assistance from discriminating (or denying services) those who have disabilities. Section 504 protects those with disabilities from being discriminated against in public schools in the United States. Students are protected under Section 504, even if they are not protected by the Individuals with Disabilities Education Act (IDEA). Section 504 is a civil rights law. Although

the initial definition of people that were protected under Section 504 was very narrow, the Rehabilitation Act Amendments of 1974 broadened the definition of those covered (Yell, Section 504, 1998).

Harvey, Cotton, & Koch (2005) believe that an area of concern is the issues of service delivery (inclusion). According to IDEA, students should be placed in the least restrictive environment for learning. It is considered less restrictive to place students with special needs in the same classroom as their normally achieving peers (Harvey, Cotton, & Koch, 2005. There are many different settings where special learners can achieve services including the general education classroom, a resource room (for part of the day), a special education classroom (for all or part of the day), homebound instruction, and separate schools (Hocutt, 1996). Whether students are included fully or only part-time in the general education classroom, a collaboration between the general educator and the special educator is more critical (Harvey, 2003). When working with students with special needs, it is important to remember that there are different ways of teaching the same material so that the students can remember the information (Epler, 2011).

Another area of concern for educators is the definition and identification of students with special needs. The number of students diagnosed with learning disabilities has increased in recent years (Hourigan, 2007). As educators, we need to ensure that we are correctly identifying all special needs while not over-identifying them (Glover & Albers, 2005). There are many different assessment tools that can be used to identify students with special needs (CEC, 2011). Also, according to IDEA, there are alternative methods that can be used for identifying students (other than discrepancies) (CEC, 2011). Linn (1983) shows that one such alternative is response-to-instruction (RTI). RTI considers how the student is performing in the classroom. Standardized

testing does provide benefits in that it makes sure that the necessary material is being covered (Linn, 1983). Observations showed that effective teachers of students with special needs used small group instruction, peer tutoring, learning centers or, other individualized approaches (Crunkilton, 1985). Varied teaching contexts include cooperative learning and inclusion (Emmer & Stough, 2001). Students with special needs frequently are placed in Career and Technical Education (CTE) courses for electives in high school.

General Education Classrooms

With either mainstreaming or inclusion in place in most school districts, more students are receiving special education services in general education classrooms (Fuchs & Fuchs, 1994). According to Buell, Hallam, Gamel, McCormick, & Scheer (1999), often, general education teachers do not receive the support that they need to assist their special needs students. The special needs students do not always receive the extra assistance that they need in this environment to be able to succeed (Buell, Hallam, Gamel-McCormick, & Scheer, 1999). Klagge and Morton believe that because there is more inclusion, it is more important than ever for the special educator and the general educator to cooperate and work as a team to help develop the best plan for meeting each the needs of students with learning disabilities, emotional disabilities, intellectual disabilities, or other special needs. Other times, the general education teacher can break the class into small groups, and a special educator can work with one of these groups. We know that some school districts do not believe in pull out instruction for any reason and think that all students should be in the same room (Klagge & Morton, n.d.).

According to Okolo and Sitlington (2001), cooperation between vocational and special education has been mandated since the passage of the Vocational Education Acts of 1963. Communication between vocational and special educators is limited (not good) In vocational

programs, students often help one another and work together. The learning environment in vocational education is concrete and interactive (Okolo & Sitlington, 2001).

Secondary CTE training efforts should include: characteristics and learning needs of students with special needs, appropriate modifications/accommodations to meet individual student needs, and student-centered occupational skill development that supports CTE program goals and realistic postsecondary outcomes for students with special needs (Harvey & Pellock, 2004). Students with learning disabilities should be given individualized programming (Adam, Rigoni, Tatnall, 2006). Randall and Engelhard (2009) indicate that read aloud modifications with reading exams for students with special needs can be effective. This test modification shows more of an impact on students with special needs than those without special needs (in most grade levels) (Randall and Engelhard, 2009).

Kohler and Field (2003) express that transition education and services focus on federal special education and disability legislation, federal, state, and local investment in transition services development, and effective transition practices research. “One size fits all” and “checks” the box transition planning is not effective for students with special needs. Students with special needs all have different needs and therefore need different transition planning strategies (Kohler & Field, 2003, p. 181).

STEM

STEM encompasses Science, Technology, Engineering, and Mathematics fields. Science can be taught through agriculture. If teachers can utilize real-world examples, they will be more likely to engage students in the subject matter (Academy of Sciences, 1988). CTE courses in agriculture can help students prepare for STEM related careers (Hyslop, A., 2010). The mission for Department of the Interior’s STEM Education and Employment Pathways is:

> "Build an inclusive 21st century workforce and increase science literacy by connecting the public with the Nation's natural and cultural resources through outdoor developmental experiences and long-term engagement, education, employment, and service on and in support of public lands and waters. Through these actions, advance the science, engineering, and technology that inform natural and cultural resource management, natural hazards response, and decision making on critical issues that impact our nation, the world, and society" (U.S. Department, 2013, p. 1).

According to Broadening (2015), science and engineering programs now have an increase in the number of people with disabilities that are participating in them. It is important that there is an accessibility of courses, computing resources, electronic resources, events, information technology, libraries, science labs, and services. Disabilities can impact learners in the areas of attention, hearing, learning, mobility, speech, and vision. While many disabilities are obvious, others are not. The disabilities that are not obvious are referred to as "invisible disabilities". These disabilities include things such as: attention deficits, autism spectrum disorders, learning disabilities, and psychiatric impairments (Broadening, 2015).

Basham, Israel, & Maynard (2010), found that students often struggle in STEM-related courses if they have an intellectual disability. As the subject matter becomes increasingly difficult, many students develop a negative attitude towards STEM subjects. When the instructional needs of students with intellectual disabilities are met, they can succeed in STEM curriculum. Strategies can be used with students with disabilities to help them succeed. These strategies include: anchored instruction, content area reading strategies, explicit vocabulary instruction, and text adaptations (Basham, Israel, & Maynard, 2010).

According to Basham, Israel, & Maynard (2010), to ensure that curriculum is accessible for all, the system needs to be evaluated for effectiveness. In a STEM FOR ALL system, outcome measures need to evaluate: "1. The ability of the system to develop an accessible curriculum based on scientifically valid frameworks such as UDL, that are aligned with the desired 21st century outcomes; 2. The ability of the local education agency to effectively provide and support the necessary 21st century tools, including modern technology, for teaching and student learning; 3. The teacher's ability to effectively instruct students in a transdisciplinary curriculum using scientifically valid instructional design frameworks such as UDL; and 4. The student's ability to effectively and authentically express understanding of content using 21st century tools" (Basham, Israel, & Maynard, 2010, p. 17). It is important for this initiative to concentrate on all students. This needs to include students with diverse learning needs and students with disabilities. By reassessing current curriculum, a significant STEM education can be provided to these students (Basham, Israel, & Maynard, 2010). When teaching students with special needs in the area of STEM, it is crucial that the teacher utilizes curriculum with built-in supports (Basham and Marino, 2013).

Innovative technology is being integrated into middle school agricultural education programs according to Draper and Henke (2011). Evaluations from workshops for students have indicated that they gain a better understanding of careers in STEM and enjoy the use of technology when hands-on, lab-based modules are utilized (Draper & Henke, 2011). It has been suggested by Hilby, Striplin, and Stephens (2014) that agricultural education is a realistic method to increase learning in STEM areas by students. Math concepts can easily be utilized in agricultural classes. It is essential for agricultural teachers to be competent in mathematics so that they can integrate it into the agricultural classes (Hilby, Striplin, & Stephens, 2014).

Universal Design for Learning (UDL)

Universal design uses a global approach which increases access for all students. The principles of universal design include: equitable use; flexible use; intuitive and simple use; low physical effort; perceptible information; space and size for use and approach; and tolerance for error (Hansen & Mislevy, 2008).

According to Hanna (2005), there are several elements to universally designed assessments. Universal design begins by building accessibility into items from the start. Universally designed assessments should be compatible with adaptive equipment, accommodations, and assistive technology for the students that still need accommodations. The target population needs to be considered when tests are conceptualized. For maximum legibility in tests, the design needs to consider several factors such as: blank space; contrast; graphs and tables; illustrations; justification; leading; line length; response format; spacing; type size; and typeface. For maximum comprehensibility and readability, language that is concise and straightforward should be utilized. Tests should be developed using precisely defined constructs that measure what is intended to be measured. Finally, procedures and instructions should all be presented in clear, simple, and understandable language. The use of universal design will help agricultural teachers be able to better create assessments that more accurately depict the knowledge and skills of all of their students (Hanna, 2005).

Universal Design for Learning (UDL) is a curriculum that is designed with options to access, engage, and use learning materials since there is not a single method that will work for all students (Hitchcock, Meyer, Rose, & Jackson, 2002). According to UDL, multiple representations of vocabulary, principles, and key concepts should be provided by instruction,

curriculum, and related materials. Within STEM, this can be done with graphics, simulations, sound, and video (Basham & Marino, 2013). The principles behind UDL include:

- Delivery methods – alternative delivery methods need to be provided.
- Demonstration of knowledge – alternative ways for students to demonstrate their understanding should be utilized.
- Feedback – feedback should be provided during and after an assignment.
- Inclusiveness – the atmosphere in the classroom should be one that respects the diversity of the students.
- Information access – provide alternative materials for students (videotapes with captions, early printed material, and printed material in an electronic format).
- Interaction – encourage students to interact with the teacher and each other in different ways.
- Physical access – make sure that all classrooms, field works, and laboratories are accessible to students with varying individuals (Moon, Todd, Morton, & Ivey, 2012).

The purpose of UDL (Delaware Department of Education, 2004) is to give all students access to learning.

Ralabate (2011) indicates that it is a challenge for educators to provide inclusive learning opportunities for all students in the agricultural education classroom. By implementing UDL, all students are allowed to progress, participate in, and access the general education curriculum since the barriers to instruction are reduced (Ralabate, 2011). According to Basham, Israel, & Maynard (2010), often, students struggle in STEM-related courses if they have an intellectual disability. As the subject matter becomes increasingly difficult, many students develop a negative attitude towards STEM subjects. When the instructional needs of students with

intellectual special needs are met, they can succeed in STEM curriculum. Strategies can be used with students with special needs to help them succeed. These strategies include anchored instruction, content area reading strategies, explicit vocabulary instruction, and text adaptations (Basham, Israel, & Maynard, 2010).

The purpose of universal design is not to eliminate or take away from the IEP process but rather to make it a richer process since it will focus on the instructional needs of the student rather than needed changes (Thompson & Thurlow, 2002). The principles of universal design that should be utilized in all subject areas include:

- Equitable use – the design needs to be useful to people with differing abilities.
- Flexibility in use – the design should accommodate a wide variety of different abilities and preferences.
- Low physical effort – the design should be comfortable to use and should result in a minimum amount of fatigue.
- Perceptible information – the design should communicate the necessary information to the participant, regardless of the sensory abilities of the user.
- Simple and intuitive use – the design should be easily understood regardless of the knowledge, experience, or ability of the user.
- Size and space for approach and use – there should be a suitable space provided so that the participant can easily approach, manipulate, and reach needed materials.
- Tolerance for error – hazards are minimized as well as negative consequences of unintentional actions (Thompson & Thurlow, 2002).

Thompson and Thurlow (2002) suggest that several elements should be utilized when constructing assessments that are universally designed. While different types of courses use

different types of assessments, they should still all be designed in such a way that the assessment works well for students with varying abilities and needs.

- Accessible, non-biased items – in the beginning, accessibility should be built-in and, it should be reviewed to ensure that quality is preserved.
- Amenable to accommodations – needed accommodations should be enabled by the test design.
- Inclusive assessment population – all students, other than those who are participating in alternative assessments, should be included in the design of the assessment and the testing procedures in the field.
- Maximum legibility – figures, illustrations, response formats, tables, and text should be easy to decipher.
- Maximum readability and comprehensibility – the text should be comprehensible and readable (ensure that problematic words and the length of sentences are both kept to a minimum).
- Precisely defined concepts – constructs must be identified in such a way that unrelated cognitive, emotional, physical, and sensory barriers are eliminated.
- Simple, clear, and intuitive instructions and procedures – clear, simple, and understandable language should be used for all instructions and procedures (Thompson & Thurlow, 2002).

The universal design concept helps to consider how to better assess students' knowledge (Thompson & Thurlow, 2002).

According to the Center for Applied Special Technology (CAST, 2018), there are three universal design for learning guidelines. These guidelines include action and expression (the

"how" of learning), engagement (the "what" of learning), and representation (the "why" of learning). There are multiple options that can be utilized under these three guidelines (CAST, 2018). Stair (2009) found that the most successful teachers are those who have recognized strategies which work for all students to use in their classrooms. According to Moon, Todd, Morton, & Ivey (2012), there are plain language strategies that can be utilized while editing assessments (tests) for students. For example, if students in agriculture are taking an assessment on different types of power tools it would be helpful for the teacher to have a word bank ready to give to those students that need it. In a STEM or agricultural classroom, the teachers can allow the entire class period to take the test. Allowing the entire class period to take a test helps students who struggle with extended test times as an accommodation (Moon, et al., 2012). Thompson and Thurlow (2002) claim that it is important to avoid ambiguous words (for example, duck can be an aquatic bird or, it can mean to lower your head). Avoid inconsistent naming and graphic conventions (do not use different names for the same concept). Avoid irregularly spelled words (for example, height). Avoid proper names (an example is to use just a first name instead of a first and last name). Avoid unclear signals about how to direct attention (graphic arrangement can communicate the significance of information). Mark all questions (make sure that there are obvious visual signals (such as a number or bullet) to signal different questions. Reduce excessive length (do not include unnecessary material). Use common words (for example, use excited instead of exuberant) (Thompson & Thurlow, 2002).

Ralabate (2011) suggests that there are four connected parts of the UDL curriculum which require more explanation. 1. Assessment is gathering information within the UDL framework about the student's development utilizing a mixture of materials and methods. 2. Goals are the learning expectations for the student. Concepts, knowledge, and skills that the

student will need to master are considered to be goals. These goals are typically associated with state standards. 3. Materials are what is used to demonstrate learning and share content. There are many different types of media options and supports that are included. 4. Methods are the strategies used by teachers which, are designed to support student learning. These methods should be evidence-based. To use UDL in a classroom or for a student caseload, there are three beginning steps. 1. Appropriate goals need to be defined. 2. Curriculum barriers should be evaluated. 3. The needs of diverse learners should be assessed (Ralabate, 2011).

According to Moon, Todd, Morton, & Ivey (2012, p. 19), "Design for all" principles such as UDL can benefit all students that are in STEM laboratories or classrooms. Utilizing this design will also accommodate students with special needs. Many teachers may lack the necessary tools (resources and school support) to make accessible pedagogy an actuality. Teachers who utilize a classroom pedagogy based around a single theme in a science curriculum may benefit students with learning disabilities (LD), attention-deficit/hyperactivity disorder (ADHD), as well as students who do not have a disability. For example, a science theme when learning about water could have a unit on pollution and another unit on conservation (Moon, et al., 2012).

Moon, Todd, Morton, & Ivey (2012) show that the backward design approach can be useful for helping students to understand the material. The backward design approach will often help the students to become more engaged. Teachers should provide detailed reading lists and course syllabi to their students (Moon, et al., 2012). Childre, Sands, & Pope (2009) indicate that to implement this approach, teachers must understand the difference between the student's understanding and the student's knowledge. When using this approach with students with special needs, the following steps should be used:

1. identify learners
    a. identify classroom needs
    b. identify individual student needs
2. identify curricular priorities
    a. determine state/local standards
    b. create essential questions
    c. identify prerequisite knowledge and skills
3. design assessment framework
    a. performance tasks or projects
    b. oral or written prompt
    c. quiz or test
    d. informal assessments
4. and create learning activities
    a. design and sequence learning activities
    b. check for the integration of accommodations (Childre, Sands, & Pope, 2009).

The STEM and agriculture teachers can focus on both short and long-term goals (Moon, et al., 2012).

Moon, Todd, Morton, & Ivey (2012) point out that many students with developmental special needs struggle with STEM coursework above the elementary level. To teach students with developmental special needs, it is often necessary for special education teachers to adapt a hands-on teaching style. Some students with Asperger's can easily memorize and recite lists and perform mathematical calculations in their head. UDL methods that may prove useful include using a laptop to take notes, having a note-taker and teacher provided study guides (Moon, et al.,

2012). The Delaware Department of Education (2004) shows that there are several methods that can be utilized to overcome instructional barriers. For the recognition network, the teacher can give alternative formats and multiple examples, highlight important details, offer various formats and media, and give related contextual information to students. For strategic network, the teacher needs to provide flexible instruction and materials and continuous feedback that is relevant. Regarding the effective network, the teacher should offer tool and content choices, adjustable challenge levels, and rewards or choices which can promote interest, engagement, and motivation (Delaware Department of Education, 2004). While these strategies may be utilized currently in many new teacher programs, it would be best if they are included in all teacher programs.

Inquiry-Based Instruction

Easterly and Myers (2011) recommend using inquiry-based instruction because it encourages the use of scientific processes to find the responses to questions. This model of instruction stresses the thinking and learning process. Using inquiry-based instruction with students with special needs helps students learn how to process information and encourages the thinking process. Research has shown that students who are taught with inquiry-based instruction have stronger achievement in science and higher opinions about science. It also shows that students taught with this method have higher knowledge of the content than students who are taught with other methods. The use of inquiry-based instruction instead of text-based education has been found to have a positive effect on students' application test question scores, factual recall, and vocabulary. Furthermore, it has helped to ease content knowledge acquisition by the students. When an inquiry-based approach is used, students learned more, remembered more, and liked learning more (Easterly & Myers, 2011).

The framework of Immersion Structuring Applying (IMSTRA) uses a cyclical model to outline inquiry-based instruction (Easterly & Myers, 2011). This framework is based on the idea that the learner constructs their own knowledge and is an independent thinker. The Immersion phase has the students beginning to address an issue or problem. The students in this phase are urged to look for additional information about a problem. The Structuring phase has students start to try to clarify the problem that was given in the Immersion phase. In this phase, students may look for theoretical conceptualization, connect the problem to another problem, or test a hypothesis to try to understand the problem. The Applying phase has students apply the conceptual pattern they learned in the Structuring phase and relate it to other conditions. Teachers assess what the students have learned in the Applying phase (Easterly & Myers, 2011). It was found that students with disabilities can learn the subject matter through inquiry-based instruction. This indicates a need for faculty in agricultural education to teach pre-service and continuing teachers how to use inquiry-based instruction correctly with their students (Easterly & Myers, 2011).

Response-to-Intervention (RTI) Model

According to Wright (2006), another helpful tool is Response to Intervention (RTI). This model allows schools to intercede early to help meet a struggling student's needs related to a diagnosis of an educational disability. It also determines which instructional approaches will benefit a specific student the most. Based on the Individuals with Disabilities Education Improvement Act (IDEIA) in 2004, states are explicitly allowed to use RTI to identify learning disability. RTI is a process which determines if a student responds to scientific, research-based intervention. A common method under RTI for determining if a student has a learning disability is the dual discrepancy model. The first discrepancy is if there is a "discrepancy in initial skills or

performance" and the second discrepancy is if there is a "discrepancy in rate of learning relative to peers". With RTI, the following steps can be used if it has been determined that a student is performing well below their peers: "1. Estimate the academic skill gap between the student and typically-performing peers; 2. Determine the likely reason(s) for the student's depressed academic performance; 3. Select a scientifically-based intervention likely to improve the student's academic functioning; 4. Monitor academic progress frequently to evaluate the impact of the intervention; and 5. If the student fails to respond to several well-implemented interventions, consider a referral to Special Education" (Wright, 2006). Helping faculty in agricultural education understand the RTI model and giving them guidance in instructing pre-service teachers in the use of RTI will be beneficial to the students.

Elliott (2008) asserts that there are ten points that are important for understanding RTI implementation. These include:

1. "Description of the problem" – the teacher collects academic data on the student.
2. "Student strengths and weaknesses" – the teacher looks at the skills and learning style of the student to determine potential interventions.
3. "Relevant health or other issues" – the teacher determines if there are health, hearing, physical, or visual impairments that can hamper the student's ability to learn.
4. "Hypothesis regarding student needs" – the teacher comes up with possible reasons for the student's inability to learn as well as potential solutions.
5. "Types of intervention selected" – the teacher determines the correct intervention for the student based on the needs of the student.

6. "Length of time of intervention" – this will depend on several factors, including resources available, student schedule and attendance, and data from research.
7. "Student goal" – determine the skill that the student could achieve with the proposed intervention.
8. "Measures used for progress monitoring and decision rules" – the curriculum areas that are being targeted must be identified by the school. The use of Curriculum-Based Measurement (CBM) can measure the student's growth.
9. "Evidence of response or non-response to intervention" – regular review of student RTI will determine if the intervention needs to be continued, discontinued, or continued with modification.
10. "Decision" – based on CBM, has the student made progress? Based on the student's progress, a decision should be made as to if the intervention needs to be continued, decreased, or increased. A decision may be made to refer the student for special education (Elliott, 2008).

Inclusive Pedagogy

According to Florian and Linklater (2010, p. 370), "inclusive pedagogy focuses on extending what is ordinarily available as part of the routine of classroom life as a way of responding to differences between learners rather than specifically individualizing for some." Inclusive pedagogy discards the suggestion that teaching approaches should be based on groups of learners (Florian, 2010). According to Florian (2010), we need to rethink the limits that are placed on children when they are considered 'less able'. Inclusive pedagogy is well demonstrated by the concept of transformability (Florian & Linklater, 2010). The principle behind

transformability is that the capacity of children to learn can transform and be altered for the better as a consequence of what occurs and what people do currently (Florian & Linklater, 2010).

Rose (2007) found that students with special needs often are labeled as different when they are given additional directed assistance. Often the split between those with special needs and the rest of the classroom is strengthened by this additional assistance (Rose, 2007). According to Spratt and Florian (2015), utilizing an inclusive pedagogy involved modifying the strategy for the entire class. This approach encourages teachers to look at the problem of how to teach the entire class as a professional predicament for themselves as opposed to a shortfall in the students with special needs (Spratt & Florian, 2015).

Teaching Online in Secondary Education

According to DiPietro, Ferdig, Black, & Preston (2008), Michigan became the first state that mandated a virtual learning experience for all students before they graduated from high school. There are several characteristics that they found that a virtual teacher needs to be successful. These include: Doing all they can to help students succeed using available data; having knowledge in the area of technology; spend more time providing feedback to students; present material in different ways to engage students; staying organized; enough knowledge about the content that student questions case be answered in an email; use appropriate tactics to address students who are exhibiting inappropriate behavior in public course locations (such as discussion boards); monitor public communication settings in the course to recognize students that may be having a personal crisis; allow students to exemplify their knowledge in personally significant ways; use alternative assessment tactics; use various strategies to encourage productive interactions with the students; have organized and structured content; support and foster communication between students; have supplemental tools to meet the different needs of

students; monitor the progress of the students; provide feedback in a timely manner; and consider the accessibility of technology to the students (DiPietro et al., 2008).

Valtonen and Kukkonen (2006) found four different patterns of course design that teachers utilized when teaching online. The first pattern is the teacher-centered individual pattern. With this pattern, the course contains a lot of guided material. The teacher controls the learning process and uses teacher evaluated assignments. The second pattern is the teacher-centered collaborative pattern. This pattern tends to use asynchronous discussion forums. The students typically gain knowledge on their own and then the teacher guides them in applying this knowledge in a discussion environment. Pattern three is the learner-centered individual pattern. This pattern utilizes mostly self-study learning materials. There are typically tools for self-evaluation and the teacher is available only if needed. In this pattern, the student studies independently to prepare for tests. The final pattern is the learner-centered collaborative pattern. This pattern uses student centered learning and the teacher supports the learning process. Student groups are in charge of the learning process (Valtonen & Kukkonen, 2006). Based on these findings, students with special needs would benefit most from the teacher-centered individual pattern. Students with special needs typically cannot learn the material on their own so having guided material will make it more likely that the students can succeed.

Teachers may find benefits with online education since they do not have to deal as much with classroom management issues. According to Archambault and Crippen (2009), online educators felt that there were advantages to online education. They found that these educators like the ability to connect with the content and the students in a more personalized way. These teachers also believed that there were less constraints and management issues than in a traditional classroom. While more of the comments about online teaching were positive (63%),

there were also negative feelings (8%), and mixed comments (29%). The negative feelings included challenging, difficult, formal (inflexible), frustrating, negative, not as good as face-to-face instruction, overwhelming, terrible, and too much work (Archambault & Crippen, 2009).

Teaching Students with Special Needs Online

If teachers are going to communicate in a virtual environment with their students with special needs, they will need to determine if it is best to do this using asynchronous or synchronous methods (Smith and Meyen, 2003). When Smith and Meyen (2003) examined online instruction for students with special needs, it was through the lens of using this as a resource, not the sole mean of instruction. According to Burgstahler (2004), there are guidelines that indicate how individuals with special needs should be accommodated in online courses yet there are still barriers in many online courses. It is important to keep in mind that assistive technologies cannot remove all barriers to access (Burgstahler, 2004).

Keeler and Horney (2007), found that although there is a significant amount of literature on guidelines to accommodate individuals with vision, hearing, and mobility impairments, but there is not much literature in regard to those with intellectual disabilities. There are significantly more individuals with intellectual disabilities than the combined amount with vision, hearing, and mobility impairments (Keeler & Horney, 2007). According to Burgstahler (2004), there are two main methods to planning for accessibility including: avoiding specific methods or data and offering different features, formats, or methods. Keeler and Horney (2007) argue that if students do not have complete access at the lesson level then they cannot be successful in the course. In other words, if a student with special needs cannot easily access the lessons in a manner that the student can understand, then they will not be able to succeed. The different aspects of a lesson that could pose a barrier include: assessments, assigned activities, available options,

communication with peers, readability, summaries, and timing requirements. If there is a barrier due to any of these lesson aspects for an individual with special needs, this problem could cause: frustration with trying to complete the lesson, inability to finish the lesson, inability to participate with their peers, limited mastery of the material, or a lowered grade (Keeler & Horney, 2007).

Teaching Standards

The task force for Interstate Teacher Assessment and Support Consortium (Assessment and Support Consortium, 2013) lists ten standards within four general categories that are core teaching standards. These standards include:

- "The learner and learning:
    - Standard #1: Learner Development. The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences." This standard indicates that teachers need to understand the differences in how students learn. This standard would include understanding that students with special needs may learn and develop across the areas differently from their peers.
    - "Standard #2: Learning Differences. The teacher uses an understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards." According to this standard, teachers need to recognize that individuals have differences (this includes students with special needs).

  - "Standard #3: Learning Environments. The teacher works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self-motivation" (Assessment and Support Consortium, 2013, p. 8). The teachers should be utilizing the learning environment in a way that supports all individual students including those with special needs.

- "Content:
  - Standard #4: Content Knowledge. The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and creates learning experiences that make the discipline accessible and meaningful for learners to assure mastery of the content." By indicating that the teacher needs to ensure the discipline is accessible, the material should be accessible and meaningful for students with special needs as well as all other students.
  - "Standard #5: Application of Content. The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues" (Assessment and Support Consortium, 2013, p. 8).
- "Instructional practice:
  - Standard #6: Assessment. The teacher understands and uses multiple methods of assessment to engage learners in their growth, to monitor learner progress, and to guide the teacher's and learner's decision making." The teacher needs

to make sure that they are monitoring the progress of all of their students, including those students who have different needs.

  - "Standard #7: Planning for Instruction. The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.
  - Standard #8: Instructional Strategies. The teacher understands and uses a variety of instructional strategies to encourage learners to develop a deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways" (Assessment and Support Consortium, 2013, p. 9). The teachers need to have a variety of instructional strategies so that they can help all students in the class understand the material. Some students may not understand the material in a typical manner so the teacher should have additional ways of teaching it so that all students can understand the lesson.

- "Professional responsibility:
  - Standard #9: Professional Learning and Ethical Practice. The teacher engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner" (Assessment and Support Consortium, 2013, p. 9).

- "Standard #10: Leadership and Collaboration. The teacher seeks appropriate leadership roles and opportunities to take responsibility for student learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth and to advance the profession" (Assessment and Support Consortium, 2013. p. 9). The teacher should have a team that they work with that helps all students learn and grow. This is especially important for students with special needs to ensure these students have people that will advocate for them.

Chapter Summary

This chapter included literature that addressed planned behavior and the connection with teaching students with special needs. The literature explained the different routes to teacher licensure and the opportunities for professional development for teachers. The information on planned behavior model variables indicates that they can successfully predict the planned behavior for teaching students with disabilities (Theodorakis, et al., 1995).

A survey was conducted about educator perceptions by Harvey and Pellock (2003) with CTE teachers in Pennsylvania. From the survey, a list of recommendations for CTE teacher training was compiled. Brownell and Pajares (1999) identified self-efficacy as an indicator of success. Perceived preservice teacher preparation strongly predicts teachers' self-efficacy and indirectly impacts identified success through efficacy (Brownell & Pajares, 1999).

Policies that impact students with special needs include IDEA and Section 504. Special needs students do not always receive the extra assistance that they need in the general education classroom to be able to succeed (Buell, Hallam, Gamel-McCormick, & Scheer, 1999). Ideas for aiding students in STEM education include using Universal Design for Learning in the

classroom. According to Florian (2010), we need to rethink the limits that are placed on children when they are considered ‘less able’. In summary, the chapter looked at how teachers are prepared, different policies related to students with special needs, and how to best serve this population of students.

Chapter Three: Methodology

Purpose

This qualitative single case design study was conducted to examine the planned behavior of an exemplar agriculture teacher when teaching students with special needs. Qualitative data was collected to identify the methods used by an exemplar agriculture teacher when working with students with special needs. To address the challenge of teaching students with special needs, the following research questions were addressed:

1. How does an exemplar agriculture teacher who works with students with special needs and the special education coordinator, describe the teacher's knowledge of special education practices and implementation?
2. How does an exemplar agriculture teacher integrate their knowledge of special education practices in their lessons?
3. How does an exemplar agriculture teacher's knowledge of special education practices reflect in their observed behavior?

Considerations for Qualitative Research

"Qualitative research is a situated activity that locates the observer in the world" (Denzin and Lincoln, 2018, p. 43). There are different reasons why qualitative research is useful. Qualitative methods can be useful in determining both the why and the how of events (Sofaer, 1999). When using qualitative research, the researcher looks at different perspectives and views of the participants (Creswell & Poth, 2018). Qualitative research is both relevant and insightful (Straus & Corbin, 1998). Qualitative research goals include: describing multiple realities, developing sensitizing concepts, developing understanding, and grounded theory (Bogdan & Biklen, 1997).

According to Creswell and Poth (2018), there are four philosophical assumptions with implications for practice in regards to a qualitative study. The assumptions are ontological, epistemological, axiological, and methodological. With the ontological assumption, different viewpoints are reported as themes that develop by the researcher. Using epistemological assumptions, quotes from the participants are relied on by the researcher and the researcher also becomes an "insider". With axiological assumption, the values that shape the narrative are discussed openly by the researcher and the researcher's interpretation is included in combination with the participants. Using methodological assumption, the researcher examines the details before the overview, describes things in detail, and frequently modifies questions based on field experiences (Creswell & Poth, 2018).

Creswell and Poth (2018) found that there are several important characteristics that are common to most case studies. When working with a case study, the first step is to identify a specific case. The case must be bounded which means it is defined within specific parameters. The procedures for the specific type of case study are important (intrinsic or instrumental). This was an instrumental case study. There should be an in-depth comprehension of the case. The approach to the analysis of the data differs between case studies. It is important to identify case themes while creating the description of the case. Finally, the conclusion developed by the researcher typically discusses the overall case meaning (Creswell and Poth, 2018).

Narrative Inquiry

Connelly and Clandinin (2006, p. 375) state that "Narrative inquiry comes out of a view of human experience in which humans, individually and socially, lead storied lives." Xu and Connelly (2010) define narrative inquiry as the experiential study of experience. Furthermore, in terms of school-based research, narrative inquiry develops from real-world studies of teacher

knowledge and teacher knowing. Narrative inquiry is therefore phenomena and method for school-based studies. In terms of school-based research, the phenomenon is the experience of the teacher. Narrative inquirers should start with remarkable life situations that appear troubling or puzzling and that possibly could be improved. The first thing the researcher should do is learn more about the circumstances. The second thing that the researcher could do is think about their own experience in relation to the situation (Xu & Connelly, 2010).

According to Wells (2011), narrative inquiry is based on observations and utilizes concepts that are used to understand what is observed. It makes every effort to illustrate or develop theoretical concepts in methods that are significant beyond initial observations (Wells, 2011). In this study, the observations were made by the special education coordinator and special education aide and then described to the researcher. Webster and Mertova (2007) state that narrative inquiry gives researchers a rich framework that can be used to investigate how people experience the world. An advantage of narrative inquiry is that is tries to capture the entire story. Other methods examine a phenomena at specific points, but they often miss the important 'intervening" periods (Webster and Mertova, 2007).

Bell (2002) maintains that narrative inquiry includes working with stories that people tell while realizing that they may rest on more in-depth stories that the people do not realize. These stories offer a window into people's experiences and beliefs. Furthermore, these narratives let researchers present people's experiences holistically. Advantages to a narrative approach include: allowing the researcher to understand experience, allows the researcher to obtain information that people do not know consciously, and clarifies the notion of experience while accepting that the understanding of events and people change. In terms of using narrative inquiry in schools, this allows new ways for the researcher to understand the classroom. It also presents

teachers the opportunity to understand their students in additional ways (Bell, 2002). The use of narrative inquiry allowed me to gain information from the teacher about how he interacts with his students with special needs. He was able to state in his own words the accommodations he makes for his students and how the students react to those accommodations.

Research Design

The design of this study was a qualitative single instrumental case study. A single instrumental case study is when the focus is on a concern or issue and one case is selected that illustrates the issue (Creswell and Poth, 2018). The study involved a series of two interviews with an exemplar agriculture teacher, the document analysis of lesson materials (the teachers emailed the researcher a lesson plan from each of the three classes he taught), and interviews with the special education coordinator and a special education aide who was a sign language interpreter in the class. The purpose of conducting interviews with the special education coordinator and special education aide was to triangulate the data. The researcher used data source triangulation to gain multiple perspectives and to validate the data (Carter, Bryant-Lukosius, DiCenso, Blythe, and Neville, 2014).

This teacher was chosen because of his ability to work with students with special needs. The parameters for selecting the teacher included: agriculture teacher, has students with special needs in the class, and exemplar teacher. This teacher was suggested as an exemplar teacher by former students and other agriculture teachers. The selected teacher is in a rural high school. He was traditionally certified to teach agriculture and has taught for over fifteen years. At the school where he currently teaches, there is another full-time agriculture teacher. He teaches the following courses: Horticulture I and II, Introduction to Animal Systems, Ag Power I, Ag Fabrication, Small Engine Repair, Ag Business I and II, and Leadership. He teaches

approximately 110 students each year and about 10% of those are students with special needs. The special education coordinator at the school has worked with Mike for seven years and the special education aide has worked with him for three years. The researcher has a Master's of Education with a concentration in Special Education. The researcher is also the parent of a child with special needs.

The initial study was planned with in-person recordings of the classes to observe what assistance was being used for students with special needs in this case study. COVID-19 started spreading throughout the United States. As a result, on March 13, 2020, Governor Northam (the Governor of Virginia) ordered all K-12 schools in the state closed from March 16 – March 27. On March 23, 2020, Governor Northam mandated all K-12 schools in the state to remain closed for the remainder of the current school year. This closure left schools trying to figure out how or if they will be continuing instruction for their students. The study was then modified to include interviews with both the special education coordinator of the school and a special education aide that worked in the classroom with Mike to triangulate the information. In qualitative research, triangulation is used to acquire a better understanding of a particular phenomenon (Patton, 1999). According to Patton (1999), there are four different types of triangulation including: data source triangulation, investigator triangulation, method triangulation, and theory triangulation. The researcher used data source triangulation to gain multiple perspectives and to validate the data (Carter, Bryant-Lukosius, DiCenso, Blythe, and Neville, 2014). The use of triangulation helps to achieve reliability which strengthens using a qualitative method of research according to Stake (1995).

Qualitative Data Collection and Instrumentation

The first step of the data collection involved using an in-depth, semi-structured interview with open-ended questions. Preliminary questions were developed based on literature (Appendix E). A priori table of propositions was developed (Appendix I). By utilizing a semi-structured interview, the researcher was able to prepare questions to ask the participant (Wengraf, 2004). The researcher first asked Mike (the selected agriculture teacher) to sign the consent form. Next Mike was asked to answer questions to determine his knowledge of special education practices (Appendix D) prior to asking him questions about how he works with students with special needs in his classroom. The questions were chosen from Praxis® study guides for special education. The researcher interviewed Mike one time for between approximately thirty-five minutes. The interview took place via Zoom. The researcher recorded the interviews to ensure that the participant's words were accurately transcribed (Seidman, 2006). The participant was then emailed a copy of the transcribed interview to ensure that there was no misunderstanding by the researcher.

During the second part of the qualitative data collection, the researcher videotaped an interview with the special education coordinator via Zoom. This involved using an in-depth, semi-structured interview with open-ended questions (Appendix F). An aide from the agricultural class agreed to answer written questions as she was not comfortable being video-taped. This also involved using open-ended questions (Appendix G). The researcher entered these transcripts into ATLAS.ti Web and used open coding to identify key phrased and words shared between all of the interviews. Open coding is when concepts are labeled which defines and develops categories (Khandkar, 2009). The researcher also conducted a document analysis of the lesson plans for the three different classes.

The third step was when researcher met with the teacher via Zoom to fill in any gaps and to clarify intentions in regards to described behaviors. The meeting took place after the analysis of the transcripts and the lesson plans. The follow-up interview with the teacher was the last step of the qualitative research. This interview also involved using open-ended questions (Appendix H). All of the interviews were transcribed verbatim using a professional transcription service. The researcher entered the data from all of the transcripts into ATLAS.ti Web. The researcher also conducted a document analysis of the lesson plans for the three different classes to see if the themes could be confirmed with the lesson plans.

Data Analysis Procedures

The researcher entered the data from the transcripts with the teacher into ATLAS.ti Web. ATLAS.ti Web is a qualitative data analysis software. Preliminary themes were created based on open coding and a code book was developed. Strauss and Corbin (1990) identify open coding as "the interpretive process by which data are broken down analytically." Open coding allows the researcher to group similar items together (Strauss & Corbin, 1990). The researcher then identified key phrases and keywords from the initial interview with the teacher. When the interviews with the special education coordinator and special education aide were added to ATLAS.ti Web, additional codes were included in the code book. The researcher reviewed the transcripts and coded them a second and third time to ensure that accurate codes were achieved. Reviewing the transcripts multiple times allowed the researcher to refine the code categories. During the second and third review, the researcher merged some of the codes as it was determined that the were all related to the same idea. The themes were then organized according to the research questions.

The researcher also conducted a document analysis of the lesson plans for the three different classes that the teacher teaches. These lesson plans were evaluated to determine if they had student learning objectives listed and if they listed the questions that the students would be able to answer at the end of the lesson. Furthermore, the researcher assessed the lesson plans to establish if the teacher utilized UDL. If the lesson plans utilized UDL, the researcher listed the different methods of UDL being used. The researcher then determined if the teacher listed the modifications used for students with special needs. If modifications were listed, the researcher noted the different modifications. The themes from the interviews were then compared to the lesson plans as part of the triangulation.

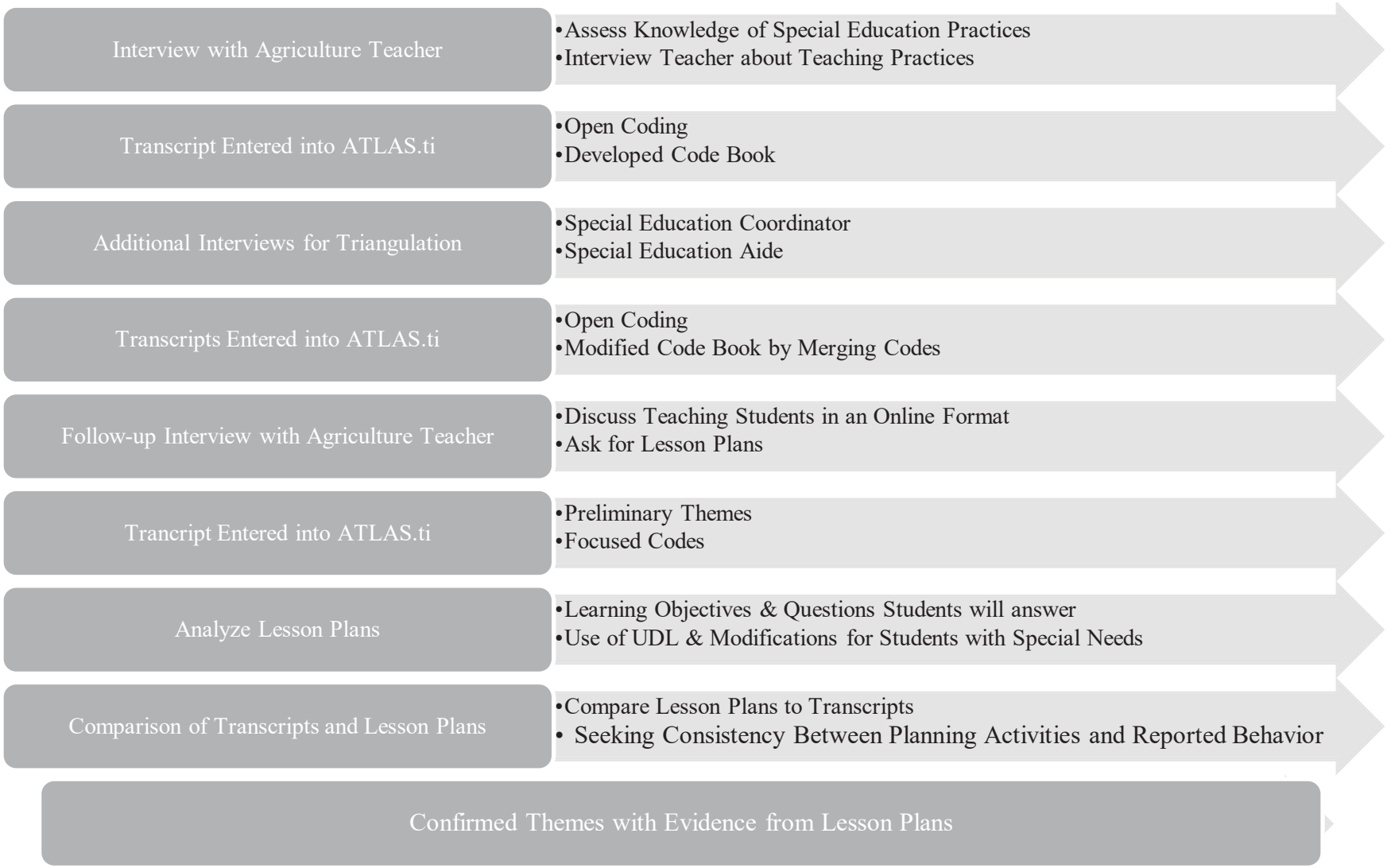


Figure 3: *Flowchart of Project Stages*

Rationale for the Design

According to Ary, Jacobs, Sorensen, and Walker (2018, p. 392), "the greatest advantage of a case study is the possibility of depth; it seeks to understand the whole case in the totality of the environment." An instrumental case study was utilized. Case studies are grounded in real life and can provide comprehensive explanations of a phenomena (Ary et al., 2018).

Case Selection

An instrumental case study was conducted using an exemplar agriculture teacher. This particular exemplar teacher was selected because he could illustrate how a teacher interacts with students with special needs in their classroom. All of the techniques used were focused on a single teacher. The researcher believes that this teacher can provide an understanding of different ways in which an agriculture teacher can interact with students with special needs in their classroom.

Validity

According to Riege (2003), there are multiple ways to determine the validity of a case study. Initially he discusses the construct validity. In a case study, he suggests using multiple sources of evidence. In this case, the researcher used interviews and analysis of lesson plans. Another recommendation is internal validity which is accomplished with triangulation of data. The researcher interviewed the special education coordinator, the special education aide, and the teacher. These interviews along with the analysis of the lesson plans provided triangulation of the data. Finally, external validity is advised which was done by utilizing predetermined questions for all of the interviews (Riege, 2003).

Limitations of Qualitative Research

The three main limitations with qualitative research include generalization, induction, and transparency (Whipp, 1998). It is difficult to generalize the information gained from a case study to a larger population. The theory evolves from the evidence that is collected in qualitative research (induction). Since an issue is examined in-depth, immersion by the researcher is a potential problem (transparency) (Whipp, 1998). A major limitation of qualitative research is that the findings are not transferable (Drisko, 1997). Carr (1994) suggests that there is low population validity when qualitative research methods are utilized. Another limitation to qualitative research is that the participants may say what they believe the researcher wants to hear (Bowen, 2005).

Summary

An exemplar teacher was selected to participate in the instrumental case study. The case study results will be used to develop guidelines for the needs of pre-service and in-service teacher preparation programs to best prepare teachers to support students with special needs successfully. Multiple perceptions from three different individuals, the teacher, the special education aide, and the special education coordinator along with the analysis of the lesson plans provided the triangulation of the data. Confirming the accuracy of the transcripts with the participants along with the developed themes supports the trustworthiness and the reliability of the results of this study (Creswell & Poth, 2018).

Chapter Four: Results

Introduction

This research study was conducted to investigate the planned behavior of an exemplar agriculture teacher when teaching students with special needs. Qualitative data was collected during this research study. The focus of the study was how an exemplar agriculture teacher works with students with cognitive impairments. This design sought to inform the following research questions:

Research Question 1:How does an exemplar agriculture teacher who works with students with special needs and the special education coordinator, describe the teacher's knowledge of special education practices and implementation?

Mike described himself as moderately knowledgeable about special education practices and implementation. He indicated that he has not had much formal training but has participated in some professional development. Mike believes that he is "at best moderately knowledgeable" about special education practices and implementation. He revealed that most of his knowledge is experiential from participating in a lot of IEP meetings. He said, "having to work on writing some IEP's was pretty eye-opening." According to Phillips and Dormody (1993) it is important for teachers to be active participants in IEP meetings. Mike specifically talked about attending IEP meetings on two separate occasions during the initial interview. When Mike was asked specific questions to assess his knowledge of special education practices and implementation, he got approximately eighty percent of the questions correct (Educational Testing Service, 2017).

Hoerst and Whittington (2006) found that 60% of the secondary agriculture teachers who completed their survey indicated they need additional training when writing goals and objectives for students' IEPs. This same study found that 50% of these teachers conveyed that they needed additional training in the area of interpreting the results of assessments of students with special

needs (Hoerst and Whittington, 2006). Working with students with special needs was one of the new areas of need that appeared between 2000 and 2015 (DiBenedetto, Willis, & Barrick, 2018).

Mike said that a lot of the time he adapts as he goes. He also indicated that his perception has changed over time. He said that, “initially when I thought learning support students, I thought, "Okay, they're just students that aren't going to achieve quite the same level.” In Mike’s school system, students with special needs are referred to as learning support students. He then realized that, “there's a huge spectrum within those students.” During the interview, Mike thought about his past experiences at a camp for fairly severely disabled adults and also as an aide in a learning support position. He described both of these experiences as “eye-opening”. According to Taylor (1994, p. 9), “the primary focus of self-evaluation is reflection”. Mike was engaging in reflective behavior when he thought about his experiences at a camp as an aide.

When the special education aide answered the questions, she indicated that Mike is knowledgeable in his work with students with special needs and makes accommodations for them based on their IEP. She also stated that he helps students with special needs by, “presenting materials in a different matter, if material is not understood.” According to Curtis and Howell (1980, p. 17), “It was imperative that agricultural education teachers know individual and group techniques to help special needs students develop to their full potential”. Additionally, “Pairing academically disadvantaged students with advanced students, helped both parties” (Iverson, 1993, p. 6). Mike practiced this when he was “Partnering Special Needs students with Gen. Ed. students and peer mentors”, according to the special education aide.

When the special education coordinator was interviewed, she commented that, “our ag teachers are awesome.” One thing that she commented on that she really appreciated was when Mike, “actually did like a class where they had the majority of the kids in there were special

education students. And so they were able to like modify a class just for us." According to Heward (2003, p. 38), "When practiced most effectively and ethically, special education is characterized by the use of research-based teaching methods, the application of which is guided by direct and frequent measures of student performance". According to the special education aide, "he would send the student back to redo or fix a Christmas wreath project the same as he did the Gen Ed. students." This practice indicates the use of measuring a student's performance. Additionally, having the students complete a Christmas wreath project is an example of using hands-on learning techniques which Phillips and Dormody (1993) identified as beneficial. The necessity of participation in IEP meetings and the fact that Mike participated in them was a recurring theme from both Mike and the special education coordinator. This theme was present nine times between the initial interview with Mike and the interview with the special education coordinator.

Research Question 2: How does an exemplar agriculture teacher integrate their knowledge of special education practices in their lessons?

Mike said that a lot of the time it was a matter of "adapting as we go". He confirmed that he feels that attending IEP meetings is the best way to get the bigger picture of a student, "I think it's good to see the bigger picture. I'll be honest, if you just get a copy of an IEP, like I get for every student at the beginning of the year, you can read through that but that's not the same as meeting." He feels that it is helpful to attend the IEP so that he knows, "there's a team of people there to help". Teamwork is one of the most meaningful advantages of collaborating within classrooms that include students with special needs (Phillips, Sapona, & Lubic, 1995). Friend and Cook (1996) noted that collaboration is a means for the planning, coordination, and delivery of instructive services to students with special needs. This again is supported as important by

Phillips and Dormody (1993) who identified participation in IEP meetings as an important strategy for teachers.

The lesson plans were reviewed as part of the triangulation of data. When the researcher reviewed the lesson plans provided, all three of the lesson plans specifically listed learning support students in them (Table 1). In the first lesson (Poultry Processing), he indicated that minor adaptations are made for learning supports for students. Making adaptations for students is an example of differentiated instruction. McLeskey, Waldron, So, Swanson, & Loveland (2001, p. 108) define differentiation as a method where teachers "create different levels of expectations for task completion within a level or unit". There are two goals with this method of instruction. Maximizing grade level standards attainment is the first goal. Providing adapted curriculum for students with special needs is the second goal (Lawrence-Brown, 2004). For inquiry-based instruction, Mike had the students address the following items: how are poultry processed, notes sheet to record thoughts on terms, and what's in a label. All of the students are given a guideline sheet and scaffolding worksheet. The guideline sheets are part of representation under UDL as they support decoding for all students (CAST, 2018). Learning support student were also given extra help with the steps and extra practice until they could master the skills. For the project part of the lesson, the students with special needs were given support from mentor students and the aid. The students were also given extra time as needed. While this lesson plan was created by the National FFA Organization, Mike added a section to the beginning that discussed both UDL and modifications for students with special needs (Appendix I). Additionally, this lesson is filled with both FFA and SAE activities that are easily integrated in an agricultural education program.

Table 1: Analysis of Lesson Plans

	Lesson Plans		
Evidence Identified?	**Poultry Processing**	**Horticulture Plant Propagation**	**Livestock Diseases**

Evaluation Criteria				
	Student Learning Objectives Listed	Yes	Yes	Yes
	Essential Questions to be Answered	Yes	Yes	Yes
	Inquiry-Based Instruction	How Are Poultry Processed? Notes sheet to record thoughts on terms What's in a Label?	Create a poster or pamphlet on one type of asexual propagation.	Students identify disease, prevention, and treatment from disease scenario packet.
	UDL Utilized	Guideline sheets Scaffolding Worksheets	Guideline sheets	Guideline sheet Student notes have drop down choices Students can redo lesson List of diseases
	Modifications for Students with Special Needs	Extra time Additional assistance from teacher and aide	Extra help with steps Extra practice Support from mentor students and aide	Reduced list of diseases Worked in a group with an aide

For the second lesson plan (Horticulture Plant Propagation), Mike again used minor adaptations. For inquiry-based instruction, Mike had the students create a poster or pamphlet on one type of asexual propagation. All students in this class were again given a guideline sheet and worksheets for scaffolding. Both the guideline sheet and the worksheet support decoding under UDL (CAST, 2018). The learning support students in this class were given extra time as well as additional assistance from both Mike and the aid.

The final lesson plan (Livestock Diseases) reviewed also had minor adaptations. In terms of inquiry-based instruction, Mike had the students identify disease, prevention, and treatment from disease scenario packet. All students were given a guideline sheet and the student notes have a drop down with choices for fill in the blanks. He allows students to redo this task. Students were all provided with a list to choose from. All of these are examples of decoding under UDL (CAST, 2018). The learning support students in this class had a reduced list and completed the work in a group with an aid.

All of these lesson plans indicated that Mike was using Universal Design for Learning (UDL). This model indicates that strategies which enhance learning for students with special needs also benefit other students in the class. In all of his classes, he gives the entire class a guideline sheet. Utilizing UDL helps “to ensure that all learners can access and participate in meaningful, challenging learning opportunities” (CAST, 2021). The purpose of universal design is not to eliminate or take away from the IEP process but rather to make it a richer process since it will focus on the instructional needs of the student rather than needed changes (Thompson & Thurlow, 2002).

The special education aide mentioned multiple things that when Mike does that practice, it shows he is following special education practices in his lessons. Some examples that she gave include: preferential seating, highlighting or emphasis on important materials and drawing examples on the white board. She reported that he breaks the reading down and explains it in easier to understand terms. A final comment she made was that Mike gives shorter assignments for students with special needs.

When the special education coordinator was asked about Mike modifying curriculum for students with special need, she replied that, “in terms of adapting curriculum, that's only going to be for the students who are not on a standard or advanced diploma, so we can't really like - well, you can adapt it, but they're not going to change stuff too much.” She further stated that, “with the kids who are on an applied studies diploma, then we can definitely change stuff a lot more.” She indicated that Mike could and did make more modifications to the material for students on an applied studies diploma. She also told me that Mike would talk to the paraprofessionals about how to make a unit more accessible for the students and then if necessary the paraprofessionals would reach out to the special education coordinator.

Many useful practices for students with special needs include using the following teaching practices: content enhancement, direct instruction, peer-mentors, and technology integration (Jones, 2009). Many examples have been given of how Mike utilizes these teaching practices. Some of the examples given included: content enhancement ("highlighting or emphasis on materials"), direct instruction ("reading was broken down and explained in easier to understand terms by…….Mike" and "further one on one or group instructions/demonstrations."), peer mentors ("Partnering Special Needs students with Gen. Ed. students and peer mentors"), and technology integration ("closed captions for videos; use of mini-mic FM system"). The technology integration falls under the action and expression portion of UDL as a means of optimizing access to assistive technology (CAST, 2018). A recurring theme from Mike, the special education aide, and the special education coordinator was that Mike modifies the materials for students with special needs both in advance (lesson plans) and as he is teaching. Modifications for students were mentioned a combined total of sixteen times by the three participants.

Research Question 3: How does an exemplar agriculture teacher's knowledge of special education practices reflect in their observed behavior?

This question can best be answered by the interview the researcher did with the special education coordinator and the questions the special education aide answered. When the researcher asked the special education aide about the relationship between Mike and the special education teachers and aides, she described the relationship as, "dynamic in Mike's class, very good and positive. He appears to be well-liked and respected by staff and students alike."

According to Andresen, Boud, and Cohen (2020, p. 225), the unique feature of experience-based learning is "the experience of the learner occupies central place in all

considerations of teaching and learning." When she was asked about accommodations that Mike made for students with special needs, she listed the following accommodations: preferential seating (if needed); highlighting or emphasis on important materials; presenting materials in a different matter, if material is not understood; drawing examples on the white board; closed Captioning for videos (if available); modified assignments and work; fewer assignments; partnering special needs students with general education students and peer mentors; use of a FM system (mini mic); Mike had the special needs students each take on the role of a FFA officer conducting a meeting, then we went on a field trip to conduct an actual meeting set up for them. The special education aide also replied that Mike modified his communications and instructions by using closed caption videos, a mini-mic FM system, and by utilizing one on one or group instructions and/or demonstrations. Use of the closed caption video and the mini-mic FM system are both examples of representation under UDL by offering an alternative for auditory information (CAST, 2018).

When the researcher interviewed the special education coordinator, she responded that they work with the CTE teachers a lot since the students need eight classes for a full schedule and they enjoy the CTE classes. She also stated that, "our ag teachers are awesome." When the special education coordinator was asked about participation by Mike in the IEP meetings, she told the researcher that even if he cannot participate due to scheduling that he will provide feedback. The teachers in the school all receive an IEP at a glance for the students with special needs. This document includes accommodations, goals, and student strengths.

The researcher asked the special education coordinator if she met with CTE teachers to ensure they know how to adapt the curriculum to meet IEP compliance. She replied that, "in the ag department they are awesome at being able to adapt things for our kids." She clarified that

Mike does a great job. Furthermore, she said that, “it's great to hear the ideas that the ag teachers have, and we hear from the kids how much they enjoy the hands-on activities and stuff like that” and “at our school, they do a great job of it, like they really don't need a lot of input from us guys.” Utilizing hand-on learning techniques have been identified as advantageous for students with special needs (Phillips & Dormody, 1993). She gave a specific example of a specific student who could not to a lot of reading and writing. She said that Mike “set up times where he had the kid come in and gave him - like gave him his quizzes and tests like all just talking to him, and let the kid talk back, and he did awesome, like it was really great.” This is an additional example of UDL being used. This is part of engagement where Mike minimized threats and distractions and representation where he offered an alternative for visual information by allowing the student to come in and have a verbal test (CAST, 2018). Offering a different means of assessment is another example of differentiated instruction. When she was asked if she had anything else she wanted to share, she gave this comment, “We're very, very impressed with how he works with our students.” She also told the researcher that, “he was always happy to do whatever was needed, like he is awesome”.

The comments from both the special education aide and the special education coordinator indicate that Mike’s observed behavior reflects that he has knowledge and understanding of special education practices. He makes accommodations for students and provides extra support as needed. According to the special education aide and the special education coordinator, Mike is well liked by teachers and students.

Summary

The interviews with the special education aide and the special education coordinator confirmed that Mike was exhibiting planned behavior in his work with students with special

needs. The lesson plans that Mike provided also indicated he utilized planned behavior both in using UDL and in the modifications he makes for students with special needs. Triangulating the data showed that Mike is an exemplar agriculture teacher in his work with students with special needs.

Chapter Five: Summary and Discussion

This chapter provides a review of the design of the case study and the findings from chapter four. I will also talk about the recommendations for CTE teachers and for additional research.

Problem Statement

Teachers have different styles of teaching. According to Fishbein and Aizen (2015), a specific behavior is more likely to be conducted if the intention is stronger. Teachers may fail to act on their good intentions because they forgot. Some teachers may have good intentions to provide high-quality teaching to students with special needs but lack the knowledge or ability to be successful. Modeling strategy can be utilized so that teachers who lack the expertise to work with students with special needs can observe teachers who possess this skill (Fishbein and Ajzen, 2015).

A study found that the teachers studied intended to teach students with special needs in their inclusive classes (Hodge, Ammah, Casebolt, Lamaster, and O'Sullivan 2004). Some of the teachers had difficulty teaching students with special needs, and this difficulty seemed to be related to the severity and nature of the disabilities of the students and the teacher's level of preparedness. Additionally, most teachers did not make appropriate modifications to instruction for students with special needs. Hodge et al. (2004) theorized that this may have been because the teachers did not feel adequately prepared to teach students with special needs (the teachers in the study actually stated that they felt inadequately prepared).

Purpose

This single case design study was conducted to better understand the planned behavior of an exemplar agriculture teacher when teaching students with special needs. Qualitative data was

collected to identify the methods used by an exemplar agriculture teacher when working with students with special needs. This design sought to inform the following research questions:

Research Questions

1. How does an exemplar agriculture teacher who works with students with special needs and the special education coordinator, describe the teacher's knowledge of special education practices and implementation?
2. How does an exemplar agriculture teacher integrate their knowledge of special education practices in their lessons?
3. How does an exemplar agriculture teacher's knowledge of special education practices reflect in their observed behavior?

Summary of Findings

Research Question 1: How does an exemplar agriculture teacher who works with students with special needs and the special education coordinator, describe the teacher's knowledge of special education practices and implementation?

The purpose of this question was to determine if an agriculture teacher who has knowledge of special education practices is likely to have intentional behavior. Mike's knowledge of special education practices was evidenced by both his answers to the knowledge assessment and his answers to interview questions about special needs students. Several times during the interview, Mike exhibited reflexive behavior.

Research Question 2: How does an exemplar Agriculture teacher integrate their knowledge of special education practices in their lessons?

Mike used UDL in his lesson plans which made additional modifications less necessary for the students with special needs. Mike also listed modifications for learning support students

at the beginning of his lesson plans. This intentional behavior indicates that he is integrating his knowledge of special education practices into the planning of his lessons. Mike also indicated that he attends students' IEP meetings when there is not a schedule conflict. This allows him to collaborate with the special educators and the parents of the students to see the bigger picture.

Research Question 3: How does an exemplar **agriculture teacher's knowledge of special education practices reflect in their observed behavior?**

According to the special education aide and the special education coordinator, Mike had positive interactions with his students with special needs. Furthermore, his observed behavior indicated that he understands appropriate special education practices. While Mike indicated that he was moderately knowledgeable about special education practices, his observed behavior showed that he has a better understanding than what he acknowledged.

Mike clearly is intentional in his interactions with students with special needs in his classroom. This is supported by his lesson plans as well as by comments from both the special education aide and the special education coordinator. While Mike intentionally has modifications built into his lesson plans, he also is adept at modifying on an as needed basis while he is teaching. As all three participants indicated, and the lesson plans supported, Mike uses a great deal of hands-on learning in his classes. The use of hands-on learning activities for students with special needs makes agriculture courses a perfect environment for these students to succeed (Phillips & Dormody, 1993).

Themes

Multiple themes emerged from the analysis of the interviews. An important theme was the need for agriculture teachers to participate in IEP meetings whether by attending in person or by providing feedback for the special education coordinator to include during the meeting.

Another important theme is the need to adapt materials for students with special needs. This should take place with the lesson plans but the teacher should also feel comfortable adapting the material while teaching a lesson if the need arises. Research has shown that teachers feel they need training in the areas of adapting curriculum and developing IEPs (Seay, Hilsmier, & Duncan, 2010). A final prevalent theme was the need to help students with special needs. While both the special education aide and special education coordinator indicated that Mike does help students with special needs, he discussed the importance of having aides or peer mentors in the classroom to also help the students. Mike made a point of saying that he believes local employers see value in having students with special needs take agriculture classes. Mike indicated he also sees the value in students with special needs being given a fair and equal education. The fact that he sees value in students with special needs being given a fair and equal education indicates that he plans his lessons with this in mind. The theory of planned behavior considers that intentions control all actions (Fishbein and Ajzen, 2015). He said, "also for the community as a whole, we owe it to students to train them. We're all better served if everyone is able to contribute to have a stable job that only helps the community as a whole." Mike understands that it is necessary to teach students so they can contribute to society. According to Zint (2002), the strongest predictor of intention for a teacher is their attitude. Mike's attitude appears to be one that sees value in students being well trained in agriculture.

Recommendations for Further Research

Due to COVID-19, the parameters of this case study changed from video-taped classes to narrative inquiry. The use of narrative inquiry allowed me to gain information from the teacher about how he interacts with his students with special needs. He was able to state in his own words the accommodations he makes for his students and how the students react to those

accommodations. A limitation to qualitative research is that the participants may say what they believe the researcher wants to hear (Bowen, 2005). Being able to repeat the study while video-taping the teacher's behavior when they are working with students with special needs would be valuable. The researcher would then be able to follow up with the teacher to determine if their behavior is intentional or accidental. An example of intentional behavior is when a teacher moves closer to a student with special needs because that student benefits from teacher proximity. An example of accidental behavior is when a teacher moves closer to a student with special needs because the sun is in their eyes but the student still benefits from the teacher proximity.

The major limitation of this study is the lack of generalizability of the findings, since it is a case study with one teacher. It is difficult to generalize the information gained from a case study to a larger population (Whipp, 1998). It would be helpful to have additional research with teacher's regarding their planned behavior when working with students with special needs. Conducting a mixed methods study where a survey is distributed to agriculture teachers to determine their experiences when working with students with special needs and then conducting focus groups of teachers to talk about what does and does not work would help validate the survey results. According to Johnson and Onwuegbuzie (2004, p. 18), "researchers should collect multiple data using different strategies, approaches, and methods in such a way that the resulting mixture or combination is likely to result in complementary strengths and nonoverlapping weaknesses." Greene (2007, p. 98) also explains that "the overall broad purpose for mixing methods in the social inquiry is to develop a better understanding of the phenomena being studied." By integrating quantitative and qualitative research, there is more credibility to the research (O'Cathain, Murphy, & Nicholl, 2010). Information about the challenges that teachers

face can help in the development of additional best practices for preparing teachers to work with students with special needs in their classrooms. Carey (1993) indicates that qualitative and quantitative methods are instruments and when they are combined in mixed-methods research, then questions of considerable significance can be answered. Mixed methods have a goal of using the strengths of both quantitative and qualitative and minimizing the weaknesses of both methods by combining the study (Johnson & Onwuegbuzie, 2004). After an initial survey and focus group with agriculture teachers, I would recommend expanding both the survey and the focus group to include other CTE teachers and be conducted across a variety of states.

Additional research questions could be answered with a mixed methods research study. Questions that I would recommend answering include: What is the relationship between years of teaching experience and level of preparation for teaching students with special needs? What is the relationship between teachers' years of teaching experience and their level of need for training in various aspects of special education? How does an agricultural teacher's knowledge of special education practices relate to utilizing the IEP in their lessons?

Recommendations for Practice

I think that information should be provided to both pre-service and in-service teachers about special education laws and disabling conditions. This will allow these individuals to understand the law and ensure that they are following it. They will also be able to have a better understanding of disabling conditions. Understanding different disabling conditions may provide the teacher with a better understanding of how to make accommodations for the students. Additionally, I think that information about INTASC standards should be integrated into the curriculum for pre-service teachers. This will give the pre-service teachers a better understanding of the core teaching standards.

I suggest that all teacher preparation programs have pre-service teachers work with students with special needs while they are student teaching. They should also ensure that their lesson plans include appropriate accommodations for students with special needs. Being able to sit in on an IEP meeting as a student teacher would be a valuable experience so that these pre-service teachers can see how everyone works as a team to help the student do their best. While there are some teacher preparation programs that have pre-service teachers work with students with special needs, I think it should be a mandatory experience prior to teacher certification. In my experience, I have seen very different abilities among agriculture teachers in their skill level of working with students with special needs. There are agriculture teachers who have great lesson plans that list all of the accommodations for students with special needs and who are very intentional in interacting with these students to help them reach their highest potential. These teachers tend to always find something positive to say about students with special needs. There are also agriculture teachers who have told me that they do not know how to handle students with special needs. These teachers tend to find it difficult to find good things to say about students with special needs

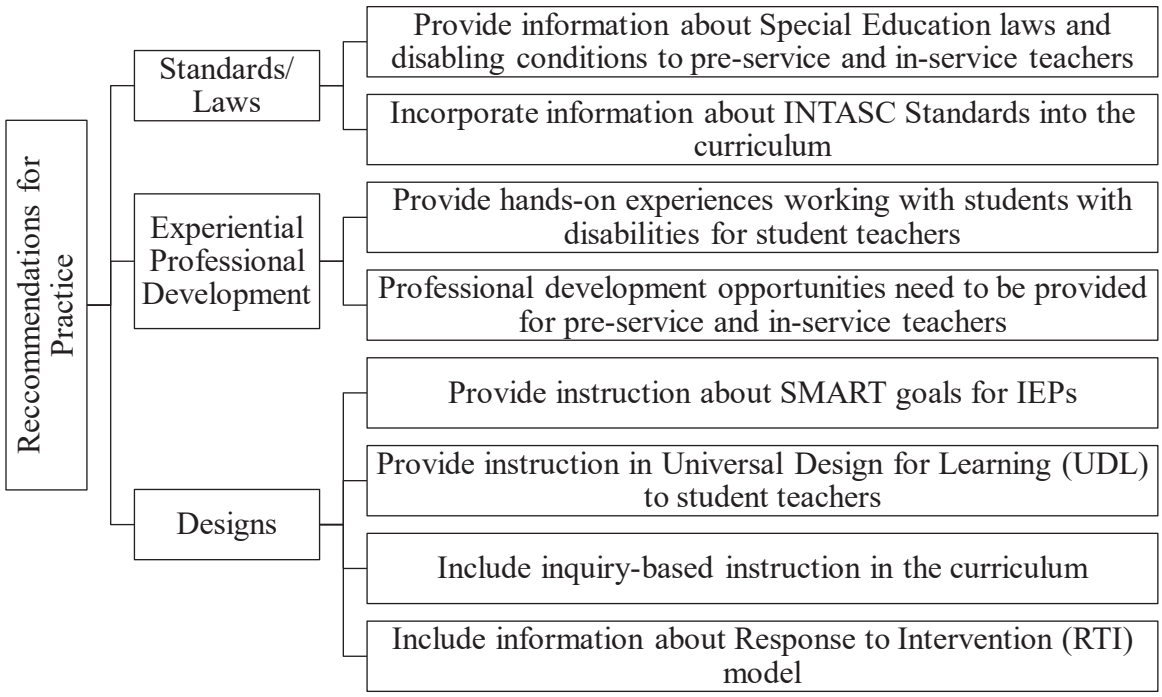
Professional development workshops that discuss best practices for teachers when working with special needs can be a great benefit. If someone with expertise in the area of working with students with special needs can facilitate the workshop, their knowledge can be invaluable to the teachers. Mike said that he did not have much formal training, but he indicated that most of his knowledge is from professional development and “being around a lot of IEP meetings”. Teachers should interact with other agriculture teachers to find out if they have discovered certain things that have worked for them while working with students with special needs.

Several suggestions for agriculture teachers were revealed during my research. First and foremost, active participation in IEP meetings is important for the teachers to get the bigger picture of the student and their particular needs. SMART goals for IEPs should be explained to pre-service teachers and to current agriculture teachers. SMART goals are specific, measurable, use action words, are realistic and relevant, and are time-limited (Wright & Wright, 2008). Agriculture teachers should also be sure that their lesson plans are including necessary accommodations for students with special needs. It is helpful if the teacher has an aide in the classroom as it may be challenging for the teacher to balance the time needs of the students with special needs with the needs of the class as a whole. If an agriculture teacher is unsure about accommodations for a student with special needs, they should always reach out to their special education coordinator for advice and assistance. The necessity of participation in IEP meetings and the fact that Mike participated in them was a recurring theme from both Mike and the special education coordinator.

Additionally, pre-service and in-service agriculture teachers need to be provided with instruction on Universal Design for Learning. Mike utilized UDL in all three of the lesson plans that he provided. Universal design uses a global approach which increases access for all students (Hansen & Mislevy, 2008). The use of UDL requires planning on the part of the teacher. According to Zint (2002), the strongest predictor of the intentions of a teacher is attitude. If the teacher has a positive attitude towards a behavior such as utilizing UDL, they are more likely to intend to use it. Ajzen (199) indicated that someone's intention to perform a specific behavior is the central factor of the Theory of Planned Behavior. An individual who intends to accomplish a specific behavior should succeed in carrying it out (Ajzen, 1991).

The inclusion of inquiry-based instruction in the curriculum has been shown to help students with special needs learn how to process information and encourages the thinking process (Easterly & Myers, 2011). Mike utilized inquiry-based instruction as opposed to text-based education. Easterly & Myers (2011) found that students learned more, remembered more, and liked learning more when this approach was used.

The Response to Intervention (RTI) model allows schools to intercede early to help meet a struggling student's needs related to a diagnosis of an educational disability (Wright, 2006). If agriculture teachers use this model, they may be able to assist students who have an undocumented learning disability. Depending on the student's response to intervention, the student may be referred for special education (Elliott, 2008).



Failure to actively include students with special needs in classroom activities is not only detrimental to the student with special needs but to the entire class as it teaches other students that it is acceptable to exclude people who are different. It does take more work and can take

more time to work with students with special needs but a benefit that Mike noted is, “for the community as a whole, we owe it to students to train them. We're all better served if everyone is able to contribute.” A final comment that Mike made sums up the perfect attitude to have when working with students with special needs, “I think it's more about trying to help them where they're at, and give them the assistance that they need.” Realizing that not all students are the same but that everyone is better served if all teachers do their best at helping students achieve their highest potential. Because in the end, we all just want to be accepted for who we are.

References

Academy of Sciences. (1988). Understanding Agriculture: New Directions for Education. The National Academies Press. Retrieved February 4, 2013, from http://www.nap.edu/catalog/766.html.

Adam, T., Rigoni, A., & Tatnall, A. (2006). Designing and implementing curriculum for students with special needs: a case study of a thinking curriculum. *Journal of Business Systems, Governance and Ethics*, *1*(1), 49-63.

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*(2), 179-211.

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior 1. Journal of applied social psychology, 32(4), 665-683.

Allinder, R. M. (1994). The relationship between efficacy and the instructional practices of special education teachers and consultants. *Teacher education and special education*, *17*(2), 86-95.

Andresen, L., Boud, D., & Cohen, R. (2020). Experience-based learning (pp. 225-239). Routledge.

Archambault, L., & Crippen, K. (2009). K–12 distance educators at work: Who's teaching online across the United States. Journal of Research on Technology in Education, 41(4), 363-391.

Ary, D., Jacobs, L. C., Sorensen, C. K., & Walker, D. A. (2018). Introduction to research in education. Boston, MA: Cengage.

Assessment, C. I. T., & Support Consortium. (2013). InTASC Model core teaching standards and learning progressions for teachers 1.0: A resource for ongoing teacher development.

ATLAS.ti Web (2021). Qualitative Analysis Software

Avramidis, E., Bayliss, P., & Burden, R. (2000). A survey into mainstream teachers' attitudes towards the inclusion of children with special educational needs in the ordinary school in one local education authority. *Educational Psychology*, *20*(2), 192-211.

Bandura, A. (1994). Self-Efficacy. *Encyclopedia of Health and Behavior,4*, 71-81.

Bandura, A. (Ed.). (1995). Self-efficacy in changing societies. Cambridge university press.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, *84*(2), 191.

Basham, J. D., Israel, M., Graden, J., Poth, R., & Winston, M. (2010). A comprehensive approach to RTI: Embedding universal design for learning and technology. Learning Disability Quarterly, 33(4), 243-255.

Basham, J. D., Israel, M., & Maynard, K. (2010). An ecological model of STEM education: operationalizing STEM for all. Journal of Special Education Technology, 25(3), 9.

Basham, J. D., & Marino, M. T. (2013). Understanding STEM education and supporting students through universal design for learning. Teaching Exceptional Children, 45(4), 8-15.

Bell, J. S. (2002). Narrative inquiry: More than just telling stories. TESOL quarterly, 36(2), 207-213.

Billingsley, B. S., & Cross, L. H. (1991). Teachers' decisions to transfer from special to general education. *The Journal of Special Education*, *24*(4), 496-511.

Boardman, A. G., Arguelles, M. E., Vaughn, S., Hughes, M. T., & Klingner, J. (2005). Special education teachers' views of research-based practices. *The Journal of Special Education*, *39*(3), 168-180.

Bobbitt, E. M. (2011). Secondary school agriculture teachers' perceived competence level toward educating students with education challenges (Doctoral dissertation, The Pennsylvania State University).

Boe, E. E., Shin, S., & Cook, L. H. (2007). Does teacher preparation matter for beginning teachers in either special or general education? *The Journal of Special Education*, *41*(3), 158-170.

Bogdan, R., & Biklen, S. K. (1997). *Qualitative research for education*. Boston, MA: Allyn & Bacon.

Boone Jr, H. N., & Boone, D. A. (2007). Problems Faced by High School Agricultural Education Teachers. *Journal of Agricultural Education*, *48*(2), 36-45.

Bowen, G. A. (2005). Preparing a qualitative research-based dissertation: Lessons learned. *The Qualitative Report*, *10*(2), 208-222.

Brand, B. (2008). Supporting high quality career and technical education through federal and state policy. *American Youth Policy Forum*. Retrieved September 23, 2010, from http://www.aypf.org/wp-content/uploads/2014/07/Supporting-High-Quality-CTE.pdf.

Broadening Participation in Science and Engineering by Welcoming Participants with Disabilities. (2015). Retrieved February 24, 2015, from https://www.washington.edu/doit/broadening-participation-science-and-engineering-welcoming-participants-disabilities.

Brownell, M. T., & Pajares, F. (1999). Teacher efficacy and perceived success in mainstreaming students with learning and behavior problems. *Teacher Education and Special Education*, *22*(3), 154-164.

Buell, M. J., Hallam, R., Gamel-McCormick, M., & Scheer, S. (1999). A survey of general and special education teachers' perceptions and inservice needs concerning inclusion. *International Journal of Disability, Development and Education*, *46*(2), 143-156.

Burgstahler, S. (2001). Real connections: Making distance learning accessible to everyone.

Carey, J. W. (1993). Linking qualitative and quantitative methods: Integrating cultural factors into public health. *Qualitative Health Research*, *3*(3), 298-318.

Carr, L. T. (1994). The strengths and weaknesses of quantitative and qualitative research: what method for nursing?. *Journal of advanced nursing*, *20*(4), 716-721.

Carter, N., Bryant-Lukosius, D., Dicenso, A., Blythe, J., & Neville, A. J. (2014). The Use of Triangulation in Qualitative Research. Oncology Nursing Forum, 41(5), 545-547. doi:10.1188/14.onf.545-547.

CEC | Members Only Area. (2011). CEC | Home. Retrieved June 12, 2012, from http://www.cec.sped.org/AM/Template.cfm?Section=Identifying_Learning_Disabilities&Template=/TaggedPage/TaggedPageDisplay.cfm&TPLID=11&ContentID=3543.

Center for Applied Special Technology (CAST). (2018). Universal Design for Learning Guidelines version 2.2. Retrieved from http://udlguidelines.cast.org.

Center for Applied Special Technology (CAST). (2021, April 09). The UDL Guidelines. Retrieved May 12, 2021, from https://udlguidelines.cast.org/?utm_source=castsite&lutm_medium=web&utm_campaign=none&utm_content=aboutudl. Cherry, K. (2013). What is self-efficacy. *Psychology: Theories*.

Childre, A., Sands, J. R., & Pope, S. T. (2009). Backward design. Teaching Exceptional Children, 41(5), 6-14.

Commonwealth of Virginia. (2019). Title 8. Education. Retrieved from https://law.lis.virginia.gov/admincode/title8/agency20/chapter23/section220/.

Conderman, G., & Johnston-Rodriguez, S. (2009). Beginning teachers' views of their collaborative roles. *Preventing School Failure: Alternative Education for Children and Youth*, *53*(4), 235-244.

Connelly, F. M., & Clandinin, D. J. (2006). Narrative inquiry. Handbook of complementary methods in education research, 3, 477-487.

Cooc, N. (2019). Teaching students with special needs: International trends in school capacity and the need for teacher professional development. *Teaching and Teacher Education*, *83*, 27-41.

Corbin, J. M., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. Qualitative sociology, 13(1), 3-21.

Crawley III, F. E. (1990). Intentions of science teachers to use investigative teaching methods: A test of the theory of planned behavior. *Journal of Research in Science Teaching*, *27*(7), 685-697.

Creswell, J. W., & Poth, C. N. (2018). Qualitative inquiry and research design: Choosing among five approaches. Sage publications.

Crunkilton, J. R. (1985). Preparing agricultural teachers of the handicapped. *The Agricultural Education Magazine*, *57*, 19-21.

Curtis, S. M., & Howell, D. L. (1980). The Penn State story... vocational teacher education for special needs students [Pennsylvania]. *The Agricultural education (USA)*.

Darling-Hammond, L. (2003). Keeping good teachers: Why it matters, what leaders can do. *Educational leadership*, *60*(8), 6-13.

Delaware Department of Education. (2004). Universal design for learning: Reaching all, teaching all. Retrieved February 24, 2015, from https://files.eric.ed.gov/fulltext/ED485470.pdf.

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2018). The Sage handbook of qualitative research. Sage.

Department of Education. (2016, November). Prevalence of teachers without full state certification and variation across schools and states. Retrieved from https://www2.ed.gov/rschstat/eval/teaching/teachers-without-certification/report.pdf.

DiBenedetto, C. A., Willis, V. C., & Barrick, R. K. (2018). Needs Assessments for School-Based Agricultural Education Teachers: A Review of Literature. *Journal of Agricultural Education*, *59*(4), 52-71.

DiPietro, M., Ferdig, R. E., Black, E. W., & Presto, M. (2010). Best practices in teaching K-12 online: Lessons learned from Michigan Virtual School teachers. Journal of interactive online learning, 9(3), 10.

Draper, S. R., & Henke, M. (2011). Saturday Technology Academy: Youth Learning in STEM Fields of Study. *TECHNOLOGY EDUCATION*, *13*, 23.

Drisko, J. W. (1997). Strengthening qualitative studies and reports: Standards to promote academic integrity. *Journal of social work education*, *33*(1), 185-197.

Durheim, M. (2017). A parent's guide to Section 504 in public schools. Retrieved March 02, 2018, from https://www.greatschools.org/gk/articles/section-504-2/.

Easterly III, R. G., & Myers, B. E. (2011). Inquiry-Based Instruction for Students with Special Needs in School Based Agricultural Education. *Journal of Agricultural Education*, *52*(2), 36-46.

Educational Testing Service. (2017). Georgia assessments for the certification of educators (GACE) study companion special education general curriculum assessment. Retrieved

from https://www.gace.ets.org/s/pdf/study_companions/gace_sc_special_ed_general_curriculum.pdf.

Educational Testing Service. (2019). Praxis® Core Academic Skills for Educators Tests Overview. Retrieved from https://www.ets.org/praxis/about/core/.

Elbert, C. D., & Baggett, C. D. (2003). Teacher competence for working with disabled students as perceived by secondary level agricultural instructors in Pennsylvania. *Journal of Agricultural Education*, *44*(1), 105-115.

Elliott, K. (2008). Response to intervention. *Exceptional Parent*, *38*(2), 72.

Emmer, E. T., & Stough, L. M. (2001). Classroom management: a critical part of educational psychology, with implications for teacher education. *Educational Psychologist*, *36*(2), 103-112.

Epler, C.M. (2011). *The Relationship Between Implicit Theories of Intelligence, Epistemological Beliefs, and the Teaching Practices of In-service Teachers: A Mixed Methods Study* (Doctoral dissertation). Retrieved from etds@vt. (etd-04082011-154026).

Ferrum College. (2019). Programs by degree. Retrieved from http://ferrum.catalog.acalog.com/content.php?catoid=7&navoid=414.

Ferrum College. (2019a). Teacher education minor. Retrieved November 1, 2019, from http://ferrum.catalog.acalog.com/preview_program.php?catoid=7&poid=872&returnto=414.

Fishbein, M., & Ajzen, I. (2015). *Predicting and changing behavior: the reasoned action approach*. New York, NY: Routledge.

Florian, L. (2010). The concept of inclusive pedagogy. *Transforming the role of the SENCO*, 61-72.

Florian, L., & Linklater, H. (2010). Preparing teachers for inclusive education: using inclusive pedagogy to enhance teaching and learning for all. *Cambridge journal of education*, *40*(4), 369-386.

Forlin, C., Sharma, U., & Loreman, T. (2007). An international comparison of pre-service teacher attitudes towards inclusive education. *Disability Studies Quarterly*, *27*(4).

Friend, M., & Cook, L. (1996). Interactions: Collaboration Skills for School Professionals (2nd. ed). New York: Longman.

Fuchs, D., & Fuchs, L. S. (1994). Inclusive schools movement and the radicalization of special education reform. *Exceptional Children*, *60*(4), 294-309.

Giffing, M. D. (2009). Perceptions of agriculture teachers toward including students with disabilities. Utah State University.

Glover, T., & Albers, C. (2005). Considerations for evaluating universal screening assessments. *Journal of School Psychology*, *45*, 117-135.

Greene, J. C. (2007). *Mixed methods in social inquiry* (Vol. 9). John Wiley & Sons.

Gunter, P. L., Shores, R. E., Jack, S. L., Rasmussen, S. K., & Flowers, J. (1995). On the Move Using Teacher/Student Proximity to Improve Students' Behavior. Teaching Exceptional Children, 28(1), 12-14.

Hanna, E. I. (2005). Inclusive design for maximum accessibility: A practical approach to universal design.

Hansen, E. G., & Mislevy, R. J. (2008). Design patterns for improving accessibility for test takers with disabilities. ETS Research Report Series,2008(2), i-32.

Hardman, M. L., & Dawson, S. (2008). The impact of federal public policy on curriculum and instruction for students with disabilities in the general classroom. *Preventing School Failure: Alternative Education for Children and Youth*, *52*(2), 5-11.

Harvey, M. W. (1999). Perceptions of vocational special needs; concerns and comparisons from area vocational technical center and comprehensive high school educators. *Workforce Education Forum*, *26*, 40-57.

Harvey, M. W. (2003). Employment opportunities and enrollment patterns for students with disabilities in CTE: the Pennsylvania perspective. *Workforce Education Forum*, *30*(1), 1-21.

Harvey, M. W., Cotton, S. E., & Koch, K. R. (2005). Indiana career and technical instructor's perceptions of program expectations for students with and without disabilities. *The Journal for Vocational Special Needs Education*, *28*(1), 4-22.

Harvey, M. W. & Pellock, C. (2003). Influences of student educational labels, behaviors, and learning characteristics as perceived by Pennsylvania's secondary career and technical educators. *The Journal for Vocational Special Needs Education, 25* (3), 30-41.

Harvey, M. W., & Pellock, C. (2004). The relationship between Pennsylvania career and technical instructors' demographic characteristics and program expectations for students with and without disabilities. *The Journal for Vocational Special Needs Education*, *26*(3), 4-22.

Hilby, A. C., Stripling, C. T., & Stephens, C. A. (2014). Exploring the Disconnect Between Mathematics Ability and Mathematics Efficacy Among Preservice Agricultural Education Teachers. *Journal of Agricultural Education*,*55*(5), 111-125.

Hitchcock, C., Meyer, A., Rose, D., & Jackson, R. (2002). Providing new access to the general curriculum: Universal design for learning. *Teaching exceptional children*, *35*(2), 8-17.

Hocutt, A. (1996). Effectiveness of special education: is placement the critical factor? *The Future of Children*, *6*(1), 77-102.

Hodge, S., Ammah, J., Casebolt, K., Lamaster, K., & O'Sullivan, M. (2004). High school general physical education teachers' behaviors and beliefs associated with inclusion. *Sport, Education and Society*, *9*(3), 395-419.

Hoerst, C. M., & Whittington, M. S. (2009). The Current Status of Classroom Inclusion Activities of Secondary Agriculture Teachers. *Journal of Agricultural Education*, *50*(2), 39-52.

Hourigan, R. (2007). Preparing music teachers to teach students with special needs. *Applications of Research in Music Education*, *Update* (Fall-Winter), 5-14.

Hyslop, A. (2010). CTE's Role in Science, Technology, Engineering and Mathematics. Techniques: Connecting Education and Careers (J1), 85(3), 16-20.

Iverson, M. J. (1993). Will we serve the academically disadvantaged? The Agricultural Education Magazine, 66(6), 4.

Jobling*, A., & Moni, K. B. (2004). 'I never imagined I'd have to teach these children': providing authentic learning experiences for secondary pre-service teachers in teaching students with special needs. *Asia-Pacific Journal of Teacher Education*, *32*(1), 5-22.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher*, *33*(7), 14-26.

Johnson, L., Wilson, E., Flowers, J., & Croom, B. (2012). Perceptions of North Carolina High School Agricultural Educators Regarding Students with Special Needs Participating in

Supervised Agricultural Experience and FFA Activities. Journal of Agricultural Education, 53(4).

Jones, M. L. (2009). A study of novice special educators' views of evidence-based practices. Teacher Education and Special Education, 32(2), 101-120.

Kessell, J. (2005). *Agricultural education student teachers' confidence and knowledge: Teaching special needs students.* (Doctoral dissertation, Texas Tech University).

Keeler, C. G., & Horney, M. (2007). Online course designs: Are special needs being met?. The American Journal of Distance Education, 21(2), 61-75.

Kessell, J., Wingenbach, G. J., & Lawver, D. (2005). Student teachers' confidence in teaching special needs students in agricultural education. *Research in Higher Education Journal*, *2*, 357-369.

Khandkar, S. H. (2009). Open coding. University of Calgary, 23, 2009.

Klagge, J., & Morton, IV, F. M. (n.d.). Classroom inclusion in Montgomery County: Balancing the needs of special and regular students. *Department of Philosophy*. Retrieved June 7, 2012, from www.phil.vt.edu/JKlagge/Inclusion.htm.

Kohler, P. D., & Field, S. (2003). Transition-focused education. *The Journal of Special Education*, *37*(3), 174-183.

Kor, K., & Mullan, B. A. (2011). Sleep hygiene behaviours: An application of the theory of planned behaviour and the investigation of perceived autonomy support, past behaviour and response inhibition. Psychology & health, 26(9), 1208-1224.

LaJoie, S. (n.d.). Discovery based learning [PowerPoint slides]. Retrieved from https://louisville.edu/.

Lancaster, J., & Bain, A. (2007). The design of inclusive education courses and the self-efficacy of preservice teacher education students. *International Journal of Disability, Development and Education*, *54*(2), 245-256.

Lawrence-Brown, D. (2004). Differentiated instruction: inclusive strategies for standards-based learning that benefit the whole class. American Secondary Education, 32(3), 34-62.

Learning Policy Institute. (2019). Uncertified teachers and teacher vacancies by state. Retrieved November 7, 2019, from https://learningpolicyinstitute.org/uncertified-teachers-and-teacher-vacancies-state.

Linn, R. (1983). Teaching and instruction: links and distinctions. *Journal of Educational Measurement*, *20*(2), 179-189.

Lohrmann, S., & Bambara, L. M. (2006). Elementary education teachers' beliefs about essential supports needed to successfully include students with developmental disabilities who engage in challenging behaviors. Research and Practice for Persons with Severe Disabilities, 31(2), 157-173.

MacFarlane, K., & Woolfson, L. M. (2013). Teacher attitudes and behavior toward the inclusion of children with social, emotional and behavioral difficulties in mainstream schools: An application of the theory of planned behavior. *Teaching and teacher education*, *29*, 46-52.

McGuire, J. M., Scott, S. S., & Shaw, S. F. (2006). Universal design and its applications in educational environments. *Remedial and special education*, *27*(3), 166-175.

McLeskey J., Waldron, N.L., So, T.H., Swanson, K. and Loveland, T (2001). Perspectives of teachers toward inclusive school programs. Teacher Education and Special Education, 24 (2) 108-115.

Moon, N. W., Todd, R. L., Morton, D. L., & Ivey, E. (2012). Accommodating students with disabilities in science, technology, engineering, and mathematics (STEM). Atlanta, GA: Center for Assistive Technology and Environmental Access, Georgia Institute of Technology.

Myers, B. E., Dyer, J. E., & Washburn, S. G. (2005). Problems facing beginning agriculture teachers. *Journal of Agricultural Education*, *46*(3), 47.

Nadworny, E., & Kamenetz, A. (2020, March 23). Education dept. says disability laws shouldn't get in the way of online learning. Retrieved March 31, 2020, from https://www.npr.org/sections/coronavirus-live-updates/2020/03/23/820138079/education-dept-says-disability-laws-shouldnt-get-in-the-way-of-online-learning.

O'Cathain, A., Murphy, E., & Nicholl, J. (2010). Three techniques for integrating data in mixed methods studies. *Bmj*, *341*.

Okolo, C. M., & Sitlington, P. L. (2001). Mildly handicapped learners in vocational education: a statewide study. *The Journal of Special Education*, *22*(2), 220-230.

Panico, A. (2008, January 29). Classroom management that works. Retrieved December 18, 2019, from https://www.wtc.ie/images/pdf/Classroom_Management/cm17.pdf.

Patton, M.Q. (1999). Enhancing the quality and credibility of qualitative analysis. Health Sciences Research, 34, 1189–1208

Phillips, L. & Dormody, T. (1993). Agricultural education for the mentally handicapped. Agricultural Education Magazine, 66(6), 14-20.

Phillips, L., Sapona, R.H., & Lubic, B.L. (1995). Developing partnerships in inclusive education: one school's approach. Intervention in School and Clinic, 30, 262-272.

Ralabate, P. K. (2011). Universal design for learning: Meeting the needs of all students. The ASHA Leader, 16(10), 14-17.

Randall, J., & Engelhard, G. E. (2009). Performance of students with and without disabilities under modified conditions: using resource guides and read-aloud test modifications on high-stakes reading test. *The Journal of Special Education*, *44*(2), 79-93.

Richardson, J. M. (2005). Strategies employed by North Carolina agriculture teachers in serving students with mild to moderate learning disabilities. Unpublished Master's thesis, University of Florida.

Riege, A. M. (2003). Validity and reliability tests in case study research: a literature review with "hands-on" applications for each research phase. Qualitative market research: An international journal.

Roll, M. (2007, June). ACCESS Project at CSU and how you can be involved. Retrieved January 19, 2018, from https://accessproject.colostate.edu/presentations/udl/consortium/LecShare_generated/html/web_data/file6.htm.

Rose, R. (2007). Curriculum considerations in meeting special educational needs. *The Sage handbook of special education*, 295-306.

Seay, C., Hilsmier, A. S., & Duncan, R. C. (2010). Examining Inclusion and Teaching Practices for Students with Mild Disabilities. *The Educational Collaborative*, *1*(1).

Segall, M. J., & Campbell, J. M. (2012). Factors relating to education professionals' classroom practices for the inclusion of students with autism spectrum disorders. *Research in Autism Spectrum Disorders,6*(3), 1156-1167.

Seidman, I. (2006). *Interviewing as qualitative research: A guide for researchers in education and the social sciences, 3rd edition*. New York: NY, Teachers College Press.

Shade, R. A., & Stewart, R. (2001). General education and special education preservice teachers' attitudes toward inclusion. *Preventing School Failure: Alternative Education for Children and Youth*, *46*(1), 37-41.

Siekmann, G., & Korbel, P. (2016). Defining" STEM" Skills: Review and Synthesis of the Literature. Support Document 1. National Centre for Vocational Education Research (NCVER).

Silvestri, S. M., & Heward, W. L. (2015). The neutralization of special education, revisited. In *Controversial therapies for autism and intellectual disabilities* (pp. 156-173). Routledge.

Smith, S. J., & Meyen, E. L. (2003). Applications of online instruction: An overview for teachers, students with mild disabilities, and their parents. *Focus on Exceptional Children*, *35*(6), 1.

Snow, D. A., Zurcher, L. A., & Sjoberg, G. (1982). Interviewing by comment: An adjunct to the direct question. Qualitative Sociology, 5(4), 285-311.

Sofaer, S. (1999). Qualitative methods: what are they and why use them? Health services research, 34(5 Pt 2), 1101.

Spratt, J., & Florian, L. (2015). Inclusive pedagogy: From learning to action. Supporting each individual in the context of 'everybody'. *Teaching and Teacher Education*, *49*, 89-96.

Stake, R. E. (1995). The art of case study research. Thousand Oaks, CA: Sage Publications.

Stair, K. S. (2009). Identifying Confidence Levels and Instructional Strategies of High School Agriculture Education Teachers When Working with Students with Special Needs.

Stair, K. (Director) (2009, December 18). Identifying confidence levels and instructional strategies of high school agriculture education teachers when working with students with special needs. *Association for Career and Technical Education Research Conference*. Lecture conducted from Association for career and technical education research, Nashville.

Stockard Jr, J. W. (2006). Handbook for teaching secondary school social studies. Waveland Press.

Straus, A., & Corbin, J. (1998). Basics of qualitative research: Techniques and procedures for developing grounded theory.

Talbert, B. A., & Edwin, J. (2008). Preparation of Agricultural Education Students to Work with Diverse Populations. *Journal of agricultural education*, *49*(1), 51-60.

Taylor, L. (1994). Reflecting on Teaching: the benefits of self-evaluation. *Assessment & Evaluation in Higher Education*, *19*(2), 109-122.

Teacher Certification Degrees. (2019). Alternate routes to teaching in Virginia. Retrieved November 1, 2019, from https://www.teachercertificationdegrees.com/certification/virginia-alternative/.

TeacherVision. (2001, August 16). Adapting instructional materials -- providing direct assistance. Retrieved December 18, 2019, from https://www.teachervision.com/adapting-instructional-materials-providing-direct-assistance.

Theodorakis, Y., Bagiatis, K., & Goudas, M. (1995). Attitudes toward teaching individuals with disabilities: Application of planned behavior theory. *Adapted Physical Activity Quarterly*, *12*(2), 151-160.

Thompson, S., & Thurlow, M. (2002). Universally designed assessments: Better tests for everyone. Policy Directions, 14.

United States Department of Education. (2020, March 21). Supplemental fact sheet addressing the risk of COVID-19 in preschool, elementary and secondary schools while serving children with disabilities. Retrieved March 31, 2020, from https://www2.ed.gov/about/offices/list/ocr/frontpage/faq/rr/policyguidance/Supple Fact Sheet 3.21.20 FINAL.pdf.

University of Louisville. (2017). Modeling - autism/moderate and severe disabilities. Retrieved December 18, 2019, from https://louisville.edu/education/abri/primarylevel/modeling/autism_msd.

University of Washington. (2017, June 28). What is the difference between an IEP and a 504 Plan? Retrieved February 24, 2018, from https://www.washington.edu/doit/what-difference-between-iep-and-504-plan.

U.S. Department of the Interior STEM Education and Employment Pathways Strategic Plan Fiscal Years 2013—2018. (2013, January). Retrieved December 11, 2017, from https://nctc.fws.gov/programs/education-outreach/DOI-STEM-Strategic-Plan-2013-2018.pdf.

Valtonen, T., Kukkonen, J., & Wulff, A. (2006). High School Teachers' Course Designs and Their Professional Knowledge of Online Teaching. Informatics in Education, 5(2), 313-328.

Virginia Department of Education. (n.d.). Virginia State Quality Profile. Retrieved June 23, 2021, from https://schoolquality.virginia.gov/virginia-state-quality-profile#desktopTabs-7.

Virginia Department of Education. (2018a). Agricultural Education. Retrieved January 10, 2018, from http://www.doe.virginia.gov/instruction/career_technical/agriculture/index.shtml.

Virginia Department of Education. (2018b). Individuals with Disabilities Education Act (IDEA). Retrieved January 10, 2018, from http://www.doe.virginia.gov/federal_programs/idea/index.shtml.

Virginia Department of Education. (2018c). Licensure. Retrieved October 12, 2018, from http://www.doe.virginia.gov/teaching/licensure/.

Virginia Department of Education. (2018d). Licensure. Retrieved February 15, 2018, from http://www.doe.virginia.gov/teaching/licensure/.

Virginia Department of Education. (2019). Career Switcher Program. Retrieved from http://www.doe.virginia.gov/teaching/educator_preparation/career_switcher/index.shtml.

Virginia Department of Education. (2019a). Career & technical education (CTE). Retrieved from http://www.doe.virginia.gov/instruction/career_technical/index.shtml.

Virginia Department of Education. 2019b). Fall membership Build-A-Table. Retrieved October 24, 2019, from https://p1pe.doe.virginia.gov/apex/f?p=180:1:2401072356191:::::.

Virginia Department of Education. (2020, March). Frequently asked questions – updated March 30, 2020. Retrieved March 31, 2020, from http://www.doe.virginia.gov/support/health_medical/office/covid-19-faq.shtml.

Virginia State University. (2018). 2018-2020 Undergraduate catalog. Retrieved November 1, 2019, from http://www.vsu.edu/files/docs/academics/catalog/undergraduate-catalog-2018-2020.pdf.

Virginia State University. (2019). Teaching & learning programs. Retrieved November 1, 2019, from http://www.education.vsu.edu/departments/teaching-learning/programs/index.php.

Virginia Tech. (2017, July 18). Career and technical education. Retrieved November 1, 2019, from https://www.soe.vt.edu/cte/pdf/MS_PreService Requirements.pdf.

Virginia Tech, School of Education. (2013, June 27). Teacher licensure program requirements. Retrieved from https://www.soe.vt.edu/cte/Teacher_Licensure/Program_Requirements/program_requirements.html.

Watson, B. (2019, December 3). Email interview.

Watson, B. (2021, June 30). Email interview.

Webster, J. (2017, October 13). General Education: The Education Everyone Should Be Provided. Retrieved January 10, 2018, from https://www.thoughtco.com/general-education-glossary-term-3110863.

Webster, L., & Mertova, P. (2007). *Using narrative inquiry as a research method: An introduction to using critical event narrative analysis in research on learning and teaching*. Routledge.

Wells, K. (2011). *Narrative inquiry*. Pocket Guides to Social Work Research Methods.

Wengraf, T. (2004). *Qualitative research interviewing*. SAGE Publications Ltd.

Whipp, R. (1998). Qualitative methods: technique or size?. *Researching the world of work: Strategies and methods in studying industrial relations*, 51-64.

Wonacott, M. E. (2001). Students with Disabilities in Career and Technical Education. ERIC Digest.

Wright, J. (2006). Getting started with 'response to intervention': A guide for schools. Retrieved March 12, 2015, from http://www.jimwrightonline.com/ppt/rti_intro_wright.ppt.

Wright, P., & Wright, P. (2008, June 17). SMART IEPs: Introduction. Retrieved April 14, 2015, from http://www.readingrockets.org/article/smart-ieps-introduction.

Yell, M. (1998). Section 504 of the Rehabilitation Act of 1973. In The law and special education (3rd ed., pp. 93-123). Upper Saddle River, N.J.: Merril

Zint, M. (2002). Comparing three attitude-behavior theories for predicting science teachers' intentions. *Journal of research in science teaching*, *39*(9), 819-844.

APPENDIX A-Timeline of Research Work

Research Step	**Date**
IRB approval for study	June 2012
IRB approval for amendment to study	January 2020
Contact Agriculture teacher to set up initial interview	March 2020
Interview Agriculture teacher	March 2020
IRB approval for amended study due to COVID-19	June 2020
Interview Special Education Coordinator	June 2020
Questions answered via email from Special Education Aide	October 2020
Follow-up interview with Agriculture teacher to discuss how the teacher worked with students with special needs in an online format	November 2020

APPENDIX B-IRB Approval for Survey

VirginiaTech

Office of Research Compliance
Institutational Review Board
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, VA 24060
540/231-4606 Fax 540/231-0959
email irb@vt.edu
website http://www.irb.vt.edu

MEMORANDUM

DATE: June 27, 2012

TO: Donna Westfall-Rudd, Michelle L Greaud, Rick Rudd

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires May 31, 2014)

PROTOCOL TITLE: Students with Special Needs in CTE

IRB NUMBER: 12-237

Effective June 27, 2012, the Virginia Tech Institution Review Board (IRB) Chair, David M Moore, approved the Amendment request for the above-mentioned research protocol.

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

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

All investigators (listed above) are required to comply with the researcher requirements outlined at:

http://www.irb.vt.edu/pages/responsibilities.htm

(Please review responsibilities before the commencement of your research.)

PROTOCOL INFORMATION:

Approved As:	**Exempt, under 45 CFR 46.110 category(ies) 2**
Protocol Approval Date:	**June 12, 2012**
Protocol Expiration Date:	**N/A**
Continuing Review Due Date*:	**N/A**

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

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

Date*	OSP Number	Sponsor	Grant Comparison Conducted?

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

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

APPENDIX C- IRB Approval for Amended Study

VIRGINIA TECH

Division of Scholarly Integrity and
Research Compliance
Institutional Review Board
North End Center, Suite 4120 (MC 0497)
300 Turner Street NW
Blacksburg, Virginia 24061
540/231-3732
irb@vt.edu
http://www.research.vt.edu/sirc/irb.php

MEMORANDUM

DATE: June 1, 2020

TO: Donna Marie Westfall-Rudd, Michelle L Greaud

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires October 29, 2024)

PROTOCOL TITLE: Case Study of an Agricultural Teacher's Planned Behavior When Working With Students With Special Needs

IRB NUMBER: **20-082**

Effective May 29, 2020, the Virginia Tech Human Research Protection Program (HRPP) and Institutional Review Board (IRB) determined that this protocol meets the criteria for exemption from IRB review under 45 CFR 46.104(d) category(ies) 2(ii).

Ongoing IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities impact the exempt determination, please submit a new request to the IRB for a determination.

This exempt determination does not apply to any collaborating institution(s). The Virginia Tech HRPP and IRB cannot provide an exemption that overrides the jurisdiction of a local IRB or other institutional mechanism for determining exemptions.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

https://secure.research.vt.edu/external/irb/responsibilities.htm

(Please review responsibilities before beginning your research.)

PROTOCOL INFORMATION:

Determined As:	**Exempt, under 45 CFR 46.104(d) category(ies) 2(ii)**
Protocol Determination Date:	**January 24, 2020**

ASSOCIATED FUNDING:

The table on the following page indicates whether grant proposals are related to this protocol, and which of the listed proposals, if any, have been compared to this protocol, if required.

SPECIAL INSTRUCTIONS:

*** The Virginia Tech IRB/HRPP has requested that research involving person-to-person contact or gatherings of human research participants be paused as soon as possible. The duration of the pause is unknown, but to reduce disruption to the extent possible, we will be reassessing daily. Although we continue to issue approval notices, Virginia Tech guidance should be followed. Please visit https://www.research.vt.edu/covid-19-updates-impacts.html for updates.

This amendment, submitted May 19, 2020, updates research protocol. Consent forms were updated. Data collection instruments were updated to conduct all interviews via Zoom instead of video-taping the teacher in class.

Date*	OSP Number	Sponsor	Grant Comparison Conducted?

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

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

APPENDIX D-Questions to Determine Knowledge of Special Education Practices

1 Which of the following is an accurate statement about what IDEA requires for any IEP?

- ❍ The IEP must include a multiyear outline of instructional objectives
- ❍ The IEP must include a section on assistive devices, regardless of the nature or degree of the student's disability
- ❍ The IEP must be in effect before special education services or related services are provided.
- ❍ The IEP must not be made available to any school personnel except special education teachers.

---

2 Trish is a high school student who is diagnosed with autism spectrum disorder (ASD). She has difficulty maintaining eye contact and makes impulsive comments during lessons. Which of the following behavioral strategies would best help Trish?

- ❍ Assigning Trish a peer buddy to help her keep on task
- ❍ Providing Trish a visual menu of appropriate behaviors
- ❍ Seating Trish next to the window so she can look outside
- ❍ Giving Trish high-interest, low-reading level assignments

---

3 To promote the transfer of word attack skills to newspaper reading, a teacher of students with intellectual disabilities is most likely to

- ❍ prepare teacher-made newspaper articles for the students to read
- ❍ select articles from the local newspaper for students to read
- ❍ develop writing exercises using words from the curriculum
- ❍ prepare worksheet exercises based on single sentences from newspaper articles

---

4 A well-made teacher-developed test is generally preferred to a standardized achievement test when measuring learning mastery because it

- ❍ is more likely to yield a true score
- ❍ has higher interrater reliability
- ❍ allows comparison of students to each other
- ❍ has better content validity

---

5 Using a student's classwork as a means to evaluate progress and adapt instruction is known as

- curriculum-based assessment
- standardized achievement testing
- summative assessment
- guided practice

---

6 Which of the following techniques is likely to be most successful in helping learners with intellectual disabilities to retain previously acquired skills?

- Scheduling frequent peer tutoring sessions
- Acknowledging appropriate behavior regularly
- Providing periodic review of lessons
- Allowing longer independent practice periods

---

7 An IEP must include which of the following components?

- The present levels of academic achievement and functional performance
- A record of past student performance
- A description of the student's intellectual functioning
- Suggestions for parental involvement

---

8 Which of the following is legally required to initiate a formal evaluation for a student suspected of having a specific learning disability?

- Signed parental permission
- Verbal agreement provided by the parents
- Teacher referral
- Physician referral

---

9 Jen, a high school student, receives special education services under the category of specific learning disability. Jen's IEP states that written assignments will be completed using word processing and speech recognition software. Which of the following is most likely to promote successful use of assistive technology?

- Limiting the amount of written homework
- Providing software for home use
- Assigning keyboarding homework
- Allowing choice of topic for written assignments

(Educational Testing Service, 2017)

APPENDIX E-Interview Protocol and Questions for Teacher

The interview will be audio recorded for the purpose of this study. Do you consent to using a recording device for the interview?

My name is _____. I would like to thank you for taking the time to allow me to interview you today. The purpose of this interview is to gather information about an agricultural teacher's planned behavior and interaction with students with special needs.

I would like to ask you some questions about your experiences as an agricultural teacher and your intentions.

We will begin by discussing your role as a participant in this study and obtaining informed consent. I will then ask you specific questions from my interview guide. My role as the interviewer is to ask questions about the topic and ask additional details on particular responses. The interview will last for approximately one hour.

Please read and review the consent form. If you have any questions, please ask them.

Do you have any questions?

(Allow the participant to read and sign the consent form).

Now, please read and answer the questions about special education practices.

(Allow the participant time to read and answer the nine questions about special education practices).

During the interview, there are no right or wrong answer. Please share your opinions during the interview. Please let me know if you do not want to respond to a question. We will skip that question and continue to the next question.

As the consent form states, you have been allowed to select a pseudonym. We will start by testing the recording device. Please state your selected pseudonym.

(The interviewee will read their name to test the volume of the recording device).

I will now begin recording.

You have read and signed the consent form Will you please provide verbal consent to participate in this audio recorded study?

Participant Interview

I will begin by asking general questions about your teaching history. We will then talk more about your experiences as they relate to students with special needs.

1. How long have you been an agricultural teacher?

2. Why did you decide to become an agricultural teacher?

3. What guides your decisions when working with students with special needs?

   a. How did you come to learn these things?

4. Do you feel that you are knowledgeable about special education practices and implementation?
   a. Why or why not?
5. How do you integrate your knowledge of special education practice into your classroom lessons?
6. Do you participate in the IEP meetings for students with special needs in your classroom?
   a. Why or why not?
7. Do you feel that you connect well with students with special needs in your classroom?
   a. Why or why not?
8. Do you think that you help students with special needs feel connected to other students in your classroom?
   a. Why or why not?
9. Is there anything else that you would like to share about how you interact with students with special needs in your classroom?

As an agriculture education teacher directly involved in classroom activities:

10. What do you believe are the **advantages** of supporting youth with cognitive impairments in classroom activities?
11. What do you believe are the **disadvantages** of supporting youth with cognitive impairments in classroom activities?
12. Is there anything else you associate with supporting youth with cognitive impairments in in classroom activities?
13. Are there any individuals or groups who would **approve** of your supporting youth with cognitive impairments in classroom activities?

14. Are there any individual or groups who would **disapprove** of your supporting youth with cognitive impairments in classroom activities?

15. Are there any other individuals or groups who come to mind when you think about supporting youth with cognitive impairments in classroom activities?

16. What factors or circumstances **enable** you to support youth with cognitive impairments in classroom activities?

17. What factors or circumstances make it **difficult or impossible** for you to support youth with cognitive impairments in classroom activities?

18. Are there any other issues that come to mind when you think about supporting youth with cognitive impairments in classroom activities?

I am going to stop recording at this time.

Thank you again for participating in this interview. I will transcribe the interview word for word. You will receive the transcription so that you can review it and provide feedback about the accuracy. I will then interpret the findings to learn more about teacher self-efficacy. I may need to contact you while I am analyzing the data. If you have any questions or comments during this time, please let me know.

APPENDIX F-Interview Protocol for Special Education Coordinator

1. How would you describe the relationship in your school between special education teachers and general education teachers?
    a. How would you describe the relationship in your school between special education teachers and CTE teachers?
    b. Tell me about the teaching partnership between the agriculture teacher and special education.
2. Are general education teachers invited to IEP meetings?
    a. Are CTE teachers invited to IEP meetings?
    b. Is the agriculture teacher invited to IEP meetings?
        i. Does the agriculture teacher participate in IEP meetings?
3. How do you ensure IEP compliance?
    a. Do you meet with general education teachers to ensure they understand how to adapt curriculum for students to meet IEP compliance?
    b. Do you meet with CTE teachers to ensure they understand how to adapt curriculum for students to meet IEP compliance?
4. What modifications do you expect/hope that teachers use to accommodate all students in their classrooms?
5. Tell me about the support offered to the agriculture teacher for working with students with special needs in an online format.
    a. Do you have contact with the students with special needs to determine if they need additional support?

b. Do you have contact with the agriculture teacher to determine if he needs assistance in adapting curriculum for students with special needs in an online format?

APPENDIX G-Interview Protocol for Special Education Aide

1. How would you describe the relationship in your school between special education teachers/aides and general education teachers?
    a. How would you describe the relationship in your school between special education teachers/aides and teachers in the CTE programs?
2. Tell me about the teaching partnership you have with the agriculture teacher.
    a. Do you meet with the agriculture teacher to discuss supports that students may need?
3. What modifications do you expect/hope that teachers use to accommodate all students in their classrooms?
4. What have you observed the agriculture teacher doing to accommodate the needs of students with special needs in their classroom?
    a. How do they modify materials?
    b. How do they modify their communications or instructions?
5. Prior to COVID-19, how would you describe the type of support you gave the agriculture teacher in the classroom?
    a. Did you provide support for the agriculture teacher in multiple classes or only one class?
    b. Did you provide support in helping to implement the IEP for students in the agriculture class?
6. Tell me about any type of support you are providing to the agriculture teacher for special education students while teaching is being done online.

a. Are you in contact with the agriculture teacher to discuss assistance students may need online?
b. Are you in contact with the students in the agriculture class online to give them any assistance?

APPENDIX H-Interview Protocol for Second Interview with Teacher

1. What did you do in terms of assignments for students in general in your class?
2. Were the assignments the same for everybody?
    a. Were there any modifications for any of the students that have special needs?
3. Was there a mechanism with your school system for students to turn things in on paper?
4. Were there specific lesson plans for students in the online format?
5. We had talked before about you sharing some of your lesson plans with me that might include some modifications that you do for some of the students. Could you share some of those from before COVID-19 with me?
6. In general, what types of things do you do in terms of modifications for students that need extra assistance?
7. How many aides did you have in your class?
8. How many students with special needs did you have in your class?
9. Did any of the parents of students with special needs students reached out to you?
10. If school did not start on time for the 2020-2021 year, were you supposed to be making things accessible to students?
11. Did you have supports built in for all students in your class or only for students with special needs?
12. Is there anything else you want to tell me about or that you think I should know about?

APPENDIX I-Lesson Plan

USPOULTRY
U.S. POULTRY & EGG ASSOCIATION

Lesson Plan
10 of 13

Poultry Processing

Created: 07/2019 by the National FFA Organization

The National FFA Organization and U.S. Poultry and Egg Association lesson plan series provides educators with a comprehensive curriculum resource to teach students about the commercial poultry and egg industry. Additionally, lessons are infused with FFA and SAE activities to easily integrate into any agricultural education program.

The following plan was used with minor adaptations for learning support students. All students have a guideline sheet for their bellringer questions. Students were all given the worksheets for scaffolding. Learning support students were given extra time to complete the work and given additional assistance from the classroom teacher and aid.

Student Learning Objectives:

After completing these activities, students will …

1. Understand the steps and equipment used in poultry meat processing.
2. Understand the layout of a poultry processing facility.
3. Identify the requirements of packaging labels.

Essential Questions:

1. What are the steps of poultry meat processing?
2. What equipment is used during processing?
3. How is a poultry processing plant layout organized to ensure the production of a safe food product?
4. What needs to go on a packaging label?

Time Required: 90 minutes

Resources:

1. "An Inside Look at U.S. Poultry Processing" video, https://youtu.be/ZnRYi2ukzOs
2. National FFA Poultry Evaluation Career Development Event Handbook, https://FFA.app.box.com/file/290516840457
3. "Poultry Processing" PowerPoint, https://ffa.box.com/s/zqhgl5ljqeqrcqftqp2l0kvxaead5sdb

Equipment and Supplies Needed:

1. A copy of the "How Are Poultry Processed?" worksheet for each student
2. A copy of the "What's in a Label?" worksheet for each student
3. A copy of the "Further Processed Poultry" worksheet for each student
4. Internet access to play the video in real time or embed it in a PowerPoint ahead of time.

Lesson Plan:

1. *Bell Ringer:* Have students respond to the question "Why is poultry processed?"

2. *Interest Approach:* Have students get into small groups and write the alphabet vertically down the left side of a paper, one letter per line. On the word "go," have students race to brainstorm as many processed poultry products as they can list from A to Z. Examples could be soup, bouillon, wings, etc. When one minute has passed, count to see who has come up with the most products and read the list aloud. Transition by explaining that during this class period, students will learn how these products are made.

3. *Instruction:*

Student Learning Objective One: Students will be able to understand the steps and equipment used in poultry meat processing.

Steps: I. Shackling a. Poultry meat processing is initiated by hanging, or shackling, the birds to a processing line. b. Birds are transferred from coops or transport cages to a dark room where they are hung upside down from shackles attached to an automated line. II. Stunning a. Electrical stunning delivers a current through a water bath to immediately create a state of unconsciousness. For a complete stun, birds must receive a particular electric exposure for a specified time. An effective stun will cause the bird to arch the neck, hold the wings tightly to the body, sometimes result in body tremors and render the bird unconscious immediately. This will last until the bird has been killed. The current should be compliant with minimum recommended current per bird. b. Controlled environment stunning is another alternative stunning process. Birds are immersed in an approved gas or mixture of gases (i.e., CO_2) in order to displace oxygen and render the bird unconscious. III. Bleeding a. After stunning, the birds are passed through an automated knife that makes an incision on the neck to cut the major blood vessels in the neck. b. With the carcass hanging upside down and the major blood vessels cut, the majority of the blood in the carcass will exit. IV. Scalding a. Scalding loosens the feathers to facilitate their removal. b. Carcasses are submerged into the scalder that contains water heated from 125 to 150°F, depending upon the type and age of the poultry. c. This high water temperature serves to loosen the connection of feathers to the skin. V. Picking a. Picking is a term that refers to feather removal. b. The picker removes the feathers on the carcass. c. The picker is an automated machine that contains rubber finger-like projections that rotate in a circular motion to remove feathers without damaging the carcass. VI. Removal of feet, head, neck and oil glands a. Feet are removed at the ankle joints. b. The head is cut and removed. c. The neck is cut with a machine, and the esophagus is exposed. VII. Evisceration a. ***Evisceration*** refers to the removal of internal organs. b. The inedible viscera consist of the spleen, esophagus, lungs, intestines and reproductive organs. c. The intestines (viscera) are federally inspected for signs of disease or other problems.	ACTIVITY 1: Each student needs a copy of the "How Are Poultry Processed?" worksheet. Have students watch the U.S. Poultry video "An Inside Look at U.S. Poultry Processing," available at https://youtu.be/ZnRYi2ukzOs. As students watch the video, they will describe each step in processing as well as the equipment used. They will record their answers on the worksheet. Once the video is complete, review the steps in the process with the class and use direct instruction using the PowerPoint to fill any missing pieces.

i. Identified disease or other problems results in the removal, or condemnation, of the carcass from the processing line. d. The edible viscera, or giblets, consist of the heart, liver and gizzard. i. The giblets are packaged in the carcass or sold separately. VIII. Washing the carcass a. The carcasses are cleaned for microbial and visible concerns. When processing chicken, microbial bacteria such as E. coli and salmonella are analyzed. IX. Chilling a. The carcass temperature must be reduced to prevent microbial growth. b. The USDA specifies the amount of chilling for specific bird sizes i. 4-pound broiler: 40°F within 4 hours ii. 4- to 8-pound broiler: 40°F within 6 hours iii. Greater than 8 pound broiler: 40°F within 8 hours c. Submerging the carcass in an ice (chilled water) bath is the most common method of carcass chilling. d. Carcass can also be chilled by air chilling. i. Air chilling occurs by passing cold air over the carcass. This is a more expensive process but some consumers are willing to pay more for air chilling. X. Cut-up and deboning a. On average, 75 to 80 percent of the live animal weight is retained in the carcass. i. This amount of live weight retained in the carcass is known as the dressing percentage. b. The carcass can be sold whole or individual components of carcass can be cut-up for individual sale. i. Cut-up often includes removal of the breast, thighs, drumsticks and wings. c. Deboning refers to the removal of bone from the cut-up meat. i. Breasts and thighs are commonly deboned. XI. Further processing a. The whole carcass or cut-up and deboned pieces may be further processed for added value. b. Further processing may include forming, curing, smoking and cooking of products. i. Forming product requires a change in particle size and often includes the addition of ingredients to add flavor. ii. Forming product also requires the use of a mold to obtain desired shape. iii. Formed products include hot dogs, chicken nuggets or sausage. c. Curing involves the addition of preservatives, often nitrates, to the meat to improve flavor and product shelf-life. d. Smoking also acts as a preservative while providing additional flavor to the product. e. Some product may be prepared in a form that is edible without additional preparation and is known as "ready-to-eat." XII. Storage a. Poultry meat should be refrigerated at approximately 30°F. Keeping the poultry below 40 °F reduces the risk of microbial growth. b. Refrigeration and freezing does not kill all microbes, some will survive. Equipment: I. Stunning Cabinet a. Electrical circuit passes through the whole body and delivers sufficient current to render the bird unconscious immediately and lasting until the bird is killed. II. Automated Knife Blade a. Cuts the neck and major blood vessels allowing the blood to flow out of the bird b. All birds are stunned and insensible to pain prior to entering the automated knife machine.	

III. Scalding Tank a. The purpose is to loosen the feather follicles of the bird so that the picker can remove the feathers. IV. Picker a. Soft, rubber projections ("fingers") are installed throughout the picker to remove all the feathers so the bird is ready for processing. V. Pneumatic shears a. An air-powered device used to remove the neck and head	

Student Learning Objective Two: Students will be able to understand the layout of a poultry processing facility.

I. Flow of operations a. Poultry processing plants are highly organized and mechanized facilities that contain state-of-the-art technology to ensure the safe preparation of poultry meat products. b. Processed product should travel from the area of highest potential contamination to the lowest potential contamination. II. Personnel traffic flow a. Personnel traffic flow should be restricted to prevent potential contamination of product. b. Personnel should be restricted to their routine work area. III. Separation of raw and ready-to-eat product a. Ready-to-eat products must be located in a separate facility from raw product in order to prevent potential contamination. b. Ventilation systems should direct airflow away from cooked products.	**Activity 1:** Write the following terms on the whiteboard or flip chart: -Flow of operation -Personnel traffic flow -Separation of raw and ready-to-eat product Have students think back to the video they watch earlier. Have them record on the "Notes Sheet" their thoughts on each of the terms listed. After everyone has written their own definitions, discuss their definitions, the real definitions and the importance of each item to the poultry processing process. You can utilize the PowerPoint to review the definitions. Students can record information on the "Notes Sheet."

Student Learning Objective Three: Students will be able to identify the requirements of packaging labels.

I. "Sell By" a. Product dating not required b. Preferred by stores for dating c. Date used for quality assurance d. Food can still be used if chicken is frozen and the sell-by date is expired. II. Plant Code a. The plant code traces the facility that produced the product and tracks the product in case of a recall. III. Grade of Chicken a. Grade A: best quality (plump, bruise free, no broken bones) IV. Nutritional Facts a. Serving sizes b. Fat, sugar, sodium and carbohydrate quantities V. "Keep Refrigerated" VI. Following label regulations	**Activity 1:** Each student needs a copy of the "What's in a Label?" worksheet. Have students work in pairs to draw lines from the words in the word bank to where the term is located on the label.

a. Follow all claims 1. For example: if labeled "Organic," the bird must have been raised organically and certified organic. b. Some labels are misleading 1. For example: "No hormones or steroids" – It is illegal to use hormones or steroids in poultry production.	

4. *Follow-up:* Put students into small groups of three or four. Ensure that each group has one set of "Assemble the Steps" pre-cut and one phone or other device to time students. Each student in the group will begin by flipping all strips so they are facing down. Next, students will start timer and flip strips over, assembling into the correct order of poultry processing. Once complete, time is called and then the student flips the strips over and mixes them. Students will race until each student has correctly completed assembling the puzzle. The fastest student "wins."

5. *FFA/SAE Connection:* A portion of the poultry evaluation career development event has student's judge poultry products that have been further processed based on quality factors. Bring in or show pictures of various poultry products (boneless and bone-in) that show the various defects.
   Boneless (coating defects, color defects, consistency of shape/size, broken and/or incomplete products, cluster/marriages and evidence of foreign material)
   Bone-In (coating defects if applicable, color defects, consistency of size, broken products, mis-cut products and evidence of foreign material)
   Students will utilize the scorecards on the "Further Processed Poultry" worksheet to record their findings.

6. *Exit Ticket:* On the exit ticket collection sheet, write a summary of the content learned using no more characters than a single tweet (240 characters).

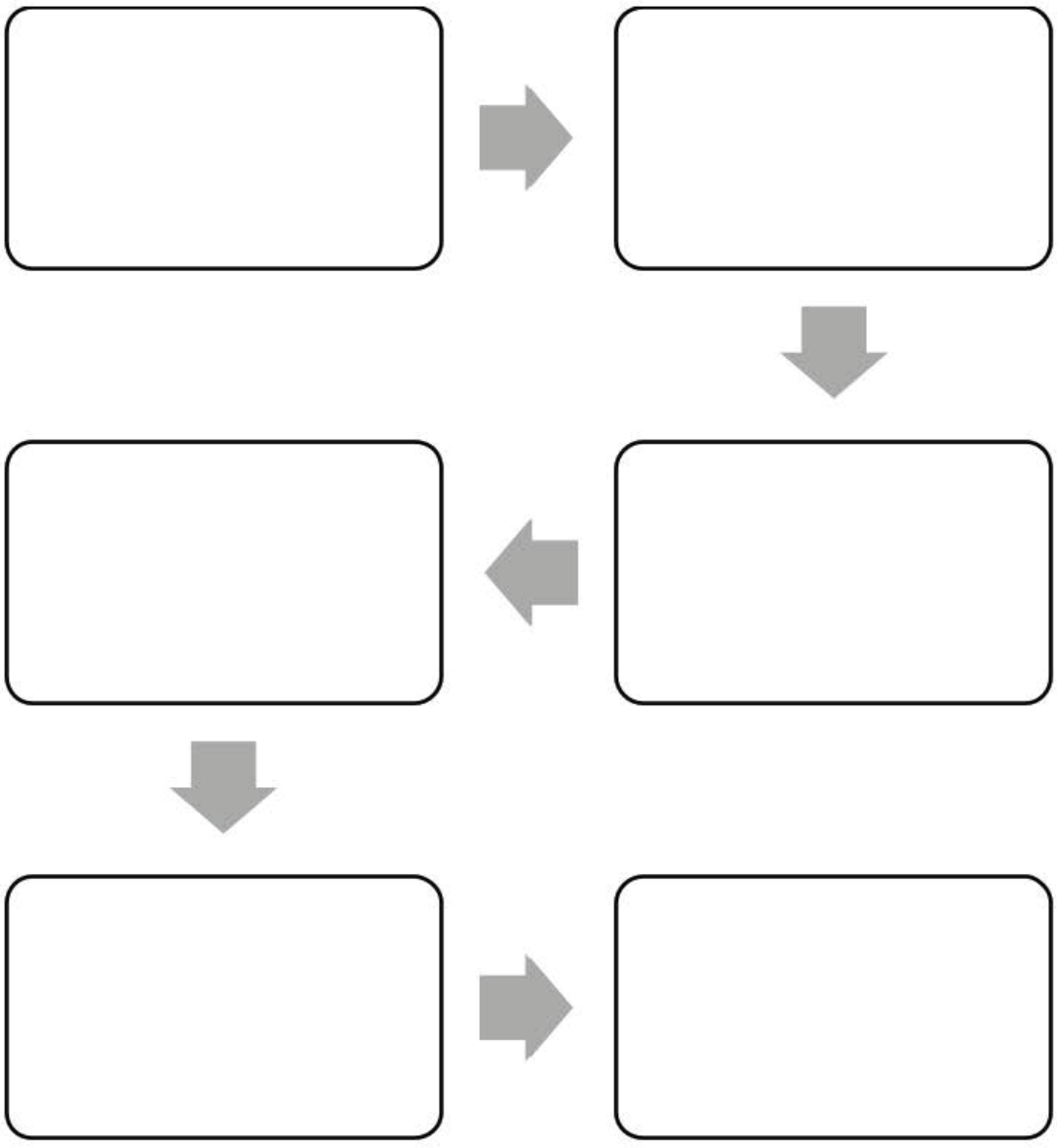
NAME: _____

Aligned to the following standards:
FPP.01; FPP.03; FPP.04; FFA.PL-A; FFA.PG-J; FFA.CS-M; FFA.CS-N; AG-FD-1; AG-FD3; AG-FD4; AGPA01.01; AGAP01.03; AGAP01.04; CS.01; CS.02; CS.03; CCSS.ELA.W.9-10.2; CCSS.ELA.SL.9-10.1; CCSS.ELA.SL.9-10.2; CCSS.ELA.SL.9-10.4; CRP.02; CRP.04

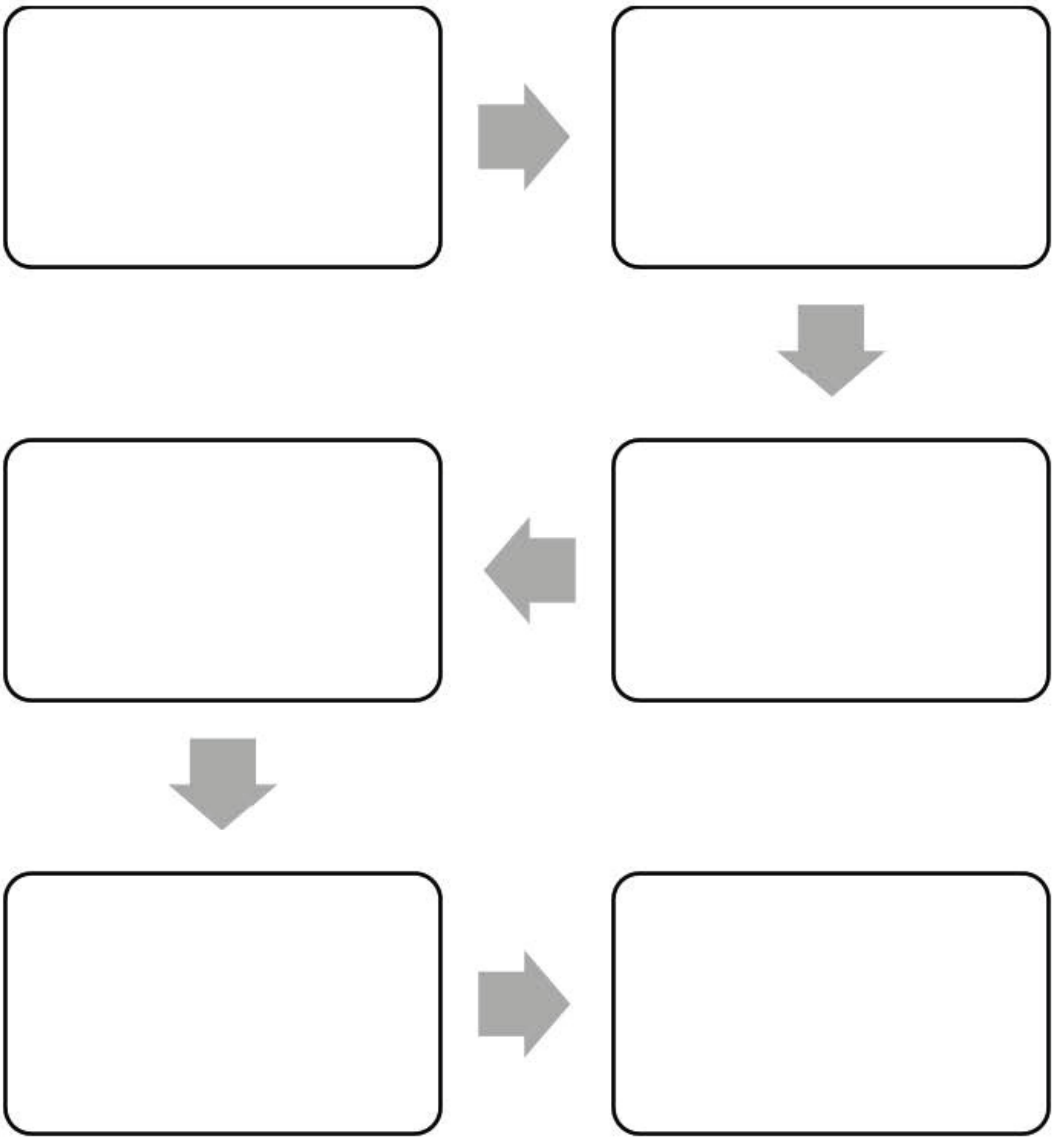
How Are Poultry Processed?

Directions:

Watch the video "An Inside Look at U.S. Poultry Processing," available at https://youtu.be/ZnRYi2ukzOs. As you watch the video, use the space below to describe each step in the process as well as the equipment used.



NAME: _____



NAME: _____

Aligned to the following standards:
FPP.01; FPP.03; FPP.04; FFA.PL-A; FFA.PG-J; FFA.CS-M; FFA.CS-N; AG-FD-1; AG-FD3; AG-FD4; AGPA01.01; AGAP01.03; AGAP01.04; CS.01; CS.02; CS.03; CCSS.ELA.W.9-10.2; CCSS.ELA.SL.9-10.1; CCSS.ELA.SL.9-10.2; CCSS.ELA.SL.9-10.4; CRP.02; CRP.04

What's in a Label?

DIRECTIONS:

Draw lines from the terms in the word bank to the location of the term on the label.

Labeling Terms:

Sell-by Date | Plant Code | Grade of Chicken | Nutrition Facts

Serving Sizes | Keep Refrigerated | Fat

Sodium | Carbohydrates

NAME: _____

Aligned to the following standards:
FPP.01; FPP.03; FPP.04; FFA.PL-A; FFA.PG-J; FFA.CS-M; FFA.CS-N; AG-FD-1; AG-FD3; AG-FD4; AGPA01.01; AGAP01.03; AGAP01.04; CS.01; CS.02; CS.03; CCSS.ELA.W.9-10.2; CCSS.ELA.SL.9-10.1; CCSS.ELA.SL.9-10.2; CCSS.ELA.SL.9-10.4; CRP.02; CRP.04

Assemble the Steps

Shackling	Stunning
Bleeding	Scalding
Picking	Removal of head, neck, feet and oil glands
Evisceration	Washing the carcass
Chilling	Cut-up and deboning
Further processing	Storage

NAME: _____

Aligned to the following standards:
FPP.01; FPP.03; FPP.04; FFA.PL-A; FFA.PG-J; FFA.CS-M; FFA.CS-N; AG-FD-1; AG-FD3; AG-FD4; AGPA01.01; AGAP01.03; AGAP01.04; CS.01; CS.02; CS.03; CCSS.ELA.W.9-10.2; CCSS.ELA.SL.9-10.1; CCSS.ELA.SL.9-10.2; CCSS.ELA.SL.9-10.4; CRP.02; CRP.04

Further Processed Poultry

Boneless Further Processed

Defect	Product Number									
	1	2	3	4	5	6	7	8	9	10
Coating Void										
Inconsistent Color										
Inconsistent Shape/Size										
Broken/Incomplete										
Cluster/Marriages										
Foreign Material										
No Defect										

Bone-In Further Processed

Defect	Product Number									
	1	2	3	4	5	6	7	8	9	10
Coating Void										
Inconsistent Color										
Inconsistent Size										
Broken/Broken Bone										
Mis-cut										
Foreign Material										
No Defect										

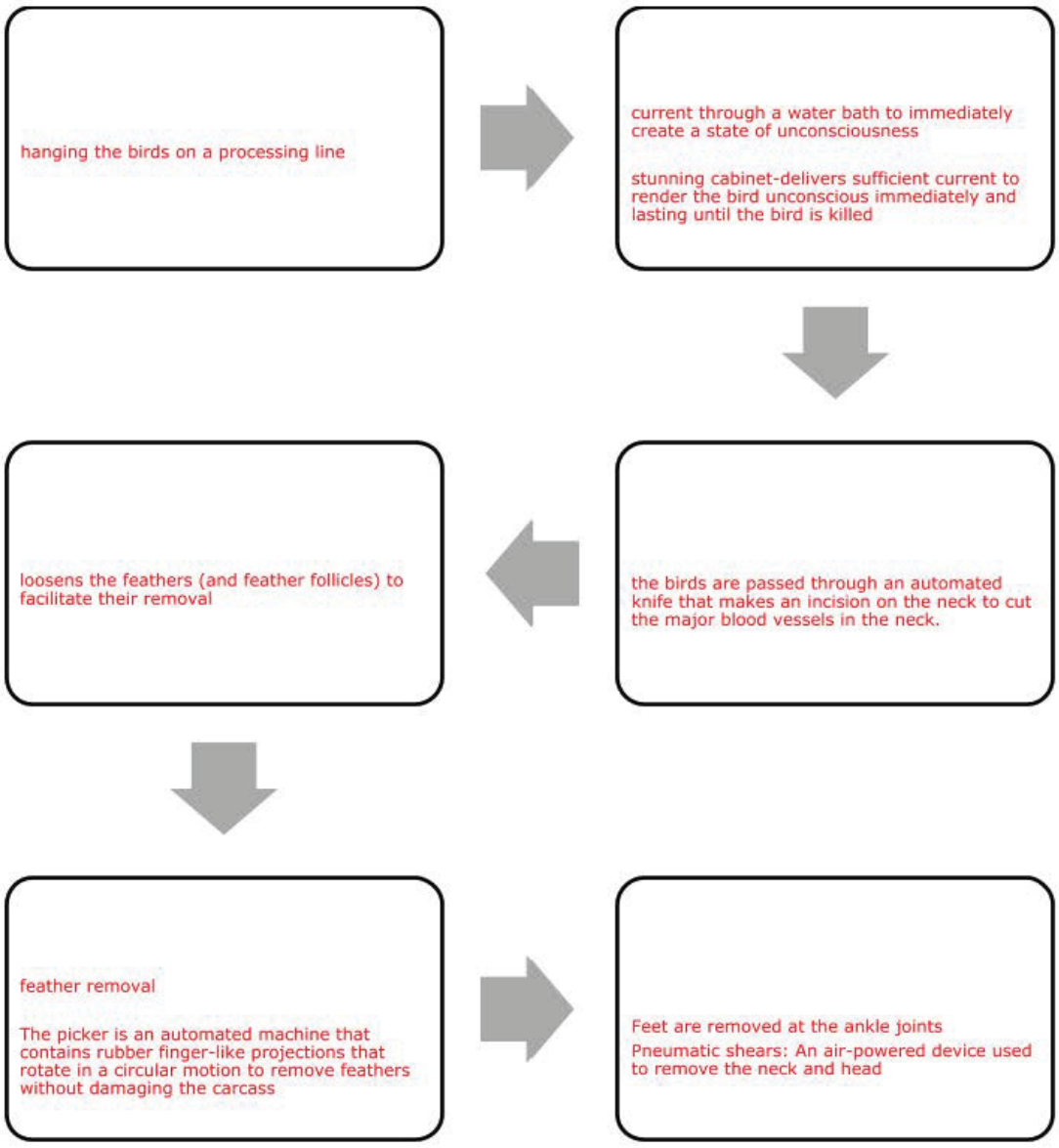
NAME: _____

Aligned to the following standards:
FPP.01; FPP.03; FPP.04; FFA.PL-A; FFA.PG-J; FFA.CS-M; FFA.CS-N; AG-FD-1; AG-FD3; AG-FD4; AGPA01.01; AGAP01.03; AGAP01.04; CS.01; CS.02; CS.03; CCSS.ELA.W.9-10.2; CCSS.ELA.SL.9-10.1; CCSS.ELA.SL.9-10.2; CCSS.ELA.SL.9-10.4; CRP.02; CRP.04

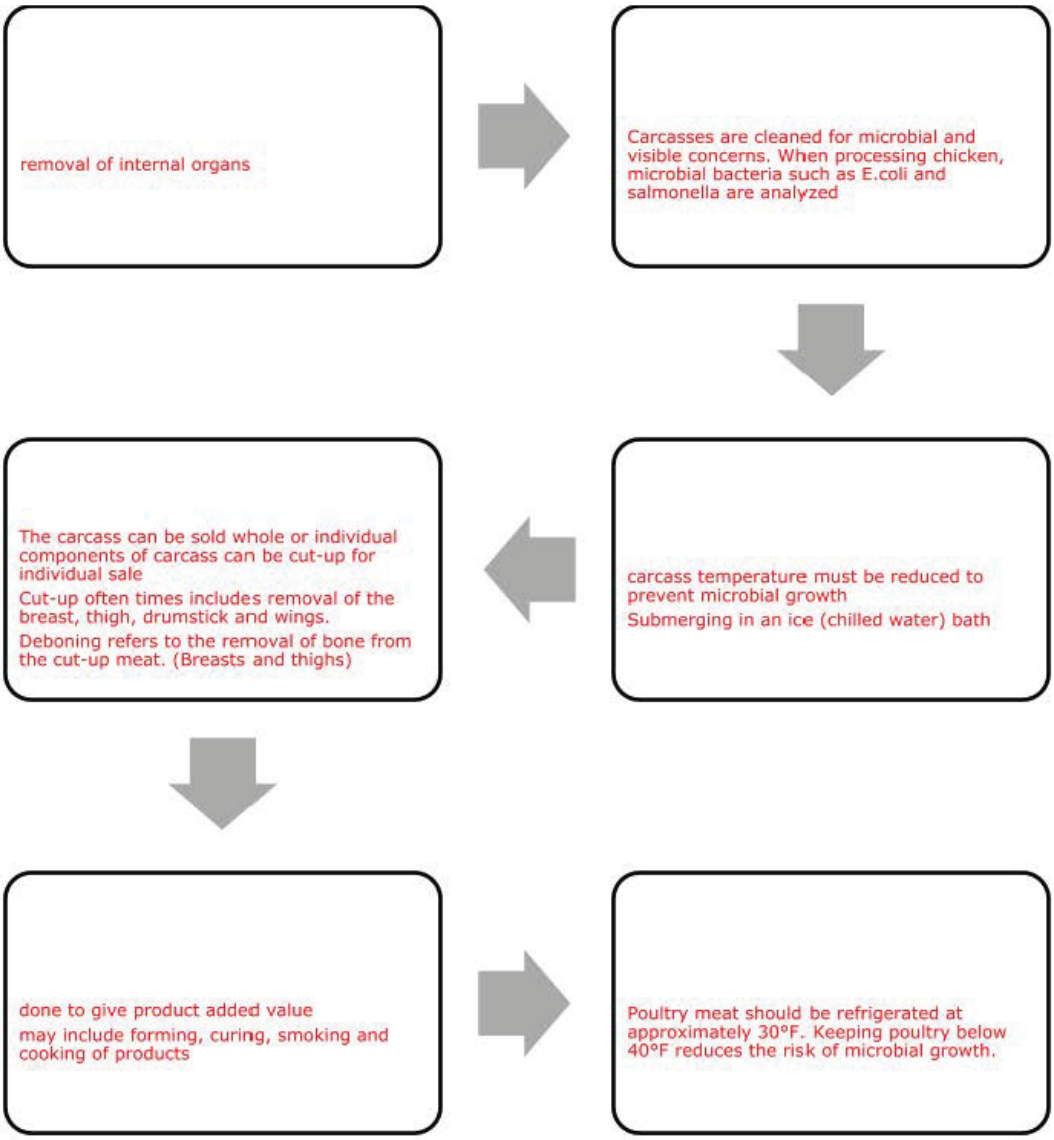
KEY: How Are Poultry Processed?

Directions:

Watch the video "An Inside Look at U.S. Poultry Processing," available at https://youtu.be/ZnRYi2ukzOs. As you watch the video, use the space below to describe each step in the process as well as the equipment used in the spaces below.



NAME: _____


removal of internal organs
Carcasses are cleaned for microbial and visible concerns. When processing chicken, microbial bacteria such as E.coli and salmonella are analyzed
carcass temperature must be reduced to prevent microbial growth
Submerging in an ice (chilled water) bath
The carcass can be sold whole or individual components of carcass can be cut-up for individual sale
Cut-up often times includes removal of the breast, thigh, drumstick and wings.
Deboning refers to the removal of bone from the cut-up meat. (Breasts and thighs)
done to give product added value
may include forming, curing, smoking and cooking of products
Poultry meat should be refrigerated at approximately 30°F. Keeping poultry below 40°F reduces the risk of microbial growth.

NAME: _____

Aligned to the following standards:
FPP.01; FPP.03; FPP.04; FFA.PL-A; FFA.PG-J; FFA.CS-M; FFA.CS-N; AG-FD-1; AG-FD3; AG-FD4; AGPA01.01; AGAP01.03; AGAP01.04; CS.01; CS.02; CS.03; CCSS.ELA.W.9-10.2; CCSS.ELA.SL.9-10.1; CCSS.ELA.SL.9-10.2; CCSS.ELA.SL.9-10.4; CRP.02; CRP.04

KEY: What's in a Label?

DIRECTIONS:

Draw lines from the terms in the word bank to the location of the term on the label.

Labeling Terms:

Sell by Date

Plant Code

Grade of Chicken

Nutrition Facts

Serving Sizes

Keep Refrigerated

Fat

Sodium

Carbohydrates

NAME: _____

Aligned to the following standards:
FPP.01; FPP.03; FPP.04; FFA.PL-A; FFA.PG-J; FFA.CS-M; FFA.CS-N; AG-FD-1; AG-FD3; AG-FD4; AGPA01.01; AGAP01.03; AGAP01.04; CS.01; CS.02; CS.03; CCSS.ELA.W.9-10.2; CCSS.ELA.SL.9-10.1; CCSS.ELA.SL.9-10.2; CCSS.ELA.SL.9-10.4; CRP.02; CRP.04

Notes Sheet

Lesson Title:

NOTES:	Draw a picture to summarize your learning.
Summarize the lesson in one statement or quote.	

NAME: _____

Give this lesson a new title.

APPENDIX J-A priori table

Proposition	Supporting Literature	Research Question	Information Found
An agriculture teacher who has knowledge of special education practices is likely to have intentional behavior.	Fishbein and Ajzen (2015), the Theory of Planned Behavior considers that intentions control all actions.	**RQ1: How does an exemplar agriculture teacher who works with students with special needs and the special education coordinator, describe the teacher's knowledge of special education practices and implementation?**	Interview question: 3, 4
Agriculture teachers collaborate with the special educators at their school to ensure that all practices set out in the students' IEPs are being followed.	Elbert and Baggett (2003) discuss the importance of CTE teachers conducting student analysis. This analysis will help teachers to better determine the strengths and weaknesses of the student.	**RQ2: How does an** exemplar **agriculture teacher integrate their knowledge of special education practices in their lessons?**	Interview question: 5, 6
Agriculture teachers who have knowledge of special education practices are more likely to have positive interactions with students with special needs.	Segall and Campbell (2012) indicate that the relationship between knowledge and use of strategies is significant for general education teachers.	**RQ3: How does an** exemplar **agriculture teacher's knowledge of special education practices reflect in their observed behavior?**	Appendix D,