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Examining the Influence of Pedagogical Content Knowledge, Job Satisfaction, And Professional Identity on the Turnover Intentions of Traditionally Certified and Alternatively Certified School-Based Agricultural Education Teachers: A National Study

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EXAMINING THE INFLUENCE OF PEDAGOGICAL CONTENT KNOWLEDGE, JOB SATISFACTION, AND PROFESSIONAL IDENTITY ON THE TURNOVER INTENTIONS OF TRADITIONALLY CERTIFIED AND ALTERNATIVELY CERTIFIED SCHOOL-BASED AGRICULTURAL EDUCATION TEACHERS: A NATIONAL STUDY

by

Matthew J. Wood

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ABSTRACT

Examining the Influence of Pedagogical Content Knowledge, Job Satisfaction, and Professional Identity on The Turnover Intentions of Traditionally Certified and Alternatively Certified School-Based Agricultural Education Teachers: A National Study

by

Matthew J. Wood, Doctor of Philosophy

Utah State University, 2024

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This dissertation examines the influence of pedagogical content knowledge (PCK), job satisfaction, and professional identity on the turnover intentions of traditionally certified (TC) and alternatively certified (AC) school-based agricultural education (SBAE) teachers in the United States. Utilizing the Four Capital Theory of Teacher Retention as a theoretical lens, the study analyzes the complex interactions between these factors and their collective impact on teachers' career decisions in SBAE. A quantitative relational approach was employed, collecting national survey data from agriculture teachers to understand teacher turnover dynamics.

The research identifies marked differences between TC and AC teachers regarding PCK, job satisfaction, and professional identity, with each group presenting distinct strengths and obstacles. Despite varied levels of satisfaction and PCK, a notable finding is the robust professional identity displayed by both groups. The insights gained from this study contribute to ongoing discussions about teacher retention in agricultural

education, emphasizing the importance of specialized professional development programs tailored to the unique requirements of both TC and AC teachers. The dissertation advocates for including comprehensive support systems within teacher training programs and continuous professional development efforts to enhance teacher retention.

This dissertation provides recommendations to improve educational strategies for pre-service and in-service teachers, foster a supportive professional environment, and calls for additional research to investigate teacher turnover complexities in agricultural education. This research illuminates crucial aspects influencing the retention of agriculture teachers and paves the way for future exploration of teacher preparation and support frameworks in the profession.

(224 pages)

PUBLIC ABSTRACT

Examining the Influence of Pedagogical Content Knowledge, Job Satisfaction, and Professional Identity on the Turnover Intentions of Traditionally Certified and Alternatively Certified School-Based Agricultural Education Teachers: A National Study

Matthew J. Wood

Recruitment and retention of agriculture teachers has been an ongoing challenge within education, with schools struggling to attract and keep qualified teachers. Research has explored many factors—including job satisfaction, work-life balance, administrative support, and professional development opportunities—to uncover the complex roots of teacher turnover. Despite these efforts, the cycle of recruiting and sustaining passionate and competent agriculture teachers remains a significant hurdle. A clear and comprehensive understanding of the factors that influence teacher turnover intentions is needed. This research aimed to explore the factors that influence the turnover intentions of SBAE teachers by licensure type. The Four Capital Theory of Teacher Retention guided this quantitative relational study.

The study targeted a population of SBAE teachers across the United States during the 2023-2024 school year. A researcher-developed survey instrument was utilized to collect data from teachers. The survey instrument assessed SBAE teachers' PCK, professional development needs, job satisfaction, professional identity, and turnover intentions. In total, 470 SBAE teachers participated in the study, providing a rich dataset for analysis.

Data from the survey was analyzed using various statistical techniques. Descriptive statistics painted a broad picture of the variables in question, allowing for a straightforward interpretation of the surveyed teachers' characteristics and responses. To probe deeper into the factors predicting SBAE teacher turnover, ordinary least squares regression was employed, examining how each factor influenced the turnover intentions of SBAE teachers.

Analysis showed that job satisfaction and professional identity had a more pronounced effect on turnover intentions among AC teachers compared to TC teachers, suggesting tailored strategies might be needed to support each group differently. Additionally, PCK significantly influenced professional identity, especially for AC teachers, underscoring its importance in teacher retention strategies.

This dissertation recommends several strategies based on its findings. Mentorship programs are advised to combat the universal decline in job satisfaction among SBAE teachers. Collaborative recruitment and retention strategies that look beyond job satisfaction metrics are encouraged, suggesting a focus on intrinsic motivators like professional identity and dedication. Enhancing teacher preparation programs to include training on classroom management, curriculum development, and teacher-student relationship improvement is suggested. Also, tailored professional development programs should reflect the identified needs of TC and AC teachers, including content-specific topics, technology, FFA, and curriculum development. Lastly, establishing holistic support systems in schools that provide administrative support and recognize teacher efforts is recommended to increase job satisfaction and retention.

DEDICATION

This dissertation is lovingly dedicated to my father, whose memory has been a beacon of perseverance throughout this journey. The loss of his presence during the concluding phase of my program and the start of this dissertation was a tribulation that often weighed heavily on my heart. There were numerous moments when the burden seemed insurmountable, and the temptation to surrender was great. However, it was the unwavering support and encouragement from those around me that rekindled my spirit to press on. To those cherished individuals who stood by me, your motivation was the wind beneath my wings, lifting me towards the completion of this work.

Though you are not here to witness the fruits of this endeavor, Dad, I carry the hope that from beyond, you watch over me with pride. Every page within this dissertation is infused with the lessons you and Mom instilled in me and is a testament to the strength you demonstrated throughout your life. With this achievement, I honor your enduring influence and the indelible mark you've left on my character. This accomplishment is not just mine but is a tribute to you.

In memory of

My father, Philip Christopher Wood

ACKNOWLEDGMENTS

This dissertation is the culmination of more than this research alone. It is the result of the encouragement and support of many individuals over many years.

First, and foremost, I must express my deepest gratitude to Dr. Tyson Sorensen for his unwavering support and mentorship. You spotted my potential right from the start, pushed me to explore new paths, and played a huge part in shaping who I've become as an educator and researcher. Your advice, guidance, and friendship mean the world to me, and I can't thank you enough for being there throughout this whole process.

To my committee—Dr. Michelle Burrows, Dr. Rose Judd-Murray, Dr. Lacee Boschetto, and Dr. Max Longhurst—your wisdom has been fundamental to my growth. I'm so grateful for all the time and effort you've put into helping me get here. Your guidance and encouragement have been incredible, and I truly appreciate it.

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relief. Your support and shared commitment to excellence have left an indelible mark on my journey.

Last but not least, I would like to acknowledge my husband and family. Jared, your commitment and support these last three years has never wavered. I can't begin to thank you enough for all you have done to get me to this point. While we have had to sacrifice a lot, we embarked on this journey together, and I couldn't have done it without you. Thank you for being my soundboard, a shoulder to cry on, and my biggest cheerleader when I thought I couldn't do the hard things. To my mother and the entire family, your unwavering support has been a source of strength. Your belief in the values of hard work and perseverance has been a guiding light in my academic pursuit, and for this, I am forever grateful.

CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER I

INTRODUCTION

Chapter Overview

This chapter delves into the challenges and dynamics of agricultural education, with a particular focus on recruiting and retaining school-based agricultural education (SBAE) teachers. It addresses the historical difficulties in attracting candidates to the field due to misconceptions about agricultural education, and examines the impact of these challenges on teacher shortages and the variety of licensure paths designed to mitigate these issues. By analyzing the interplay between pedagogical content knowledge (PCK), job satisfaction, professional identity, and turnover intentions among traditionally (TC) and alternatively certified (AC) teachers, the chapter illuminates the factors influencing teacher retention and potential strategies for enhancing the recruitment and retention of SBAE teachers. Researchers recognize gaps in agricultural education research concerning these variables and highlight the need for further investigation to fill this gap. Additionally, this chapter introduces the theoretical and conceptual frameworks, and concludes with the limitations and assumptions of this research project.

Background

Challenges with Recruitment in Agricultural Education

Historically, the agricultural education profession has encountered several challenges when recruiting individuals into the field. The misconception that agricultural education is limited to farming and manual labor has significantly deterred potential candidates who may not be aware of the diverse career opportunities within the discipline (Scherer, 2016). Additionally, the perception of agriculture as a declining industry has discouraged individuals from pursuing agricultural education careers despite the sector's evolving technologies and increasing global importance (Girdžiūtė et al., 2022). The shortage of qualified agricultural education teachers has also been a longstanding concern, with limited access to relevant programs and training opportunities for aspiring educators (Roberts & Dyer, 2004). These historical challenges have contributed to the ongoing need for innovative recruitment strategies and greater awareness of agricultural education's dynamic and rewarding nature.

Challenges with Retention in Agricultural Education

The agricultural education profession has historically grappled with challenges in retaining individuals within the field. One key issue has been the limited financial incentives and lower salaries associated with careers in education compared to other industries, which has driven talented educators to seek higher-paying opportunities elsewhere (Igo & Perry, 2019). Moreover, agricultural educators' demanding workload and responsibilities, including managing National FFA Organization (FFA) programs and

overseeing Supervised Agricultural Experience (SAE) projects, have contributed to burnout and attrition rates (Chenevey et al., 2008). Additionally, the aging demographic of educators has posed retention challenges, as retirement and a lack of succession planning have left difficult vacancies to fill. These historical retention challenges underscore the need for improved compensation, reduced workload, and targeted efforts to attract and retain skilled professionals in agricultural education.

Paths to Licensure in Agricultural Education

Professionals in the agricultural education profession have tried to address challenges in recruiting and retaining educators through various licensure paths. TC programs provide a comprehensive pathway for individuals who complete formal teacher education programs, ensuring they possess the necessary pedagogical skills and content knowledge. Alongside these, AC programs have been implemented to allow individuals with industry experience to become licensed agricultural educators, thereby expanding the pool of qualified candidates (Bowling & Ball, 2018). Some states have introduced alternative routes to licensure programs, which aim to attract career changers into agricultural education by streamlining the certification process (Claflin et al., 2023). These initiatives seek to mitigate shortages and improve recruitment while maintaining the quality of agricultural education.

Statement of the Problem

In SBAE, a shortage of highly qualified agricultural educators has been an ongoing issue. Various factors contribute to this teacher shortage, and no single solution appears to address the multiple dynamics of the problem effectively. According to the 2022 National Supply and Demand statistics, 869 agriculture teachers left the profession, with 172 of those due to retirement (Foster et al., 2023). While retirement has significantly contributed to the number of individuals leaving the profession, those leaving for other reasons surpass it. Additionally, of the 834 individuals who completed a teacher preparation program, only 655 entered teaching (Foster et al., 2023).

While the need for teachers is immense, recruitment and retention efforts have not been as successful (Sorensen et al., 2016b). The National Supply and Demand Data indicate that 8.8% of teachers left the profession in 2022, an increase of 2% from 2020. Despite 834 individuals completing their teacher preparation programs, 148 teaching positions remained vacant, the highest number since 2014 (Foster et al., 2023). With fewer TC pre-service teachers accepting teaching positions immediately following graduation (Cowan et al., 2016) and rising attrition rates (Solomonson, 2018), the profession has increasingly relied on teachers entering the classroom through alternative means (Claflin et al., 2020).

While AC has helped offset the SBAE teacher demand issue, it presents its own challenges. According to Bowling and Ball (2018), there are over 130 AC pathways across the nation, differing in duration, entry requirements, and curriculum. In 2022, 326 AC teachers entered the SBAE classroom (Foster et al., 2023). It has become imperative

to assess the knowledge base and pedagogical abilities of all SBAE teachers to determine if deficiencies exist. This assessment will help prepare all SBAE teachers better and provide a clearer understanding of the professional development needs of both TC and AC SBAE teachers (Rice & Kitchel, 2015).

The Research Values of the American Association for Agricultural Education, the value statement on Advancing Public Knowledge of AFNR (Agriculture, Food, and Natural Resource) Systems, states a need to provide "instruction to help individuals make informed decisions as AFNR consumers and prepare them for skilled agricultural work" (American Association for Agricultural Education, 2023, p. 6). While teacher supply and demand continues to be a challenge, as well as producing high-quality teachers who are eager to enter the SBAE classroom, the profession also grapples with a myriad of issues like supporting SBAE teachers who are experiencing burnout, a lack of job satisfaction, and those struggling to balance the obligations of their career and personal life. These interconnected issues underscore the complexity of achieving a stable and effective teaching workforce in agricultural education.

Although there is abundant research in SBAE related to PCK (Easterly & Barry, 2022; Rice & Kitchel, 2017, 2018; Tummons et al., 2020; Wooditch et al., 2018), professional development needs (Claflin et al., 2023; Coleman et al., 2020; Robinson & Edwards, 2012; Smalley & Smith, 2017; Stair et al., 2019), job satisfaction (Hasselquist et al., 2017; Kitchel et al., 2012; Sorensen & McKim, 2014; Sorensen et al., 2016a), professional identities (Gates et al., 2020; Shoulders, 2018; Sorensen et al., 2018), and turnover intentions (Claflin et al., 2020; Lemons et al., 2015; Solomonson et al., 2019, 2021; Sorensen et al., 2016b), literature connecting each of these variables from a

nationwide perspective among TC and AC teachers is nonexistent. Moreover, this research will examine each of these variables by certification type and will extrapolate information that will provide a clearer understanding of the profession. It will also explore what efforts can be made to help mitigate additional attrition issues, how to support pre-service and in-service SBAE teachers better, and strategies for preparing and recruiting high-quality teachers to the SBAE profession.

Theoretical Framework

Mason and Matas (2015) introduced the Four Capital Theory of Teacher Retention, providing a comprehensive framework to understand teacher attrition. This theory highlights the intricate interplay of four critical elements—Human Capital, Social Capital, Structural Capital, and Psychological Capital—that collectively influence a teacher's decision to stay or leave the profession.

Human capital refers to the accumulation of knowledge, skills, and experiences that educators bring to their roles, heavily influenced by their initial training and ongoing professional development. Social capital focuses on the relationships and networks teachers develop, which can significantly impact their job satisfaction and professional identity. Structural capital relates to the organizational support and resources available to teachers, including the necessary tools and environment conducive to their success. Lastly, Psychological Capital concerns itself with the teachers' self-efficacy, motivation, and commitment to their career, closely tying these to their personal experiences and the other three capitals.

This comprehensive framework suggests that enhancing these four capital areas could reduce teacher turnover by addressing the multifaceted nature of teacher retention and acknowledging the profession's complexity and the educators' diverse needs.

Conceptual Framework

This study employs a researcher-developed model as its conceptual framework, expanding on the Four Capital Theory of Teacher Retention to explore the nuances of SBAE teacher retention. Central to this framework is the understanding of PCK, a key form of human capital that embodies the fusion of subject mastery with the art of teaching (Shing et al., 2015; Shulman, 1986). The framework posits that fostering teacher self-efficacy is crucial, drawing on Bandura's theory of self-efficacy, which suggests that belief in one's abilities can significantly influence outcomes (Bandura, 1997).

Professional development influences teacher self-efficacy, which, in turn, enhances teachers' effectiveness and satisfaction in their roles by enriching their knowledge and teaching skills (Antoniou & Kyriakides, 2013). Highlighting the interrelationships among professional development, PCK, and self-efficacy is pivotal for influencing the job satisfaction and professional identity of SBAE teachers, both of which are integral to their professional retention (Blackburn & Robinson, 2008; Tschannen-Moran & Hoy, 2001).

Further, the model illustrates how professional identity and job satisfaction, reinforced by robust professional development and a strong PCK, can significantly impact teachers' turnover intentions (Sorensen & McKim, 2014). By fostering a

supportive environment that encourages the development of PCK and recognizing the symbiotic relationship between PCK, professional development, and teacher self-efficacy, educators can enhance their job satisfaction and professional identity, thereby reducing their likelihood of leaving the profession (Rice & Kitchel, 2015).

The conceptual framework underscores the importance of understanding these dynamics to address teacher retention challenges in SBAE, suggesting that nurturing these elements can be instrumental in retaining skilled teachers and ensuring high-quality education (Darling-Hammond, 2000; Ingersoll, 2004).

Purpose of the Study

This study will explore a series of issues that have challenged the field of agricultural education and, more broadly, career and technical education for many years. This study aims to describe the PCK, professional development needs, job satisfaction, professional identity, and turnover intentions of SBAE teachers by preparation pathway and determine relationships among each variable. This research supports the first value statement outlined by the American Association for Agricultural Education. Specifically, this value statement addresses the need to provide "instruction to help individuals make informed decisions as AFNR consumers and to prepare them for skilled agricultural work" (American Association for Agricultural Education, 2023, p. 6). This research supports this value statement as it intends to advance public knowledge of various challenges facing SBAE teachers.

This research will contribute to the current body of research in agricultural education, offering insights into the challenges facing SBAE by connecting each of the above variables. Moreover, this research aims to sample a larger population of SBAE teachers from the United States, unlike much of the literature that has only examined individuals or select states, so the results may apply to all SBAE teachers. It is hoped that this research will enable the profession to better understand the challenges SBAE teachers face according to their preparation pathway, allowing for targeted support to in-service teachers, improved preparation for pre-service teachers, and ultimately, the recruitment and retention of highly qualified individuals in the field of agricultural education.

Research Objectives

The following research objectives will guide this research:

1. Describe the sample of SBAE teachers by certification type.
2. Describe the PCK and professional development needs of SBAE teachers by certification type.
3. Describe job satisfaction and professional identity of SBAE teachers by certification type.
4. Describe the turnover intentions of SBAE teachers by certification type.
5. Explain the relationship between PCK, job satisfaction, and professional identity among SBAE teachers by certification type.

6. Explain the relationship between job satisfaction, professional identity, and turnover intentions among SBAE teachers by certification type.
7. Explain the relationship between PCK and turnover intentions among SBAE teachers by certification type.

Assumptions

To accomplish this study's purpose and research objectives, the following assumptions have been made.

1. The population frame for this research represented secondary SBAE teachers in the United States during the 2023-2024 school year. A series of clusters (Regions) served as the basis for the random selection of these teachers.
2. The instrument adapted for this study can accurately measure SBAE teachers' PCK, job satisfaction, and professional identity.
3. SBAE teachers in this study could access and complete the online instrument, knew the answers to the instrument items, and answered them truthfully.

Limitations

The following are the limitations identified for this research.

1. This research focused on SBAE teachers during the 2023-2024 school year and may not be generalizable to teachers in other disciplines, subjects, school years, or grade levels.

2. The data collected for this research used an online instrument that required participants to self-report information, which may threaten validity.
3. Online instruments may limit the data collected from participants and may not offer opportunities to gather more in-depth and meaningful information about this study's variables.
4. The survey was administered to SBAE teachers in October. Different results may have been obtained if the survey had been conducted at other times of the year, as the varying demands and experiences throughout the academic calendar could influence teachers' responses.
5. The professional development section of the survey consisted of only one question, which may not have accurately gauged participants' need for professional development. Some respondents might have listed topics they are interested in rather than those they need or could benefit from.
6. As an SBAE teacher, I made every attempt to remain objective. However, my lived experiences and values related to the topic area may have influenced my decisions associated with the research topic, development of the instrument, variables selected for study, data collection, analysis, conclusions, and implications.

Delimitations

The following are the delimitations of this research.

1. The research focused exclusively on in-service SBAE teachers, excluding teachers from other disciplines or pre-service teachers.
2. The research did not explore variables outside of those listed in the research variables.

Definition of Terms

Agriculture Teacher: Any certified middle or high school teacher qualified to instruct agricultural education courses within an AFNR pathway.

Alternative Certification (AC): A specialized program that offers individuals a pathway to obtain teaching certification, specifically designed for those without prior educational backgrounds, enabling them to transition into a teaching career. These individuals have expertise in diverse fields and seek to leverage their knowledge by gaining the necessary certification to educate students.

Common Content Knowledge (CCK): A type of pedagogical content knowledge that highlights a teacher's ability to identify when a student offers an inaccurate throughout the educational process.

Four Capital Theory of Teacher Retention: A conceptual framework devised by Mason and Matas (2015) suggests that four interconnected elements influence teacher attrition: Human Capital, encompassing teachers' knowledge and skills; Social Capital, involving their social relationships and support networks; Structural Capital, including resources and work conditions; and Psychological Capital, related to motivation and

career commitment. This theory highlights the complex interplay of these four capitals in determining whether teachers choose to remain in the profession or leave.

Horizon Content Knowledge (HCK): A form of pedagogical content knowledge that refers to a teacher's skill in connecting and integrating content knowledge beyond their specific subject matter, creating a broader and more holistic educational experience for their students.

Knowledge of Content and Curriculum (KCC): An aspect of pedagogical content knowledge that concerns the arrangement of learning activities and the teacher's approach to scaffolding the lesson.

Knowledge of Content and Students (KCS): A component of pedagogical content knowledge that focuses on a teacher's capacity to anticipate difficult concepts and discern where students are in their developmental process, along with strategies for providing appropriate assistance.

Knowledge of Content and Teaching (KCT): A facet of pedagogical content knowledge that pertains to a teacher's aptitude for employing questioning strategies to assist students in grasping educational concepts.

National Association of Agricultural Educators (NAAE): A federation of state agricultural education associations involved in school-based agricultural education. NAAE advocates for agricultural education, provides professional development, and works to recruit and retain agricultural educators. Through a variety of programs and services, NAAE supports this three-pronged mission, ensuring the continued growth and success of agricultural education.

National FFA Organization (FFA): An integral part of a comprehensive agricultural education program that helps students develop their leadership and personal growth skills while preparing for career success. FFA members participate in career development and leadership development events, evaluating their skills and enhancing their speaking and leadership abilities.

Pedagogical Content Knowledge (PCK): A concept introduced by Lee Shulman in 1986, encompassing teachers' proficiency in not only possessing knowledge of the subject matter they teach but also in comprehending how to effectively convey and teach that content to their students. It signifies the fusion of content knowledge and the pedagogical strategies required for successful teaching.

School-Based Agricultural Education (SBAE): An agricultural education program for middle and high school students taught by a certified agriculture teacher. The curriculum in school-based agricultural education aligns with the Agriculture, Food, and Natural Resources (AFNR) pathways, which encompass agribusiness systems, animal systems, biotechnology systems, environmental systems, food products and processing systems, natural resource systems, plant systems, and power, structural, and technical systems.

Specialized Content Knowledge (SCK): A facet of pedagogical content knowledge that pertains to a teacher's expertise in explaining the precise reasons behind an incorrect answer, aiming to provide a more profound comprehension and clarification to enhance the student's learning experience.

Supervised Agricultural Experience (SAE): A program involving practical agricultural activities performed by students outside of scheduled classroom and

laboratory time. SAEs are an integral component of a comprehensive agricultural education program, providing a method for students to engage in a project(s) over a sustained period. This hands-on approach allows students to receive real-world career experiences and develop their career skills in an area of agriculture that they are most interested in, making it crucial for career preparation in the agricultural industry.

Traditional Certification (TC): The conventional teaching certification route. It involves enrolling in a 4-year accredited college or university and pursuing a bachelor's degree in education through that institution.

Turnover Intentions: The conscious and deliberate desire or plan of educators to leave their current teaching position within a certain timeframe. This concept encompasses the thoughts, considerations, and motivations that drive teachers to contemplate exiting their job, whether to move to a different school, switch to a different profession, or leave the workforce entirely.

CHAPTER II

REVIEW OF LITERATURE

Chapter Overview

School-based agricultural education (SBAE) faces a persistent shortage of highly qualified educators, with multiple factors contributing to this complex issue. This shortage is exacerbated by fewer traditionally certified (TC) pre-service teachers accepting teaching positions and rising attrition rates, leading to a reliance on alternatively certified (AC) teachers, who enter the profession through diverse and sometimes inconsistent pathways (Claflin et al., 2020).

This chapter will explore five interconnected variables affecting the agricultural education field: pedagogical content knowledge (PCK), professional development, job satisfaction, professional identity, and turnover intentions. By examining the relationships among these variables through data-driven research and statistics, the chapter aims to provide a deeper understanding of teacher dissatisfaction and attrition in SBAE. Additionally, it will present success strategies for each of the five concepts, offering insights into how to mitigate attrition issues, better support pre-service and in-service SBAE teachers, and develop strategies for preparing and recruiting high-quality teachers to the SBAE profession. This comprehensive approach seeks to address the multifaceted nature of the problem and enhance the stability and effectiveness of the SBAE teaching workforce.

Theoretical Framework

Mason and Matas (2015) postulated that teacher attrition is a complex phenomenon, a product of the interaction of four elements intersecting. Based on prior literature, a strong correlation exists between factors like teacher preparation/sources of knowledge, school culture, the nature of the job, and teacher efficacy when determining the turnover intentions of SBAE teachers (Blackburn et al., 2017; Ingersoll et al., 2014; Qin, 2019). The Four Capital Theory of Teacher Retention (Figure 1) consists of four interrelated themes which guided this study. Those themes are Human Capital, Social Capital, Structural Capital, and Psychological Capital.

Human capital consists of the knowledge, skills, competencies, and experiences that SBAE teachers have (Belay et al., 2021). While this may include past experiences and prior knowledge, pre-service SBAE teachers rely on their teacher preparation program to be influential in developing their human capital (Eck et al., 2019). Depending on a teacher's path to certification, the influence of their teacher preparation program could be a significant contributor to the other interrelated variables impacting attrition (i.e., efficacy, motivation, ability to handle the complexity of the job). For in-service teachers, human capital development comes in the form of professional development and reflection, both of which prove extremely valuable in developing high-quality teachers.

Social capital describes the social relations of SBAE teachers. Additionally, social capital supports success and education in the form of the disciplinary and academic climate of the school (Acar, 2011). The culture of the school and the support provided to the SBAE teacher can be instrumental in helping to retain teachers. By developing social

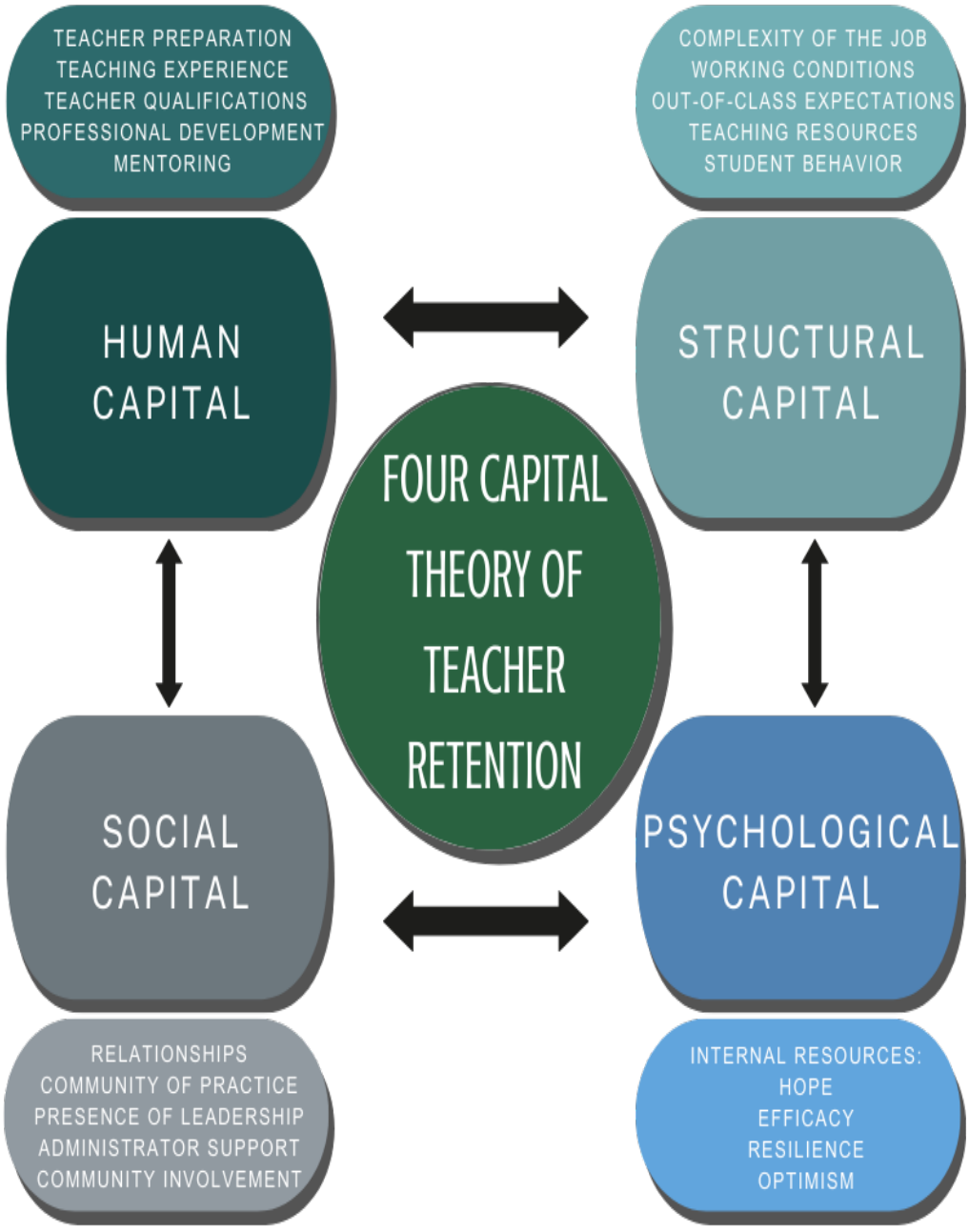
relations, SBAE teachers can establish a sense of community and, thus, their professional identities (Shoulders & Myers, 2011). Outside of the building, SBAE teachers rely on communities of practice as a means of support. A community of practice is when individuals are part of a community of like-minded individuals. This community extends beyond a mere network of connections between people; it is characterized by a shared domain of interest (Wenger, 1998). When SBAE teachers successfully integrate into a community of practice, they can build relationships and learn from fellow SBAE teachers. When SBAE teachers feel they belong to a community and have strong social capital, both in and out of their workplace, their chances of remaining in the profession are greater (Naylor, 2021; Solomonson et al., 2018, 2019).

The third tenet of the Four Capital Theory of Teacher Retention focuses on structural capital. Structural capital consists of the support provided to teachers, the job's complexity, and the nature of the work environment (Noel & Finocchio, 2022). This includes the basic facilities, teaching tools, and teacher professional development opportunities. Interrelated with social capital, this tenet also focuses on climate and work conditions (Noel & Finocchio, 2022). SBAE teachers, who require unique resources such as specific teaching equipment or facilities to succeed, face challenges when these resources are not provided. SBAE teachers cannot perform at their best and are likelier to leave the classroom. Previous literature has indicated that when an administrator supports and advocates for teachers, both through tangible resources like equipment or indirectly by providing professional development opportunities, recognizing successes, and making the teacher feel seen, teachers tend to be happier with their jobs and are more likely to stay in the profession (Edinger & Edinger, 2018; Leslie, 1989)

Lastly, psychological capital explains the motivation and career commitment among SBAE teachers (Noel & Finocchio, 2022). While all the tenets within the Four Capital Theory of Teacher Retention are related, psychological capital directly correlates with human capital. More specifically, human capital focuses on prior experiences, knowledge, and skills, which strongly predict motivation and self-efficacy (Noel & Finocchio, 2022). Research has concluded when teachers have poor pre-service experiences or are deficient in an aspect of their career, they are less efficacious (Barni et al., 2019). Additionally, an individual's response (outcome) to an event or stimulus depends on their psychological capital. How a person responds also depends on the experiences that have developed or tested their psychological capital. An example could be how a pre-service and veteran teacher approaches a problem. Since the veteran teacher likely has had more opportunities to test their psychological capital, their approach and response may differ.

Figure 1

Four Capital Theory of Teacher Retention



Conceptual Framework

Building upon the foundations laid out in Chapter One, this study employs a researcher-developed model for the conceptual framework, guided by the principles of the Four Capital Theory of Teacher Retention. This framework aims to thoroughly examine SBAE teacher retention by exploring the interconnections between the study variables and each principle of the theory. To elucidate the format and structure of this framework, it is essential to delineate the value each factor holds and how the different parts of the framework impact one another.

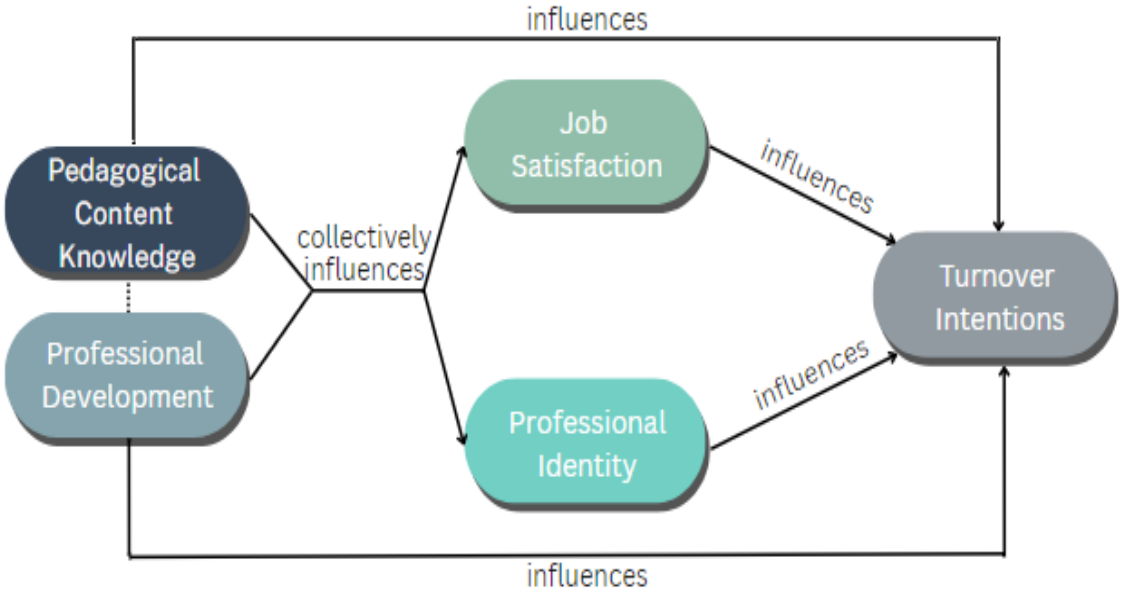
PCK in teaching refers to the unique blend of specialized content knowledge and the understanding of how to teach that content (Shulman, 1986). PCK is a distinct form of human capital that teachers develop through various experiences. According to Aksu and Kul (2019), teachers with robust PCK tend to exhibit high self-efficacy. This is because strong PCK equips teachers with both subject matter expertise and instructional strategies, thereby enhancing their confidence in effectively imparting knowledge to students (Barni et al., 2019; Fox, 2014; Zhou et al., 2020).

The framework, as depicted in Figure 2, reveals a symbiotic relationship between professional development, self-efficacy, and PCK. In this relationship, professional development—a form of human capital—acts as a catalyst, guiding teachers towards the development of PCK. Ongoing and highly effective professional development encourages teachers to expand their knowledge and refine their teaching techniques, leading to the development of PCK. As teachers develop their PCK through various experiences, they become more efficacious. McKim and Velez (2016) found that experiences such as

student teaching, pre-service coursework, and professional development opportunities enhance the self-efficacy of SBAE teachers.

Figure 17

Factors Influencing Turnover Intentions among SBAE Teachers



In addition to factors such as administrative support, school culture, workload, compensation, and personal factors, PCK significantly contributes to job satisfaction (Castillo et al., 1999; Sorensen & McKim, 2014; Walker et al., 2004). Teachers with higher PCK are better equipped to create and deliver effective instruction which keep students engaged (Shing et al., 2015). This sense of accomplishment, derived from effective instruction, contributes to greater job satisfaction. Moreover, higher PCK is associated with improved student outcomes, further boosting teacher satisfaction (Keller et al., 2016). Previous research suggests that teacher self-efficacy and professional

development are predictors of job satisfaction (Atkinson, 2020; Blackburn & Robinson, 2008; Hasselquist et al., 2017). Smet (2021) demonstrates a positive link between increased professional development and heightened job satisfaction. Similarly, past studies in agricultural education have identified a link between perceived efficacy and job satisfaction, which is closely connected to career commitment (Blackburn & Robinson, 2008).

Professional development empowers teachers to acquire new skills and refine existing ones, thereby increasing their confidence and effectiveness in the classroom and leading to job satisfaction. Through professional development, teachers can collaborate and network with colleagues, building a sense of community and positively influencing job satisfaction.

Professional identity, a form of both social and psychological capital, encompasses a teacher's beliefs, values, and self-perception (Lin et al., 2022). The culture of the building where they work, the presence of leadership, and the relationships teachers form are instrumental in developing a teacher's identity (Keiler, 2018). Similarly, high PCK empowers teachers to deliver subject matter effectively (Keller et al., 2016). When teachers feel effective in their role, it enhances their confidence, contributing to a positive self-image.

Professional development experiences significantly shape teachers' professional identity (Keiler, 2018). Participation in professional development allows teachers to network and collaborate with like-minded individuals, fostering relationships and communities of practice. Within these communities, teachers build relationships allowing enable them to trust and learn from each other (Wenger, 1998).

It is proposed that there is an intricate relationship between PCK, professional development, job satisfaction, and professional identity, all of which influence a teacher's intentions to remain in or leave the profession. Career commitment and self-efficacy, fostered by experiences that build PCK and professional development, correlate with high levels of career satisfaction and reliably forecast teacher retention (Blackburn & Robinson, 2008; Crutchfield et al., 2013; Knobloch & Whittington, 2003; Sorensen & McKim, 2014; Swan et al., 2011). Factors such as low pay, high student-to-teacher ratios, lack of administrative support, teacher self-efficacy, isolation, lack of mentoring, challenging assignments, and unclear expectations, all of which fall into various tenets of the Four Capital Theory, contribute to increased teacher turnover within SBAE (Anhorn, 2008; Ingersoll et al., 2014; Ingersoll & Smith, 2003; Sorensen et al., 2016b).

Regarding the influence of job satisfaction on turnover intention, Sorensen and McKim (2014) found a positive relationship between SBAE teachers' work-life balance, job satisfaction, and professional commitment, leading to increased retention. Moreover, teachers with higher levels of self-efficacy tend to have a stronger sense of professional identity, perceiving themselves as capable and effective educators (Ashton & Webb, 1986). Conversely, low self-efficacy can diminish teachers' commitment to the profession and, in some cases, result in them leaving the field altogether (Dembo & Gibson, 1985).

In conclusion, PCK, professional development, professional identity, job satisfaction, and turnover intentions are intricately connected and align closely with the broader concepts of the Four Capital Theory of Teacher Retention. Understanding and nurturing these relationships can provide valuable insights into the ongoing teacher retention challenges facing SBAE. By supporting SBAE teachers in these areas, it is

possible to foster a desire among them to remain in the profession and create a conducive environment for effective teaching and learning.

The PCK Concept

PCK, the first concept introduced in the conceptual framework, refers to PCK taught to pre-service teachers (student teachers enrolled in an SBAE teacher education program). The PCK concept embodies more than just subject knowledge and basic teacher training; it necessitates teachers acquire, through formal education, the skill to teach SBAE topics in a way learners can understand. Rice and Kitchel (2015) found pre-service SBAE teachers perceived their content knowledge preparation as inadequate, lacking course application to teaching, which is imperative to PCK development. While the PCK concept develops over time (Lee, 2011) through experience (Baxter & Lederman, 1999; Hashweh, 2005; Kind, 2009; Lee et al., 2007; Van Driel et al., 2002), teachers still need to "know how to help students understand authentic activities of a discipline, the way knowledge is developed in a particular field, and the beliefs that represent a sophisticated understanding of how the field works" (Davis & Krajcik, 2005, p. 5).

As research around the PCK concept intensifies, its purpose receives deeper exploration. Numerous pieces of literature assert PCK is a professional knowledge base held by teachers, including the knowledge of, the rationale behind, the planning for, and the art of teaching subject matter using specific methods for specific students to promote student learning (Carlson et al., 2015). While PCK is a newer topic in education, the

theory proposed by Lee Shulman has seen many revisions in recent years. Originally, Shulman (1986) postulated teachers possess more than just content knowledge or pedagogical knowledge. He fused the two knowledge bases, creating the term pedagogical content knowledge, or PCK. Additionally, he identified categories of teacher knowledge essential for teachers to be successful and effective in the classroom: content, pedagogy, curriculum, learners and learning, contexts of schooling, and educational philosophies, goals, and objectives (Shulman, 1986, 1987).

Grossman (1990) later conceptualized PCK by identifying the following components: conceptions of purposes for teaching subject matter, knowledge of student understanding, curricular knowledge, and knowledge of instructional strategies. Van Driel and Berry (2012) further expanded the parameters of PCK by defining it as topic-specific, person-specific, and situation-specific. Morrison and Luttenegger (2015) argued that PCK is the intersection of content knowledge, pedagogy, and the context of the learning situation. In short, PCK includes the knowledge and skills necessary for a teacher to teach a "particular topic in a particular way for a particular purpose to particular students for enhanced student outcomes" (Gess-Newsome, 2015, p. 36).

Consequently, the foundation of PCK lies in a teacher's ability to convey knowledge to students in a way that guides them to develop a deeper understanding of the content (Morrison & Luttenegger, 2015). Effective teachers must determine the needs of individual students, plan and evaluate instruction, utilize various teaching methods, appeal to student learning modalities, and demonstrate their knowledge of content, teaching, and the learning process (Rice & Kitchel, 2017). With an influx of novice teachers and retention issues plaguing the SBAE profession, it has become imperative to

assess the pedagogical knowledge bases of SBAE teachers to determine where deficits lie, regardless of a teacher's prior experience or path to licensure.

As of two years ago, most teachers (all subjects) in the U.S. fall within the early to mid-career level (3-20 years) of teaching experience, as demonstrated in the 2020-2021 National Center for Education Statistics teacher census. This study identifies 7% of the U.S. teaching population (n = 3,800,000) with less than three years of teaching experience, while 29% have between three and nine years, 37% have between ten and twenty years, and 26% are at twenty or more years of teaching experience (National Center for Education Statistics, 2023). This is drastically different from a study done on SBAE teachers during the 2017-18 school year. Within the SBAE profession, statistics confirmed 27.5% of teachers with less than three years of teaching experience and 25.6% of teachers with between four and nine years of teaching experience (Haddad et al., 2020). These studies elicit concern, with over 50% of the SBAE teaching population having less than ten years of teaching experience.

Reasons for concern stem from historical research on beginning teachers. Angell et al. (2005) found beginning teachers have deficiencies in their knowledge, including students' reasoning, teaching strategies, and curriculum. These deficiencies can significantly affect student success, as multiple pieces of evidence suggest what a teacher knows directly impacts the quality of classroom instruction and student learning (Baumert et al., 2010; Kersting et al., 2012). While PCK is not solely based on what a teacher knows about a content area but rather on how they can use that knowledge (Beyer & Davis, 2011), there is still concern as the profession sees variances in routes to licensure and teacher preparation programs across the country that may not mirror one

another. Thus, teacher preparation programs and AC programs may be graduating students with limited conceptual knowledge of what PCK is and how to utilize it in their planning and classroom instruction to improve the learning environment (Wood et al., 2024). While gaps are likely to exist in how SBAE teachers are prepared, identifying those gaps and providing interventions are the first steps in ensuring both pre-service and in-service teachers are effective in the classroom.

To date, the majority of research on this topic has focused on identifying a need for greater recruitment and retention efforts (e.g., Blackburn et al., 2017; Lawver & Torres, 2011), the current presence of AC teachers in agricultural education (e.g., Bowling & Ball, 2018), and the in-service needs among TC or AC teachers (e.g., Smalley & Smith, 2017; Stair et al., 2019). Due to a lack of research on PCK in agricultural education, there is a need to rely on closely related fields such as mathematics and sciences. While these teaching fields indicate PCK deficiencies, further PCK research in agricultural education is necessary to elucidate the profession's complexity, uniqueness, and need for further development of teachers' knowledge (Phelps & Schilling, 2004). Additional research can help resolve potential issues in teacher preparation and PCK as a whole.

PCK Research Limitations in Agricultural Education

Lee Shulman's (1986) definition of PCK has evolved, with many researchers agreeing PCK is much more complex than Shulman initially thought (Kind, 2009). While PCK receives thorough examination in other fields, research specifically focused on agricultural education remains limited. However, since agriculture is technically

categorized as a science (Ricketts et al., 2006), there are significant implications for PCK among both science teachers and SBAE teachers. For example, Haynes et al. (2012) suggest essential components of PCK—such as understanding instructional strategies, knowing the diverse needs of students, integrating curriculum content effectively, and utilizing appropriate assessment methods—are critical across both disciplines. Recognizing these commonalities can enhance the development of PCK in agricultural education by drawing on established research in science education.

As a result, numerous pieces of literature in agricultural education reference a model by Hill et al. (2008). This science education model for assessing PCK divides knowledge for teaching into six separated domains: (a) Horizon Content Knowledge, (b) Common Content Knowledge, (c) Specialized Content Knowledge, (d) Knowledge of Content and Teaching, (e) Knowledge of Content and Students, and (f) Knowledge of Content and Curriculum; as well as into the two groups of subject matter knowledge and pedagogical knowledge. Though helpful, due to a lack of PCK research in agricultural education and using a model not explicitly designed for agricultural education, it remains unclear what PCK SBAE teachers possess and its potential influence on their teaching.

At this point, it is fair to say inconsistencies exist in the research, not allowing for a clear picture. For example, Rice and Kitchel (2015) revealed content knowledge preparation among pre-service teachers was sufficient. Conversely, another study found pre-service teachers were dissatisfied with the quality of content knowledge obtained from their teacher preparation program and their perceived ability to transfer that knowledge to their future students (Rice & Kitchel, 2018). Targeting deficiencies is a challenge without a clear understanding of the content knowledge and pedagogical needs

of SBAE teachers. Therefore, it is important for SBAE teachers to partake in reflection, helping facilitate a culture of lifelong learning and development. Scholars have recently emphasized the significance of topic-specific PCK (Mavhunga, 2020; Rollnick, 2018). By encouraging SBAE teachers to reflect on their practice, they will develop skills pertaining to their topic area and better understand the areas in which they need greater support.

Developing PCK

PCK can be cultivated through a teacher preparation program, prior experiences, and applying knowledge on the job. While PCK development can occur in various capacities, previous literature has heavily focused on PCK development occurring mostly during the teacher preparation phase (Hoffer & Grandgenett, 2012). Pre-service agriculture teachers typically spend four years in a teacher preparation program with the expectation that, upon completion, they will have the knowledge and the skills necessary to be successful and effective in teaching their future students (Rice & Kitchel, 2015). While a teacher preparation program is beneficial in developing PCK, preparation programs alone are not enough and, in some cases, may not adequately address content knowledge and its application in the classroom. Prior literature indicates many beginning teachers enter teacher preparation programs with simplistic views of teaching and learning, merely as transmitting subject-matter content to students, much like didactic orientation (Geddis et al., 1993). This is simply not enough.

In fact, research indicates when pre-service teachers can purposefully identify, self-assess, and develop their knowledge of teaching, their understanding of PCK

increases (Nilsson & Loughran, 2011). Also, a positive correlation exists between PCK understanding and teacher success, when teachers adopt instructional practices like inquiry-based instruction, cooperative learning, and reflection (Käpylä et al., 2009), improving their content knowledge and pedagogical abilities. Ultimately, pre-service teachers can adopt these instructional practices through their teacher preparation programs. Program design and the experiences they have in their program are equally vital in developing PCK, according to Baumert et al. (2010).

As previously mentioned, PCK development takes time and experience in the classroom (Baxter & Lederman, 1999; Clermont et al., 1994; Hashweh, 2005; Kind, 2009; Lee, 2011). According to Darling-Hammond (2000), it takes teachers between five and eight years of experience to begin developing expertise. Some researchers may see SBAE teachers in this category as 'experts' in PCK development and may use techniques such as elaboration, rehearsal (Weinstein & Mayer, 1983), asking and answering questions, identifying alternative conceptions and student learning difficulties, and developing appropriate instructional assessment strategies (Schneider & Plasman, 2011). Other approaches these teachers may use involve active learning (Taraban et al., 2007), active and engaging pedagogies (Miller & McVee, 2013), and strategies and methods that help students learn content long term (Dunlosky et al., 2013).

On the other hand, while some studies indicate classroom experience is instrumental in developing teacher PCK, it does not always lead to robust knowledge of instructional strategies or guarantee an individual will possess PCK (Hashweh, 2005). Some research points to teachers' contexts, prior experiences, beliefs, and content area knowledge as playing a significant role in their PCK (Gess-Newsome & Lederman, 1999;

Van Dijk & Kattmann, 2007). For example, background in the content, including secondary education experiences, may be the beginning of PCK development for teachers (Darling-Hammond & Bransford, 2005). Additionally, outside of the classroom, professional development and reflection are a continuation of their learning and an important aspect of PCK development (Ball & McDiarmid, 1990; Zembal-Saul et al., 2002).

Rice and Kitchel's (2015) research study corresponds with this finding concerning PCK development among SBAE teachers. The study's findings indicated that teaching experience is the most effective way to gain agricultural content knowledge. This claim further asserts the significance of field experiences and experiential learning opportunities, especially for pre-service and novice teachers. Engaging in such experiences allows these teachers to develop their PCK, thus improving their self-efficacy and making them better classroom teachers. The more a teacher can develop their PCK, the more informed decisions they can make. This includes selecting appropriate representations and examples of concepts, addressing student misconceptions, and integrating and sequencing ideas and concepts in their curriculum (Ball et al., 2008).

The Impact of PCK's Two Sides

PCK is considered one of the most crucial elements of teacher knowledge, leading to effective classroom teaching (Baumert et al., 2010; Gess-Newsome & Lederman, 1999; Loughran et al., 2012). PCK is critical to a teacher's development and ability to impart knowledge to their students (Diakidoy & Iordanou, 2003). The impact of a

teacher's PCK on student learning has undergone extensive examination across numerous disciplines, with researchers identifying instructional tasks and the pedagogical approaches teachers employ. It is not only the direct result of their PCK (Walshaw & Anthony, 2008), but it also has implications on student learning (Bacon & Stewart, 2006).

When teachers are deficient in either content knowledge or pedagogical abilities, they struggle, as do their students. According to Veenman (1984), common problems among beginning teachers across multiple disciplines include concerns for classroom regulation, motivating students, dealing with individual differences among students, assessing students, relationships with parents, organizing classwork, insufficient teaching resources, and dealing with individual student problems. While many teacher preparation programs prepare pre-service teachers to address these challenges, beginning teachers are not receiving what they need to succeed in the classroom. Houck and Kitchel (2010) caution that significant changes to teacher preparation programs to accommodate these deficiencies could lead to unprepared SBAE teachers in subjects within agricultural education.

While some argue pedagogical knowledge takes precedence, others assert content knowledge is equally important (Shulman, 1986). In SBAE, beginning teachers have struggled to break down content knowledge for their students due to their content knowledge deficiencies (Rice & Kitchel, 2016). Additionally, if teachers are not well-versed in the content they are teaching and how to break it down for students to understand, they risk passing on misconceptions and inaccurate information (Darling-Hammond & Bransford, 2005). For SBAE teachers to be effective, they must know how

to deliver content in a way students can understand. Finding the balance between content and pedagogical knowledge is crucial in a teacher preparation program and equally important for SBAE teachers to succeed in the classroom. A good grasp of content knowledge later informs instruction and pedagogical practices. Davis et al. (2006) postulated teachers' beliefs about instruction directly correlate to their wealth of content knowledge. Practitioners who have mastered their content area have been more adept at spotting student disabilities and seeing student preconceptions and learning difficulties (Brink, 1997). In one study, biology teachers with prior content knowledge could use their prior knowledge to learn new topics (Friedrichsen et al., 2009). These pieces of literature further validate the importance content knowledge plays in developing PCK and how it speaks to pedagogical knowledge needed to positively impact student achievement.

PCK and Licensure Types

To offset the SBAE profession's retention challenges and barriers to certification, the profession has turned to AC programs (Bowling & Ball, 2018). AC is defined as "anything but a four-year undergraduate program housed in a school of education" (Walsh & Jacobs, 2007, p. 13). While retention remains an ongoing challenge, AC SBAE teachers have helped fill vacancies across the United States. As 30% of SBAE teachers enter the profession through AC, many have started to question the pedagogical abilities of these teachers (Bowling & Ball, 2018). With over 130 varieties of AC pathways across the country, all differing in duration, entry requirement, and curriculum, speculation exists that many teachers from these programs may not possess the necessary knowledge

and skills to be successful in the classroom (Bowling & Ball, 2018). Research indicates these teachers enter the classroom with little to no pedagogical skills and face significantly more challenges than their TC colleagues (Bowling & Ball, 2018; Hoerst & Whittington, 2009; Porter, 2011; Roberts & Dyer, 2004; Stair et al., 2019; Touchstone, 2015).

According to Darling-Hammond et al. (2005), AC teachers are less prepared than their TC counterparts. Watts (1986) also reported AC programs are deficient and less rigorous in at least one of the critical preparation areas: a) applicants may teach a subject area in which they have no experience; b) applicants may enter with less college preparation; c) applicants may complete the program with little to no pedagogical preparation; or d) applicants may not be required to pass a competency exam to receive licensure. Additionally, Robinson and Edwards (2012) believed the credibility of these teachers has come under scrutiny, as AC teachers lack the pedagogical preparation their counterparts receive through a teacher preparation program.

While some AC programs have been more successful than others, further research is necessary to examine whether AC is a viable model of teacher preparation and how these programs help develop knowledge for teaching (Zeichner & Conklin, 2005). A recent research article examining SBAE teachers found practical differences by licensure type when examining the six construct areas that comprise PCK. TC teachers had higher mean values in Knowledge of Content and Students (KCS) and Knowledge of Content and Curriculum (KCC), while AC teachers had higher mean values in Common Content Knowledge (CCK) and Specialized Content Knowledge (SCK) (Wood et al., 2024). This finding indicates AC teachers come to the profession with unique skills and are content

experts, whereas TC teachers have a better grasp on pedagogy. Ultimately, knowing the deficiencies within both licensure types is critical in understanding the professional development needs of all SBAE teachers.

Need for Professional Development

Within the dynamic landscape of education, teachers play a crucial role in preparing learners to solve complex problems. To ensure effective learning outcomes, teachers need continuous professional development to refine their pedagogical skills (Darling-Hammond & Bransford, 2005; Darling-Hammond et al., 2017; Mizell, 2010; Wash et al., 2000). Darling-Hammond et al. (2009) discovered that merely one-fourth of teachers in the United States are primarily driven by the desire to enhance their content knowledge through professional development. Accordingly, this section explores and emphasizes the importance of professional development opportunities for teachers, mainly focusing on secondary agricultural educators. It also delves into the factors and effects of professional development deficiency, which, in turn, contribute to the nationwide teacher shortage and the impact of high teacher turnover on student performance.

Professional development opportunities are pivotal in empowering teachers to refine their pedagogical skills, enhance their content knowledge, and stay abreast of emerging educational trends and best practices (Jaipal-Jamani et al., 2015; Kennedy, 2016) This is particularly important for secondary agricultural educators, who are responsible for various subjects encompassing eight (8) agricultural, food, and natural

resource areas (Talbert et al., 2014), and whose role extends beyond traditional classroom teaching. These educators are also responsible for facilitating students' Supervised Agricultural Experiences (SAE) and fostering leadership development through organizations like the National FFA Organization (FFA) (Croom, 2008; Phipps et al., 2008). Therefore, professional development opportunities for these educators must go beyond content-focused training and include aspects related to experiential learning, leadership development, and community engagement.

Additionally, Smalley et al. (2019) highlight how secondary agricultural educators in Iowa have expressed diverse needs regarding teaching, classroom management, and technical skills. This underscores the importance of targeted professional development programs that address educators' specific challenges in this field. However, creating meaningful and relevant professional development opportunities can be challenging. Washburn et al. (2001) stress the need to identify suitable programs that cater to the unique requirements of individual educators. Such programs should accommodate various learning styles and preferences, ensuring teachers can actively engage in learning. Organizers must provide adequate time for participation and collaboration among educators to make professional development engaging and successful. Birman et al. (2000) emphasize that allowing teachers to actively participate and share their experiences fosters a positive learning environment. Peer-to-peer interactions and collaborative workshops can facilitate the exchange of ideas and practices, leading to more effective implementation in the classroom. Furthermore, professional development programs must align with the latest research on effective teaching practices and instructional technologies. Incorporating evidence-based strategies

into these programs can empower educators with practical tools to enhance student learning outcomes.

One of the negative effects a lack of professional development has on teachers is attrition or turnover. In fact, the absence of meaningful in-service training and development has been identified as a factor in teachers' decisions to leave the profession (Marinell & Coco, 2013). Providing ongoing and relevant professional development can help teachers feel valued, motivated, and equipped to handle the challenges they encounter in their classrooms. Mentorship programs and peer support networks can also significantly nurture teachers' professional growth and job satisfaction, thereby reducing attrition rates (Ingersoll & Strong, 2011).

Targeted professional development is critical to empowering teachers to grow and excel in their roles, particularly for secondary agricultural educators with unique responsibilities and specific challenges. By tailoring professional development programs to address the specific needs of educators, schools and educational institutions can create a more effective and meaningful learning experience for teachers, ultimately benefiting their students and the entire education community (Alkaabi, 2023).

In addition to subject knowledge, secondary agricultural educators are responsible for nurturing leadership skills in their students through participation in FFA and other leadership programs. Targeted professional development should equip teachers with the tools and techniques to effectively mentor and guide students in leadership development activities, fostering students' communication, teamwork, and leadership abilities (Phipps et al., 2008).

Targeted professional development can address the specific needs of secondary agricultural educators in managing inclusive classrooms. Educators need training in writing educational goals and developing behavioral objectives that cater to students with diverse learning needs. Additionally, providing assistive technology and differentiated instructional strategies are essential for meeting the unique requirements of students with special needs (Hoerst & Whittington, 2009).

As technology continues to play an increasingly significant role in education, targeted professional development should focus on helping secondary agricultural educators effectively integrate technology into their classrooms. This includes utilizing educational apps, digital resources, and online platforms to enhance learning experiences, engage students, and streamline administrative tasks (Joerger, 2002; Layfield & Dobbins, 2002).

Given the close ties between agriculture and local communities, targeted professional development can help educators build stronger connections between the classroom and the community. This includes strategies for involving local experts and stakeholders in learning, incorporating real-world examples and issues, and creating meaningful partnerships to enrich students' understanding of agriculture's role in society (Croom, 2008).

Effective targeted professional development should not be a one-time event. Providing ongoing support and follow-up opportunities for educators to implement what they have learned is essential for the long-term success and impact of the training. Coaching, mentoring, peer collaboration, and reflective practices are strategies that can accomplish this (Rhodes et al., 2004; Ruhland & Bremer, 2003). Creating engaging

professional development opportunities is vital to ensure teachers actively participate in learning, apply new knowledge and skills effectively in their classrooms, and feel motivated to continue their professional growth. By designing dynamic and interactive programs, educational institutions can maximize the impact of professional development and ultimately enhance student learning outcomes (Alkaabi, 2023). These programs must also recognize teachers' diverse backgrounds, experiences, and learning styles. Employing a differentiated approach ensures educators can access content and activities that align with their individual needs and preferences. Offering a variety of workshops, seminars, online courses, and collaborative projects allows teachers to choose the most suitable format for their learning journey (Birman et al., 2000). Professional development content must be relevant to teachers' day-to-day teaching experiences and directly applicable to their classrooms. By incorporating real-world examples, case studies, and best practices from successful educators, professional development can offer tangible solutions to classroom challenges (Rhodes et al., 2004).

Encouraging active learning is a key component of engaging professional development. Instead of relying solely on passive lectures, workshops should incorporate various active learning strategies, such as group discussions, problem-solving activities, role-playing, and hands-on workshops. These strategies enhance engagement and enable teachers to actively practice and reinforce their newly acquired skills (Birman et al., 2000). Collaboration among teachers, in particular, fosters community and shared responsibility for professional growth, enabling teachers to exchange ideas, share experiences, and learn from one another. Allowing teachers to work in teams or engage in reflective discussions with their peers creates a supportive and enriching learning

environment (Birman et al., 2000). Additionally, recognizing teachers' achievements and celebrating their professional growth can be a powerful motivator. Platforms to showcase exemplary teaching practices, innovative projects, and successful student outcomes can inspire teachers and reinforce the value of their ongoing professional development (Rhodes et al., 2004).

Professional development opportunities should be flexible and allow teachers to tailor their learning journey based on their needs and interests. Offering a range of topics and modules enables educators to personalize their learning experience. Online platforms and resources can provide teachers with continuous access to content, allowing them to learn at their own pace and revisit materials as needed (Rhodes et al., 2004). Collecting participant feedback will help gather information on topics of interest and continually improve the quality and impact of professional development opportunities. Regular evaluations can help identify areas for improvement and ensure future programs align with teachers' needs and expectations. Incorporating feedback loops also reinforces the notion that teachers' input and perspectives are valued and integral to the design of future professional development initiatives (Birman et al., 2000).

Professional Development and Career Stages

Professional development plays a pivotal role in shaping the effectiveness and competence of educators in any field, and teaching is no exception. In the context of agricultural education, it is imperative to tailor professional development efforts to meet the specific needs of teachers at different stages of their careers. As Antoniou and Kyriakides (2013) emphasize, teacher professional development should align closely with

teachers' professional needs and distinct development stages. Despite the growing recognition of the significance of career stage-based professional development, however, many efforts have fallen short in differentiating activities to suit the needs and experiences of teachers. Easterly and Myers (2019) and Figland et al. (2019) have cautioned against the one-size-fits-all approach to professional development, highlighting it fails to acknowledge the nuanced challenges and requirements that arise as teachers progress through their careers.

To better understand the distinct needs of agricultural educators, it is crucial to recognize the various career stages they navigate. Fessler and Christensen (1992) proposed a non-linear model of teacher career stages consisting of eight phases: (a) pre-service, (b) induction, (c) competency building, (d) enthusiastic and growing, (e) career frustration, (f) career stability, (g) career wind-down, and (8) career exit. Each stage brings its own set of challenges, opportunities, and areas for growth. As teachers advance through these stages, their motivations, aspirations, and concerns undergo significant transformations.

Beginning agricultural teachers, often fresh out of pre-service training, encounter a steep learning curve as they navigate the complexities of managing an advisory board and handling facility management (Boone & Boone, 2007; Mundt, 1991). They may also face challenges in motivating students and maintaining their interest in the subject matter (Farrington, 1980; Joerger, 2002). These early career stages demand comprehensive support and targeted professional development initiatives, such as mentoring programs and training in classroom instruction, classroom management, and student motivation (Sorensen et al., 2014). Once teachers progress into the mid-career stage, concerns about

time management, course planning, and motivation may become more pronounced (Smalley & Smith, 2017). Retaining mid-career educators is essential to tap into their experience and expertise. To achieve this, professional development opportunities should focus on networking, re-energization, and stress management to cater to their unique requirements (Smalley & Smith, 2017). Finally, late-career agricultural educators with substantial teaching experience seek professional development that aligns with programmatic and technology-based needs (Layfield & Dobbins, 2002; Washburn et al., 2001). These educators may benefit from training in computer-based programming assistance, FFA award and degree applications, and record-keeping (Layfield & Dobbins, 2002). Recognizing the demands of late-career educators and providing relevant professional development opportunities is crucial to ensure their sustained engagement and contributions to the agricultural education community.

In light of these varying needs across career phases, the professional development landscape for agricultural educators should embrace a differentiated approach. Tailoring development programs to address teachers' evolving needs and aspirations at different stages of their careers is essential to promote their growth and longevity in the profession. By doing so, educational institutions can enhance teacher retention, improve educational outcomes, and ultimately create a more robust and effective agricultural education system.

Professional Development Needs of Early-Career Agricultural Teachers

The early stages of a teacher's career, particularly for beginning agricultural educators, are marked by excitement, enthusiasm, and a strong desire to positively impact

their students and the agricultural community. However, this phase also brings numerous uncertainties as they navigate the transition from theoretical learning to practical application in the classroom (Roberts et al., 2020; Voges et al., 2020). To ensure the success and retention of these novice teachers, it is crucial to address their professional development needs comprehensively.

Primary concerns for beginning agricultural teachers are classroom management and the significant challenge in keeping students engaged and motivated (Disberger et al., 2022; Voges et al., 2020). Managing diverse students with varying backgrounds, interests, and learning styles can be overwhelming, leading to frustration and inadequacy. At any stage of teaching, classroom management skills are crucial for creating a conducive learning environment. Professional development strategies should include establishing clear expectations, implementing positive behavior reinforcement, and handling disciplinary issues with empathy and consistency (Disberger et al., 2022; Thornton et al., 2020). Integrating interactive and hands-on learning experiences can pique students' interest in the subject matter and foster a love for agriculture. To create dynamic and captivating lessons, professional development initiatives should focus on innovative instructional methods, project-based learning, and technology integration (Disberger et al., 2022; Thornton et al., 2020).

Additionally, novice agricultural educators often experience self-doubt regarding their subject matter expertise, especially when teaching complex agricultural concepts and practices (Voges et al., 2020). Professional development opportunities should include content-specific workshops and training sessions to enhance their confidence and competence. An example of a professional development opportunity specifically

designed for novice agriculture educators is the Teacher Turn the Key initiative led by the National Association of Agricultural Educators. This program provides early-career agriculture educators with the tools and support they need to grow and flourish in the profession. This includes opportunities to improve their teaching and classroom management, develop time management skills, and immerse themselves in activities supporting their professional goals (National Association of Agricultural Educators, n.d.).

In addition to professional development sessions or opportunities, collaborating with experienced mentors and veteran teachers can also be valuable. Mentor relationships allow beginning teachers to gain insights and practical knowledge from those who have mastered the subject matter over the years (Ingersoll & Strong, 2011). In this context, developing well-structured and engaging lesson plans is fundamental for sharing the subject matter effectively. Beginning agricultural teachers may struggle with creating cohesive and comprehensive lesson plans that align with curriculum standards and meet the diverse needs of their students (Thornton et al., 2020). Professional development programs should offer training in effective lesson planning strategies, curriculum design, and alignment with educational standards. Moreover, mentoring support can assist beginning teachers in fine-tuning their lesson plans and instructional approaches to cater to their specific student population (Ingersoll & Strong, 2011).

Beyond classroom activities, a vital component of agricultural education is understanding and effectively managing FFA programming and SAE projects, and it becomes a critical skill for beginning teachers (Disberger et al., 2022; Roberts et al., 2020; Thornton et al., 2020). These programs provide students with valuable leadership and hands-on learning experiences, but they require careful planning, organization, and

guidance from the teacher. Professional development opportunities should include workshops and resources that help beginning agricultural educators navigate the complexities of FFA and SAE, ensuring they can support their students effectively in these essential aspects of agricultural education.

Beginning agriculture teachers are the profession's future, and their success is vital for advancing agricultural education and cultivating the next generation of agriculturists. By recognizing and addressing these educators' unique professional development needs, educational institutions, and policymakers can provide the support and resources necessary to enhance their skills, confidence, and overall effectiveness in the classroom. Equipped with targeted professional development initiatives, beginning agricultural teachers will be better prepared to overcome challenges, inspire their students, and contribute significantly to the growth and success of agricultural education.

Professional Development Needs of Mid-Career Agricultural Teachers

The mid-career phase for agricultural educators represents a critical juncture in their professional journey. These teachers have gained valuable experience and expertise over the years. Yet, they may also encounter challenges with maintaining enthusiasm, balancing responsibilities, and continuing their growth as educators (Boone & Boone, 2007; Lambert et al., 2011; Smalley & Smith, 2017). Addressing the professional development needs of mid-career agricultural teachers is essential to supporting their continued dedication to the profession and ensuring their contributions remain impactful.

One of the most significant challenges mid-career agricultural teachers face is time management (Sorensen et al., 2014). With years of experience comes an increasing

list of responsibilities, including administrative tasks, committee involvement, and leadership roles (Roberts et al., 2020; Smalley & Smith, 2017; Sorensen et al., 2014). As a result, mid-career teachers may struggle to balance their instructional duties with additional responsibilities (Roberts et al., 2020; Smalley & Smith, 2017; Sorensen et al., 2014). Professional development programs should focus on time management strategies, organizational skills, and effective prioritization techniques. Training in delegation and teamwork can also be valuable, as it allows mid-career educators to share responsibilities and manage their workload more efficiently.

Like beginning teachers, mid-career agricultural teachers may encounter challenges developing innovative and engaging lesson plans as the years progress (Thornton et al., 2020). They may seek to revitalize their teaching methods and find new ways to keep their instruction fresh and exciting for their students. Professional development opportunities can address these needs by providing workshops on curriculum design, instructional technology, and student-centered learning approaches. Encouraging mid-career agricultural teachers to participate in networking opportunities and collaborate with peers can provide invaluable support and professional growth (Smalley & Smith, 2017). Professional development events that facilitate networking among educators from different schools and districts can foster the exchange of best practices and innovative ideas. Collaborative projects and partnerships with other educators can also inspire mid-career teachers to develop fresh approaches to teaching and create a sense of professional camaraderie.

After years of teaching, mid-career agricultural teachers may begin to consider their long-term plans and potential career advancements within the field (Smalley &

Smith, 2017). Providing professional development opportunities that address teacher retention strategies, career advancement pathways, and leadership development can demonstrate institutional support for their professional growth. Encouraging mid-career teachers to pursue leadership roles within the school or district can benefit their career trajectory and contribute to overall school improvement (Christie, 2019). To help deal with burnout due to the demands of their roles and the cumulative stress they have experienced over the years, on the other hand, professional development programs should prioritize well-being and mental health support, offering workshops on stress management, staying motivated, self-care strategies, and work-life balance (Blackburn et al., 2017; Clemons et al., 2021b; Sorensen & McKim, 2014). Creating a supportive and positive work environment that fosters collegiality and provides avenues for emotional and professional support is crucial for retaining mid-career educators.

In order to combat the challenges mid-career teachers face, including burnout and the desire to leave the profession, similarly, the National Association of Agricultural Educators has created a professional development program for agriculture educators in their 7th-15th year of teaching (National Association of Agricultural Educators, n.d.). Designed in 2013, XLR8, the eXcellence in Leadership for Retention professional development program, was designed to provide year-long professional development to this group of educators. The program's goals are to develop experienced teacher leaders who will mentor other teachers in the profession, provide mid-career level professional development to participants, and increase longevity and satisfaction of participants with their chosen career of teaching agriculture (*Professional development,* n.d.). While this is

one opportunity to support mid-career teachers, there is a need for more professional development experiences to assist this particular cohort of educators.

Mid-career agricultural teachers are valuable assets to the field, with years of experience and expertise that contribute to the overall success of agricultural education. Thus, educational institutions can create targeted programs to help empower mid-career educators to overcome challenges, reignite their passion for teaching, and continue positively impacting their students and the agricultural community.

Professional Development Needs of Late-Career Agricultural Teachers

Late-career agriculture teachers are a valuable and experienced cohort within the profession. With many years of teaching experience, these educators possess a wealth of knowledge and expertise that can greatly benefit the next generation of agricultural leaders. However, late-career teachers face changing professional needs as they approach retirement (Gutman & Oplatka, 2020; Masuda et al., 2013). Addressing these specific needs through targeted professional development initiatives can help retain their valuable contributions and support a smooth transition into retirement.

Late-career agricultural teachers may have witnessed significant advancements in technology throughout their careers. To help them remain relevant in today's rapidly evolving educational landscape, professional development programs should focus on technology integration and digital tools relevant to agricultural education (Roberts et al., 2020; Thornton et al., 2020). Training using instructional technologies, educational software, and online resources can enhance late-career educators' instructional methods and enrich their teaching practices. Addressing programmatic needs such as managing

complex agricultural programs, grant writing, and external funding opportunities can empower late-career teachers to leave a lasting legacy in their programs (Roberts et al., 2020; Thornton et al., 2020).

As late-career agricultural teachers consider retirement, succession planning becomes crucial to ensure the continuity of their programs and the smooth transition of leadership. Professional development opportunities can include workshops on effective mentorship strategies, training potential successors, and building leadership skills with junior faculty or incoming teachers (Gutman & Oplatka, 2020; Masuda et al., 2013). Creating a formal mentorship program within the school or district can provide a structured pathway for late-career educators to pass on their knowledge and expertise to the next generation of agricultural educators.

Late-career teachers approaching retirement may face emotional challenges related to transitioning from a profession to which they have dedicated their lives (Day & Gu, 2013; Gutman & Oplatka, 2020). Professional development initiatives should offer support in managing this work-life transition, addressing issues such as coping with the emotional aspects of retirement, financial planning, and finding new post-retirement opportunities (such as consulting, part-time teaching, or involvement in leadership organizations) (Ekstrom, 1967). This support can help late-career teachers navigate significant life changes confidently and optimistically. Additionally, professional development programs should recognize late-career teachers' accomplishments and their long-term dedication to the profession. Thus, events can be created to celebrate their achievements, highlight their impact on students, and express gratitude for their commitment to agricultural education and significant contributions to their schools and

communities. Late-career agricultural teachers bring a wealth of knowledge, experience, and wisdom to the profession. As these teachers approach retirement, addressing their professional development needs and their unique emotional context becomes vital to ensure a smooth transition for them and their programs.

Professional Development by Licensure Type

It is crucial to understand the professional development needs of agriculture teachers based within the context of their licensure type so as to provide appropriate support and improve their effectiveness in the classroom. By identifying the specific needs of both TC and AC agriculture teachers, education stakeholders can tailor professional development programs to address these needs and foster teacher growth and retention (Darling-Hammond et al., 2017).

To fully comprehend the professional development needs of TC and AC agriculture teachers, the following section examines relevant research and findings related to their perceived needs, challenges, and effectiveness in the classroom. By gaining insights into these aspects, we can develop informed strategies and recommendations to ensure all agriculture teachers receive the necessary support and training to excel in their profession.

The Landscape of Agriculture Teacher Licensure

The shortage of qualified agriculture teachers has prompted the development of AC programs, providing individuals with non-traditional backgrounds access to

educational careers (Bell et al., 2010). The landscape of agriculture teacher licensure now encompasses TC and AC teachers, each entering the profession through distinct routes.

TC agriculture teachers undergo a rigorous university-based teacher preparation program combining coursework and student-teaching experiences. This comprehensive training equips them with pedagogical skills, curriculum development expertise, and classroom management strategies (Darling-Hammond et al., 2009). Additionally, TC teachers generally have a well-rounded understanding of teaching and are adept at identifying and meeting the diverse needs of their students (Roberts & Dyer, 2004).

On the other hand, AC agriculture teachers often come from diverse career backgrounds, such as industry professionals or individuals seeking a second career (Darling-Hammond & Hudson, 1990; Kearns, 1990). These individuals may have extensive content knowledge but limited pedagogical training, which impacts their preparedness for classroom instruction (Wayman et al., 2003). Consequently, AC teachers may face challenges related to instructional strategies, classroom management, and student motivation (Stair et al., 2019). Despite these challenges, AC programs are effective in producing competent teachers. In fact, some studies even suggest AC teachers can be as effective as their TC counterparts (Decker et al., 2004; Kane et al., 2007; Rockoff, 2004). While TC teachers may have a solid foundation in pedagogy, they may still require professional development in specific areas, such as integrating instructional technologies and developing online teaching resources (Stair et al., 2019). Conversely, AC teachers often express the need for support in areas such as writing grant proposals and managing instructional facilities (Roberts & Dyer, 2004; Stair et al., 2019).

Addressing these distinct needs through tailored professional development programs can help bridge the gap and enhance the effectiveness of both groups of agriculture teachers.

Professional Development Needs of Alternatively Certified Teachers

As AC agriculture teachers come from non-traditional backgrounds and may have limited pedagogical training, these teachers may require higher levels of support to develop the necessary skills for successful teaching (Ruhland & Bremer, 2003). This is why addressing their specific professional development needs is crucial to enhancing their classroom performance. One specific area is cohort training and cross-team instruction. Peer support, group learning, and mentorship can be valuable approaches to providing these teachers with ongoing assistance and networking opportunities (Porter, 2011).

Additionally, teacher pedagogy may be a second area of support. While AC teachers may possess significant content knowledge, they often have higher needs in areas related to instruction, curriculum development, program planning, and technical agriculture (Roberts & Dyer, 2004; Swafford & Friedel, 2010). Although research suggests AC agriculture teachers may feel more efficacious in their teacher pedagogy than TC teachers do (Duncan & Ricketts, 2008), their limited knowledge of effective pedagogical practices may influence this perception (Roberts & Dyer, 2004). Addressing this gap through professional development can help AC teachers recognize the importance of pedagogical strategies and identify their actual needs in this domain.

SAEs, in particular, are essential components of agricultural education. However, they can be challenging for teachers to implement, especially for those with limited

pedagogical training (Barrick & Estepp, 2011). Providing targeted professional development to address these challenges can help AC teachers effectively integrate SAEs and FFA activities into their instruction. Research shows AC agriculture teachers may experience greater needs in FFA engagement, SAEs, classroom management, and curriculum development (Touchstone, 2015).

According to a study by Roberts and Dyer (2004), AC agriculture teachers also need more assistance in writing grant proposals. Grant writing is a critical skill for obtaining funding to support agricultural education programs. Targeted professional development in this area can empower AC teachers to secure additional resources for their classrooms.

Overall, by addressing these specific professional development needs, education stakeholders can improve the overall effectiveness of AC agriculture teachers in the classroom and help equip them with the necessary skills and knowledge to succeed in agricultural education.

Professional Development Needs of Traditionally Certified Teachers

TC agriculture teachers are well-equipped with pedagogical skills and a well-rounded understanding of teaching (Darling-Hammond et al., 2009). However, despite their thorough training, TC teachers may still have their own set of specific professional development needs. Research shows TC agriculture teachers benefit from professional development in various areas. For instance, due to technological advancements in agricultural education, TC teachers may require support in integrating instructional technologies and developing online teaching resources (Stair et al., 2019). Professional

development initiatives can equip TC teachers with the necessary skills and knowledge to effectively integrate technology into their instructional practices.

Additionally, motivating students and managing instructional facilities are some other areas where TC teachers may need professional development (Stair et al., 2019); effective classroom management is crucial for creating a conducive learning environment, while student motivation plays a significant role in student engagement and academic achievement (Anderson et al., 2018). Addressing these needs through targeted training and workshops can empower TC agriculture teachers to manage their classrooms more effectively and inspire students' passion for agricultural subjects. Indeed, research also indicates TC agriculture teachers may express needs such as teaching problem-solving skills and effectively conducting laboratory sessions (Stair et al., 2019). These are essential for guiding students in developing critical thinking abilities and implementing engaging and educational experiences for students.

In terms of student-teaching experience, TC teachers are known to have a 'leg up' on AC teachers. New agriculture teachers who have completed traditional teacher preparation programs, including student-teaching experience, tend to exhibit higher confidence levels than their AC counterparts (Knobloch & Whittington, 2003). Student teaching offers sustained opportunities for teachers to gain mastery experiences in teaching and develop confidence in their abilities (McKim & Velez, 2016). However, we should still note that professional development can further enhance teaching skills and provide ongoing support.

Although TC teachers are considered well-rounded in almost every teaching dimension (Darling-Hammond et al., 2009), their needs for professional development

demonstrate the essential nature of ongoing learning and growth. Effective professional development programs can ensure that TC agriculture teachers continue to evolve as educators and stay abreast of the latest advancements in pedagogy and agricultural content knowledge.

Effective Professional Development

Effective professional development is fundamental for all agriculture teachers to refine their pedagogies, enhance their teaching skills, and stay updated with the latest advancements in agricultural education (Huberman, 1995). Regular needs assessments and collecting data on teacher performance and satisfaction are crucial for designing and delivering targeted professional development programs (Darling-Hammond et al., 2017). Education stakeholders can tailor professional development initiatives to address these needs and foster teacher growth and retention by identifying the specific needs of TC and AC agriculture teachers. Some examples, as previously mentioned, are collaborative learning environments, which allow teachers to share experiences, exchange best practices, and learn from one another's successes and challenges; peer support groups, which offer a safe space for teachers to seek guidance and feedback, enhancing their professional development journey; and mentorship programs, pairing experienced agriculture teachers with novices to provide personalized guidance and support (Castro et al., 2018).

Thus, effective professional development is essential for all agriculture teachers to continuously grow and succeed in their roles as educators. By recognizing the specific needs of TC and AC agriculture teachers, education stakeholders can design tailored

professional development initiatives to address these needs and empower agriculture teachers to excel in the classroom and contribute to developing the next generation of skilled agricultural professionals. Ongoing professional development efforts will improve teacher retention and enhance the quality of agricultural education, thus benefiting students, the agricultural industry, and society.

Establishing Job Satisfaction and Professional Identity

Professional development is a crucial aspect of enhancing teacher efficacy and improving the quality of education. In agricultural education, researchers have extensively studied teacher-training programs, but they increasingly recognize that teachers need supplementary professional development to prepare effectively for the profession's challenges. As McKim and Velez (2016) suggest professional development opportunities for practicing teachers can significantly enhance their self-efficacy. While student teaching and pre-service coursework are essential foundational elements, they may not fully equip teachers for the demands of actual classroom situations. Ongoing professional development allows teachers to continuously learn and grow, improving their skills, knowledge, and confidence. In agricultural education, this is especially relevant due to the industry's dynamic nature and students' evolving needs.

Prior literature has explored the effectiveness of agricultural teacher-training programs (Myers & Dyer, 2004; Swortzel, 1999; Wardlow & Osborne, 2010). While these programs are fundamental in preparing teachers, they cannot comprehensively understand all the challenges they may face in their careers. Lytle (2000) argues

supplemental professional development is necessary to bridge the gap between theoretical knowledge and practical application. By engaging in targeted development activities, agricultural educators can develop specialized skills, such as those related to SAE development, an area of concern for novice teachers (Wolf, 2011).

Overall, professional development plays a critical role in enhancing the self-efficacy of agricultural educators throughout their careers (Wolf, 2011). It complements teacher-training programs and equips teachers with the skills and confidence necessary to excel in their profession. As they progress through different professional life phases, targeted development opportunities can address specific challenges and foster sustained engagement and effectiveness (Darling-Hammond et al., 2017). Educational institutions, policymakers, and stakeholders must recognize the value of professional development and invest in creating robust and impactful programs to support agricultural educators in their journey toward excellence.

The Importance of Job Satisfaction

Job satisfaction is a critical component in agricultural education, influencing teacher retention, commitment, and the overall success of educational programs (Blackburn et al., 2017; Clemons et al., 2021a). Understanding the factors contributing to teacher satisfaction is paramount for educators, administrators, and policymakers to develop effective strategies to support agriculture teachers, as agriculture teachers play a vital role in preparing the next generation of skilled professionals for the agricultural industry. Their dedication, passion, and commitment to teaching shape students' learning experiences and contribute to the growth of the agricultural sector. However, like any

profession, teaching agriculture comes with challenges, including long working hours, multiple responsibilities, and the need to balance personal and professional demands (Traini et al., 2021).

Researchers have employed various assessment tools to measure the level of job satisfaction among agriculture teachers, one of which is the Teacher Satisfaction Scale (Hackman & Oldham, 1975). This scale serves as a valuable instrument for capturing teachers' subjective perceptions regarding their job satisfaction levels and assessing a range of factors related to their profession, which provides valuable insights into the overall contentment and motivation of agriculture teachers. The Teacher Satisfaction Scale consists of a series of items or statements that teachers rate based on their degree of agreement or disagreement. These items typically cover different aspects of the teaching profession, such as work environment, relationships with colleagues and administrators, compensation, opportunities for professional growth, and the overall sense of fulfillment derived from the job.

In addition to the Teacher Satisfaction Scale, multiple research studies have explored job satisfaction among agriculture teachers in specific states (Blackburn & Robinson, 2008; Castillo & Cano, 1999; Ritz et al., 2013). These studies shed light on multiple factors influencing job satisfaction in different contexts, providing valuable data for tailoring interventions at the state and regional levels. For example, a supportive work environment is essential for fostering teacher satisfaction (Chenevey et al., 2008; Gilman et al., 2012). Agriculture teachers who receive professional development opportunities and feel valued and supported by their colleagues, administrators, and school districts are more likely to experience higher levels of job satisfaction (Solomonson & Retallick,

2018). Professional development offerings and positive relationships with colleagues and supervisors can contribute to a sense of belonging and job security, increasing teacher commitment to their profession (Kelchtermans, 2017; Shoulders & Myers, 2011). Ultimately, agriculture teachers with access to professional development opportunities are more likely to feel supported and valued by their institutions. Consequently, teachers' commitment to continuous improvement fosters a positive work environment, enhancing career satisfaction and overall teacher retention (Shuls & Flores, 2020). Additionally, competitive compensation, advancement opportunities, and comprehensive benefits packages play a significant role in job satisfaction. Adequate salaries, promotions, and benefits recognize teachers' dedication and hard work while alleviating financial stress, allowing them to focus more on their teaching responsibilities (Doss et al., 2023; Solomonson et al., 2021).

With regard to work-life balance, the demanding nature of the agriculture teaching profession is a factor as well. Teachers who can successfully balance their professional responsibilities with their personal lives are more likely to experience higher levels of job satisfaction (Sorensen & McKim, 2014). Institutions that promote work-life balance through flexible scheduling and support systems can contribute to greater teacher contentment. Some of those work-life balance strategies include providing flexible work hours, allowing for remote work options when feasible, and encouraging the efficient use of time during work hours (Sorensen & McKim, 2014). With this, a supportive work environment is likewise crucial in promoting work-life balance. Educational leaders and administrators can foster a culture that values work-life balance by acknowledging the importance of personal well-being and offering resources and support for managing

personal and professional demands (Clark et al., 2014; Rice et al., 2011; Sutcher et al., 2016). The promotion of self-care practices among agriculture teachers is essential for maintaining work-life balance and job satisfaction. Encouraging teachers to prioritize their physical and mental health, engage in stress-reduction techniques, and seek support when needed can contribute to a more content and resilient workforce (Murray et al., 2011; Wippel, 2023). Lastly, job security and stability are essential factors in job satisfaction. Secure teachers are more likely to invest in their roles, develop long-term career goals, and contribute positively to their student's learning experiences (Warner-Griffin et al., 2018; Windon, 2019).

Research conducted on agriculture teachers in Ohio revealed overall positive job satisfaction levels (Castillo & Cano, 1999; Chenevey et al., 2008). Agriculture teachers in Ohio reported satisfaction with various aspects of their profession, including their work environment, administrative support, and colleague relationships. The presence of supportive colleagues and administrators contributed significantly to their job satisfaction, creating a positive work environment. Furthermore, teachers provided with relevant and meaningful professional development experiences reported higher levels of job satisfaction, as they felt supported in their growth and advancement within agricultural education (Castillo & Cano, 1999; Chenevey et al., 2008).

Similar to Ohio's findings, agriculture teachers in Louisiana reported satisfaction with their current employment (Blackburn et al., 2017). They expressed contentment with their work environment and perceived support from colleagues and administrators. Additionally, their ability to balance work and personal life responsibilities favorably influenced their job satisfaction (Blackburn et al., 2017). These findings from Louisiana

suggest maintaining a positive work-life balance is crucial for teacher job satisfaction and retention. By recognizing the importance of personal well-being and offering support to manage work-life demands, educational institutions can help agriculture teachers maintain their enthusiasm and dedication to the profession. Overall, the studies conducted in Ohio and Louisiana show that factors related to their work environment, professional growth opportunities, compensation, and work-life balance influence job satisfaction among agriculture teachers (Blackburn et al., 2017; Castillo & Cano, 1999; Chenevey et al., 2008).

These factors go hand in hand with another job satisfaction factor —teacher self-efficacy. Teacher self-efficacy refers to teachers' belief in their ability to positively impact student learning outcomes, and effectively manage classroom challenges (Tschannen-Moran et al., 1998). Teacher self-efficacy plays a significant role among agriculture teachers, influencing their confidence, motivation, and overall sense of fulfillment in the teaching profession (Blackburn & Robinson, 2008; Knobloch & Whittington, 2002, 2003; McKim & Velez, 2015). Research consistently shows a positive relationship between teacher efficacy and job satisfaction (Blackburn & Robinson, 2008; Hasselquist et al., 2017). Agriculture teachers who believe in their instructional effectiveness and perceive themselves as capable educators tend to experience higher levels of job satisfaction (Blackburn & Robinson, 2008). Additionally, teacher self-efficacy also influences teaching practices and classroom management. Teachers with high efficacy are likelier to experiment with innovative teaching methods, actively engage students in the learning process, and maintain a positive learning environment

(Poulou et al., 2018). These teaching practices contribute to greater job satisfaction, as teachers experience a sense of accomplishment and fulfillment in their roles.

A supportive work environment that values teacher input and encourages professional growth can also foster teacher efficacy through administrators and colleagues who recognize and affirm teachers' skills and accomplishments (Blackburn & Robinson, 2008). As demonstrated above, this, in turn, leads to higher job satisfaction and commitment to the profession. The main premise is as follows: stress and burnout are significant challenges agriculture teachers face and can harm their job satisfaction and overall well-being. Experiencing high levels of stress and burnout can lead to reduced job satisfaction among agriculture teachers (Chenevey et al., 2008; Smith & Smalley, 2018). As the demands of the profession increase, teachers may feel overwhelmed, leading to a decline in enthusiasm and motivation for their work (Bowling et al., 2022; Clemons et al., 2021a). Thus, supportive work environments and teacher efficacy can mitigate the adverse effects of stress and burnout on job satisfaction. Providing resources for stress management, encouraging work-life balance, and offering counseling or mentorship programs can improve teacher satisfaction and retention.

The research presented in this comprehensive review highlights the significance of job satisfaction in the agricultural education profession and its implications for teacher retention. The previous studies shed light on regional variations in teacher satisfaction and the factors influencing job contentment. These findings emphasize the need for context-specific strategies and support systems to address the unique challenges faced by agriculture teachers in different regions. To ensure the stability and success of agricultural education programs, it is crucial to prioritize the satisfaction and well-being

of agriculture teachers, ultimately impacting student learning outcomes and the overall success of agricultural education programs.

Overview of Teacher Self-Efficacy and Professional Identity

Teacher self-efficacy and professional identity significantly influence the success and commitment of educators in the teaching profession and are interconnected. These factors have garnered notable attention from researchers, policymakers, and educational practitioners due to their profound impact on teachers' job satisfaction, instructional effectiveness, and long-term dedication to the field of education (Shu, 2022).

As conceptualized by Albert Bandura and previously mentioned, teacher self-efficacy refers to teachers' beliefs in their ability to perform specific tasks and responsibilities related to their role as educators. This construct is rooted in social cognitive theory, where individuals' perceived capabilities shape their behaviors and motivation (Bandura, 1997). Self-efficacy influences how teachers approach challenges, set instructional goals, and persist in facing difficulties. When teachers possess high levels of self-efficacy, they are more likely to adopt innovative teaching strategies, take risks in their instructional practices, and remain resilient in the face of setbacks (Tschannen-Moran & Hoy, 2001).

On the other hand, professional identity refers to a teacher's sense of belonging, identification, and commitment to their role as an educator. The term encompasses a teacher's understanding of their professional responsibilities, beliefs about the nature of teaching, and emotional connection to the profession (Beijaard et al., 2000). A strong professional identity is associated with higher job satisfaction, increased engagement in

professional development activities, and greater advocacy for the interests of the teaching profession (Day et al., 2007; Skaalvik & Skaalvik, 2011).

The link between teacher self-efficacy and professional identity is a crucial area of inquiry in educational research. Numerous studies have demonstrated a positive correlation between the two constructs. For instance, teachers with higher levels of self-efficacy tend to have a stronger sense of professional identity, perceiving themselves as capable and effective educators (Ashton & Webb, 1986). Conversely, low self-efficacy can lead to a reduction in teachers' commitment to the profession and, in some cases, even result in them leaving the field of teaching altogether (Dembo & Gibson, 1985).

The significance of teacher self-efficacy and professional identity is even more pronounced in agricultural education. Agriculture teachers play a unique role in education, imparting subject knowledge and guiding students in real-world agricultural practices and leadership development. The diverse responsibilities of agriculture teachers require a strong sense of efficacy and commitment to navigate their multifaceted roles effectively.

Likewise, agriculture teachers often work in rural and agricultural communities, where cultural contexts vary significantly from urban or suburban settings. As a result, novice agricultural teachers may experience culture shock when transitioning to a new community to begin their careers (Hasselquist et al., 2017). This disconnection from their familiar environment can impact their self-efficacy and general well-being, further emphasizing the importance of understanding and supporting their professional identity development.

Teacher Self-Efficacy and Professional Identity in Agricultural Education

In agricultural education, Knobloch and Whittington (2003) found that novice agriculture teachers with a strong sense of self-efficacy were more committed to the teaching profession. This commitment is vital in ensuring teachers remain engaged and dedicated to their students and their chosen field of agricultural education. McKim and Velez (2015) delved deeper into components of teachers' self-efficacy that could predict career commitment in early-career teachers. They found when teachers strongly believed in their abilities to handle various classroom challenges, they were more likely to feel committed to their careers. This highlights the importance of fostering self-efficacy among novice agriculture teachers to ensure their long-term commitment to the agricultural education profession.

The relationship between self-efficacy and professional identity is also of great significance in the teaching profession. As noted, professional identity refers to a teacher's sense of belonging and identification with their role as an educator. When teachers possess a strong professional identity, they are more likely to feel connected to their profession, engage in continuous professional development, and advocate for the interests of their discipline or field (Beijaard et al., 2000). Numerous studies have emphasized the positive correlation between teacher self-efficacy and professional identity. Ashton and Webb (1986) found teachers with higher levels of self-efficacy were more likely to identify themselves as effective educators. Bandura (1997) further emphasizes that a strong sense of self-efficacy is vital for teachers to develop and maintain a professional identity.

Conversely, Dembo and Gibson (1985) found low self-efficacy could reduce teachers' commitment to the profession and, in some cases, even result in them leaving the teaching field altogether. Therefore, investing in strategies to enhance self-efficacy among agricultural education pre-service teachers is crucial for their overall professional identity development and long-term career commitment. Furthermore, it is essential to recognize the potential impact of factors influencing agricultural education teachers' self-efficacy and professional identity. For instance, Herren and Hillison (1996) pointed out that efforts to align agricultural education pre-service teachers closer to subject specialists might make them feel more connected to their teacher roles. This alignment could positively influence their sense of efficacy and professional identity.

Overall, teacher self-efficacy and professional identity play significant roles in the commitment and success of agricultural education teachers. As the agricultural education profession evolves, understanding and addressing the factors influencing self-efficacy and professional identity will be crucial in nurturing a vibrant and dedicated community of educators.

Differences in Self-Efficacy and Professional Identity

Examining the differences in self-efficacy and professional identity between agricultural education and core-content pre-service teachers can provide valuable insights into agriculture teachers' specific needs and challenges. Roberts et al. (2016) highlight the importance of prepared and professional teachers in the agricultural education sector. Addressing any disparities between these two groups can help improve the quality of

agricultural education and enhance the overall teaching experience for educators and students alike.

The research indicates that agricultural education pre-service teachers may experience a slight decrease in professional identity compared to their core content counterparts (Gates et al., 2020). This finding raises important questions about the factors contributing to this difference. One possible explanation could be the nature of agricultural education itself, which often involves additional programmatic roles beyond traditional classroom instruction. The diverse responsibilities of agriculture teachers, such as supervising agricultural projects, managing FFA activities, and organizing community events, might also impact their sense of professional identity (Shoulders & Myers, 2011; Traini et al., 2021). Additionally, a contributing factor could be the sense of belonging within the school culture. In some cases, agricultural education teachers may feel disconnected from the broader educational community due to the specialized nature of their subject area. This lack of connection might affect their perception of themselves as educators within the larger teaching profession (Marx et al., 2017; Rice & Kitchel, 2018). Overall, teachers' experiences in pre-service teacher preparation programs can significantly shape their professional identity and self-efficacy beliefs. Canrinus et al. (2011) suggest that factors such as mentorship, support, and the incorporation of real-world teaching experiences during pre-service training can positively influence professional identity development. It is essential for agricultural education programs to consider these elements to ensure pre-service teachers feel adequately prepared and confident in their abilities as future educators.

Various sociodemographic characteristics can impact the alignment between one's sense of efficacy and professional identity. For example, researchers have found that gender influences career commitment in the teaching profession (Moses et al., 2016). Kelsey (2006) reported female teachers may perceive barriers to longevity in the CTE teaching profession, resulting in lower career commitment than their male counterparts. Understanding these gender differences can help address potential disparities and create a more inclusive and supportive environment for all agricultural education teachers.

It is also crucial to consider the impact of stress on teacher self-efficacy and professional identity, especially in agricultural education. Agriculture teachers often face high stress levels due to the demands of their work and non-work roles, including the challenges of balancing work and family life (Sorensen et al., 2016a). Crutchfield et al. (2013) found a negative relationship between the occupational commitment of agriculture teachers and work interference with family (WIF) and family interference with work (FIW). Thus, providing teachers with training opportunities to manage stress and work-life balance can positively impact their job satisfaction and career commitment.

In short, understanding the differences in professional identity between agricultural education and core content pre-service teachers is crucial for enhancing the quality of agricultural education programs. Addressing agriculture teachers' challenges can improve teacher preparation, job satisfaction, and overall commitment to the profession. By providing adequate support, mentorship, and opportunities for stress management, the agricultural education field can foster a strong sense of self-efficacy and professional identity among educators, ultimately benefiting the students and communities they serve.

Culture Shock and Teacher Self-Efficacy

One critical factor that can significantly impact novice agricultural teachers' self-efficacy and overall well-being is culture shock. Culture shock refers to the psychological disorientation and discomfort experienced by individuals when they move to a new cultural environment that differs significantly from their familiar one (Oberg, 1960). For agricultural education teachers, relocating to a new community to begin their careers can be a significant life transition, exposing them to a different cultural context.

Adjusting to a new community can cause teachers stress and affect their self-efficacy. Research in psychology has shown that feeling disconnected from the community where one lives and works can lead to negative effects, including increased personal stress and a decrease in self-efficacy (Speller & Twigger-Ross, 2009). Novice agricultural teachers may experience occasional negative socio-psychological effects due to the perceived distance or differences compared to their accustomed community (Mumford, 1998). As experienced by novice agricultural teachers in a new community, this sense of culture shock may significantly influence their general well-being and their ability to achieve their teaching goals (Mumford, 1998). This deficit in connection can hinder their integration into the school and community, making it challenging to establish a strong professional identity as an educator. Feeling socially connected and included in the school's culture is crucial for agriculture teachers' success in their new environment. Schools with a strong, supportive culture can positively influence teachers' self-efficacy and professional identity (Peterson & Deal, 2002). Thus, we should foster a sense of belonging and camaraderie among agricultural education teachers within their schools, as this can lead to greater job satisfaction and commitment to the profession.

To mitigate the potential negative effects of culture shock, agricultural education programs, and schools can implement strategies to support novice teachers during their transition to a new community. Mentoring and peer support can help alleviate feelings of isolation and assist new teachers in adapting to their new cultural environment (Heider, 2005). Additionally, offering training and resources focused on cultural competency and understanding diverse communities can equip agricultural teachers with the skills needed to thrive in unfamiliar settings. Understanding the potential impact of culture shock on teachers' self-efficacy and overall well-being can inform school administrators and policymakers about the importance of creating a supportive and inclusive environment.

History and Reasons for Teacher Turnover in SBAE

Despite being a rewarding profession, teaching can take a toll on educators, leading to stress and burnout (Chenevey et al., 2008; Croom, 2003; Kitchel et al., 2012; Myers et al., 2005). Research indicates that teaching is particularly demanding, with responsibilities extending beyond working hours, contributing to a significant exodus of teachers. Haynes (2014) reported approximately half a million teachers move or leave the profession annually, with an alarming 41% of educators exiting within their first five years (Ingersoll et al., 2014). Furthermore, the data revealed a 35% decrease in teachers entering the profession nationwide between 2009 and 2014 across all subjects and grade levels.

The issue of teacher attrition is not new to the SBAE profession, as a scarcity of highly qualified teachers has persisted for over 40 years (Camp et al., 2002; Foster et al.,

2020; Kantrovich, 2010). Despite recognizing this need four decades ago, the recruitment/retention of agriculture teachers remains a critical challenge facing agricultural education, as evidenced by the National Supply and Demand Study (Foster et al., 2023).

The growing list of required skills, including classroom instruction, program management, student relationship management, classroom management, and meeting student needs, likely exacerbates the shortage of SBAE teachers. Literature has proposed that effective agriculture teachers must possess as many as 30, 40, or even 50 distinct characteristics or qualities (Easterly & Myers, 2017; Eck et al., 2019; Roberts et al., 2006; Roberts & Dyer, 2004), adding to the hurdles faced in retaining SBAE teachers.

As mentioned above, SBAE teachers must take on additional responsibilities outside the classroom along with their teaching duties, such as overseeing FFA programs, conducting SAE visits, assisting with award applications, training CDE (Career Development Event) teams, and collaborating with advisory committees. When these tasks spill over into their personal lives or when external factors affect their work, the result can be a disruption of their work-life balance, a change in their job attitudes, and an impact on their life beyond work (Sorensen et al., 2016a; Wilensky, 1960). It is no secret that work-life balance significantly influences teacher retention rates. When teachers feel overwhelmed and unable to maintain a healthy balance between work and personal life, they may become more susceptible to burnout and consider leaving the profession (Sorensen et al., 2014; Sorensen et al., 2016b). Prioritizing work-life balance can, therefore, be conducive to higher teacher retention rates and more stability in the agricultural education workforce, although achieving this balance is clearly a significant

challenge for SBAE teachers, as research in agricultural education highlights (Blackburn et al., 2017; Murray et al., 2011; Sorensen et al., 2016a). Teacher attitudes and emotions toward the profession also play vital roles in whether educators join and remain in the field.

Previous studies have identified 13 factors that influence former SBAE teachers' decisions to enter or leave the profession, including family importance, personal and professional goals, teaching preparedness, effectiveness, youth experiences in agriculture, need for support, role models, a calling to teach, desire to influence youth and society positively, community involvement in FFA activities, and job expectations (Eck et al., 2021; Solomonson et al., 2019; Traini et al., 2021). While researchers have explored the reasons for SBAE teacher attrition, it is important to note many teachers tend to reach a plateau after five years of teaching, which can lead to energy-saving behaviors and complacency (Haddad et al., 2020; Smalley et al., 2019). However, some view this positively, as teachers report increased satisfaction with their careers as time passes, resulting in fewer SBAE teachers leaving the profession after their initial five years (Haddad et al., 2020).

As a whole, teacher turnover presents substantial implications for student performance, educational costs, and the overall teaching profession (Sorensen & Ladd, 2020). Understanding the factors contributing to high teacher turnover and implementing strategies to address them are vital for creating a stable and effective teaching workforce. One of these factors and a primary contributor to teacher attrition is educators' challenging working conditions. Teachers encounter a range of stressors, including heavy

workloads, limited resources, and demanding classroom environments, all of which may lead to burnout, causing experienced teachers to leave the profession (Ingersoll, 2002).

However, recognizing teacher attrition is not uniform across all schools and districts is crucial. Schools in high-poverty areas experience higher turnover rates than those in more affluent neighborhoods (Donaldson & Johnson, 2011). These schools often face additional challenges regarding resource constraints, community issues, and complex student needs (Burney & Beilke, 2008). In high-poverty schools, prioritizing targeted recruitment strategies, improving working conditions, and enhancing professional development opportunities can effectively address attrition. Promoting a positive and supportive school culture is particularly instrumental in retaining teachers. Schools that foster community and collaboration can create a more fulfilling and supportive environment for educators. Recognizing and celebrating teachers' accomplishments can boost morale and job satisfaction, contributing to teacher retention (Ingersoll, 2004).

The perceived value and status of the teaching profession also play crucial roles in teacher attrition rates. Negative media portrayals, societal misconceptions about the teaching occupation, and concerns about job security can deter individuals from pursuing teaching careers or lead experienced teachers to seek alternative career paths (Guarino et al., 2006). Promoting the value of teaching as a noble and rewarding vocation can encourage more individuals to enter and remain in the field.

At a personal level, individual backgrounds and knowledge vary among teachers entering the profession as well. Pre-service teacher preparation can build resilience and efficacy by instilling readiness and confidence, which may contribute to longer tenure in

the profession (Darling-Hammond et al., 2005; Levine, 2002). However, there is limited research in agricultural education examining teacher recruitment and retention based on licensure types and how different preparation programs impact SBAE teacher retention.

Extensive research has pinpointed several factors contributing to teacher turnover, including the demanding workload, stress, and challenges associated with managing multiple expectations (Mundt & Connors, 1999; Myers et al., 2005; Rocca & Washburn, 2006; Torres et al., 2009). The struggle to balance work and non-work obligations and the decision to leave the profession before retirement have also been noted (Murray et al., 2011; Solomonson & Retallick, 2018; Sorensen & McKim, 2014). SBAE teachers leave the profession opportunistically, swayed by more desirable job opportunities, career advancement, family reasons, inadequate compensation, and excessive workload (Lemons et al., 2015; Sorensen et al., 2016b). Common specific stressors associated with SBAE teachers include excessive paperwork, administrative interactions, classroom management, student motivation, discipline problems, program support, facility maintenance, time management concerns, FFA chapter management, and out-of-classroom expectations (Boone & Boone, 2007; Mundt & Connors, 1999; Myers et al., 2005; Solomonson et al., 2018). Other indicators of attrition include low pay, high student-to-teacher ratios, lack of administrative support, low teacher self-efficacy, isolation, lack of mentoring, challenging assignments, and unclear expectations (Anhorn, 2008; Ingersoll & Merrill, 2010; Ingersoll & Smith, 2003; Sorensen et al., 2016b).

Despite efforts to identify and address these issues, the demand for SBAE teachers remains high, with some positions remaining unfilled due to new positions and teacher exits (Sutcher et al., 2016). Addressing SBAE teachers' challenges and providing

support and intervention to improve working conditions and job satisfaction is critical in curbing teacher attrition and ensuring a thriving agricultural education profession.

Chapter Summary

The literature review comprehensively highlights the critical role of PCK in ensuring effective teaching, particularly within SBAE. Despite extensive studies on PCK, its specific application within SBAE remains notably underexplored. PCK, which develops through both formal education and practical experience, is essential for effectively conveying complex concepts to students. Significantly, targeted professional development can enhance PCK, thereby improving teaching efficacy. Continuous professional development not only bridges the gap between theoretical knowledge and real-world classroom challenges but also boosts agricultural educators' self-efficacy, job satisfaction, and overall career satisfaction. Furthermore, the review identifies a gap in the existing research on the combined influence of PCK, professional development, professional identity, and job satisfaction on turnover intentions within SBAE. This aligns with the Four Capital Theory of Teacher Retention, which suggests that human and psychological capital (PCK), structural capital (job satisfaction), and social capital (professional identity) are interdependent and collectively impact teacher retention. Therefore, addressing these interconnected aspects is crucial for reducing teacher turnover and fostering a stable, committed workforce within SBAE programs.

CHAPTER 3

METHODOLOGY

Chapter Overview

In this chapter, the methodological procedures employed will be outlined. The key components discussed include the formulation of research questions, the research design and selection of the population sample, the development of the research instrument, and the methods used for data collection and analysis.

Research Design and Research Objectives

This study employed a quantitative relational research methodology to investigate the interconnections among pedagogical content knowledge (PCK), job satisfaction, and professional identity among school-based agricultural education (SBAE) teachers, considering different certification types. This approach was chosen because it allows for the examination of relationships between variables and can provide statistical evidence to support findings (Creswell & Creswell, 2018). Additionally, quantitative methods are well-suited for studying large populations and can yield generalizable results (Bryman, 2016). Moreover, the research explored the association between PCK and turnover intentions in this group of educators, aiming to provide insights that could inform strategies to enhance teacher retention.

The study's criteria led to selecting an online survey as the distribution approach. This method offered numerous benefits, including accommodating larger sample sizes, simplicity for respondents, and streamlined gathering and analysis of quantitative data (Dillman et al., 2014).

Research Objectives

The following research objectives guided this research:

1. Describe the sample of SBAE teachers by certification type.
2. Describe the PCK and professional development needs of SBAE teachers by certification type.
3. Describe job satisfaction and professional identity of SBAE teachers by certification type.
4. Describe the turnover intentions of SBAE teachers by certification type.
5. Explain the relationship between PCK, job satisfaction, and professional identity among SBAE teachers by certification type.
6. Explain the relationship between job satisfaction, professional identity, and turnover intentions among SBAE teachers by certification type.
7. Explain the relationship between PCK and turnover intentions among SBAE teachers by certification type.

Population and Sample

All certified middle and high school SBAE teachers in the United States and its territories who taught agricultural education courses during the 2023-2024 academic year were included in the study. These individuals were required to be officially listed as SBAE teachers in their state's directories. Information from each state's agricultural education directory was collected to compile a comprehensive list of participants. Cluster sampling was applied to ensure equal representation, organizing SBAE teachers by the National Association of Agricultural Educators (NAAE) region. Then, using random sampling, a state or a series of states from each NAAE region were chosen for the survey. All teachers within these states were invited to participate in the survey.

During the 2022-2023 school year, there were approximately 14,516 SBAE teachers nationwide (Foster et al., 2023). The number of SBAE teachers per NAAE region was as follows: Region I = 2335, Region II = 4131, Region III = 1349, Region IV = 2402, Region V = 2714, and Region VI = 1585. Figure 3 outlines each of the respective regions.

Figure 33

NAAE Region Map

Regarding sample size, Cochran's (1977) formula was used to calculate the target sample size. A 95% confidence interval and a ± 5% margin of error required a target sample size of 385 respondents to ensure generalizability to this population. Therefore, 385 was set as the desired sample size for the study.

Compared to other methods, the comparatively low response rates observed with web-based surveys necessitated an increase in the participant pool beyond the initially suggested sample size of 385 (Saleh & Bista, 2017; Wu et al., 2022). Furthermore, documented response rates for a national sample of SBAE teachers ranging from 20% to 35% (Fraze et al., 2003; McKim, 2016; Sorensen, 2015) reinforced the need for a larger pool of participants. When implementing oversampling techniques, starting with the

original sample size and estimating the response rate based on prior research is advisable (Johnson & Christensen, 2017). For this specific study, with an initial sample size of 385 and assuming a potential 20% response rate, the sample size for conducting an online survey was revised and recommended to be 1,925. Compared to the overall count of SBAE teachers across the country (14,516), Region I accounted for 16.1% of the total. Therefore, the survey needed to be distributed to 310 SBAE teachers within this region. Table 1 outlines the number of teachers and the number of surveys intended to be distributed by region.

Table 1

Survey Distribution among SBAE Teachers by NAAE Region

Region	Number of Teachers		Number of Distributed Surveys
	f	%	*f*
Region I	2335	16.1	310
Region II	4131	28.5	548
Region III	1349	9.3	179
Region IV	2402	16.5	318
Region V	2714	18.7	360
Region VI	1585	10.9	210

Description of the Survey Instrument

The survey instrument (Appendix C) was designed to meet the research objectives and evaluate SBAE teachers' perceived PCK across six distinct areas. Additionally, the instrument assessed teachers' perceived professional development needs, professional identity, current job satisfaction level, and their likelihood of leaving the profession. In total, the survey consisted of 62 items, comprising six constructs. Based on prior research (Blackburn et al., 2017; Rice & Kitchel, 2015; Sorensen, 2015; Starr et al., 2006; Tonnessen, 2021), the survey items addressed the various challenges SBAE teachers face, both holistically and individually, according to their certification type. The survey was administered online using Qualtrics.

Development of the Survey Instrument

The study drew upon existing literature to shape the construction of the survey tool. Valid and reliable published instruments were adapted to suit the particular requirements of the study. Several components of the survey instrument underwent adjustments based on items featured in the works of Blackburn et al. (2017), Sorensen (2015), Starr et al. (2006), and Tonnessen (2021) alongside items I developed.

The survey instrument used in the Tonnessen (2021) study was a modified version of the instrument created by Rice and Kitchel (2015). In the research conducted by Rice and Kitchel (2015), the authors examined the relationship between Agriculture Knowledge Bases for Teaching and Sources of Knowledge. Tonnessen (2021) applied the

instrument to assess the differences in content and PCK of traditionally certified (TC) and alternatively certified (AC) SBAE teachers. I adapted the instrument, extrapolating items only on PCK.

Blackburn et al. (2017) designed the survey tool used in their research to explore the relationship between teacher self-efficacy, job satisfaction, and perceptions of work-life balance among Louisiana SBAE teachers. They derived the components of job satisfaction from the Brayfield-Rothe Job Satisfaction Index (Brayfield & Rothe, 1951), a comprehensive instrument consisting of fourteen items designed to measure job satisfaction levels. For this study, I tailored the instrument to focus exclusively on aspects related to job satisfaction, selecting relevant items for inclusion. The survey's framework included ten carefully selected items to assess job satisfaction.

The survey tool, originally crafted by Starr et al. (2006), focused on evaluating the professional identities of physicians, capturing various facets of their roles and self-perception within the medical field. Recognizing the potential applicability of this framework to the present research on SBAE teachers, the instrument was adapted to suit the unique aims and context of the current study. This adaptation process involved modifying the survey's content and structure to ensure it effectively measures the professional identities of SBAE teachers, focusing on aspects such as self-perception as a teacher, the importance of the teaching profession, skill development, community belonging, and support from colleagues and administration. This tailored approach ensures that the survey accurately captures the specific nuances relevant to the professional identities of the target population within the scope of agricultural education.

Lastly, the instrument Sorensen (2015) used helped develop the construct for turnover intentions. In their study, Sorensen (2015) assessed SBAE teachers' work and

family domain characteristics, work-family conflict, and turnover intentions. Their instrument was developed using the 2011-2012 School Staffing Survey (NCES, 2014), the 2012-2013 Teacher Follow-up Survey (NCES, 2014), and the attrition risk assessment instrument (Lemons, 2013). Overall, I used most of the same questions on turnover intentions when developing the instrument for this research. Slight changes occurred to fit the instrument to the study parameter. The Likert scale was employed to maintain consistency across the instrument when developing these items.

In the professional development section of the survey, I opted for an open-ended question approach to accurately ascertain the professional development needs of our teachers. This method was deliberately chosen, allowing participants to articulate their unique needs and preferences in their own words. I believed that by doing so, teachers would not feel constrained or limited to selecting from a predefined set of options, which might not fully capture the breadth of their professional development requirements. The design of this open-ended question aimed to yield a deeper insight into what teachers feel will best support their professional growth and development.

Measures

Teacher Demographics

The survey tool included a section on personal demographics, capturing information on the teachers' gender and age. Additionally, it featured questions on professional characteristics, such as the number of years they had been teaching and the state in which they were currently teaching. The survey also included a specific question

to distinguish between traditional and alternative teaching credentials based on the type of certification. The respondents had to identify their pathway to certification from a given set of options: "1 = Completed a teacher preparation program in agriculture/ag education at a university, 2 = Completed a teacher preparation program in a content area other than agriculture/ag education at a university, 3 = Obtained certification in agriculture/ag education through an alternative licensing program, 4 = Holding an emergency certificate, 5 = Other." The certification question was then coded into a binary variable for the analysis, assigning "1" for traditionally certified and "0" for alternatively certified teachers.

Pedagogical Content Knowledge

Eighteen items comprised the PCK construct, measuring teachers' perceived PCK. PCK levels were determined based on six distinct expertise areas, as Hill et al. (2008) outlined. The PCK constructs encompassed the following facets: (a) Horizon Content Knowledge, (b) Common Content Knowledge, (c) Specialized Content Knowledge, (d) Knowledge of Content and Teaching, (e) Knowledge of Content and Students, and (f) Knowledge of Content and Curriculum (Table 2).

Table 2

Series of Knowledge Construct Statements

Knowledge Construct	Aligned Statement
Common Content Knowledge	"When given information, I can easily discern accurate from inaccurate information." "I am able to easily identify when a student gives an incorrect answer when teaching.
Specialized Content Knowledge	"When presented with a problem, I can find multiple ways to get an answer." "When a student makes an error, I can accurately interpret why that error was made."
Horizon Content Knowledge	"I can easily explain why a student answer is incorrect." "I can explain how this unit links to core content areas." "I can explain how this unit links to other units within agriculture."
Knowledge of Content and Students	"I am able to easily predict student misconceptions." "I know where my students should be developmentally." "I can easily predict what concepts will be most challenging for my students."
Knowledge of Content and Teaching	"I can easily explain the definitions of commonly used terms in the unit." "I am able to easily explain the process behind various concepts." "I can identify advantages and disadvantages of instructional strategies." "I can utilize questioning techniques to enhance student learning." "When a student makes a remark, I know when to effectively use it to make a point in my instruction."
Knowledge of Content and Curriculum	"I am able to fluidly sequence my material." "I am able to easily locate outside resources to aid in my teaching." "Curriculum design comes easy to me."

Horizon Content Knowledge (HCK) signifies a teacher's proficiency in forging connections across subjects beyond their specific domain (Rice & Kitchel, 2015). Common Content Knowledge (CCK) pertains to a teacher's aptitude for recognizing and

addressing incorrect responses from students (Rice & Kitchel, 2015). Aligned with CCK, Specialized Content Knowledge (SCK) encompasses a teacher's capability to elucidate the rationale behind incorrect answers. Knowledge of Content and Teaching (KCT) involves a teacher's skill in employing strategic questioning techniques to enhance student comprehension of educational concepts (Rice & Kitchel, 2015). Knowledge of Content and Students (KCS) relates to a teacher's ability to foresee challenging concepts, gauge students' developmental stages, and provide appropriate support. Lastly, Knowledge of Content and Curriculum (KCC) pertains to the arrangement of learning activities and how a teacher scaffolds lessons (Rice & Kitchel, 2015).

The survey asked participants to read each statement and indicate their level of agreement with each listed item. Participants were to base their assessment on a course they were currently teaching. The items on the survey utilized a 5-point Likert scale for evaluation (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5 = *Strongly Agree*).

Professional Development Needs

The survey's professional development section included a single open-ended question to pinpoint teachers' specific professional development needs. This approach enabled participants to articulate their individual needs in their own words without the constraints of predefined options. The responses to this question were thematically coded. This method categorizes data into themes based on recurring patterns or concepts within the responses, thereby enabling a deeper understanding of the diverse professional development needs expressed by the participants.

Job Satisfaction

Items from Blackburn et al. (2017), which were previously adapted from the Brayfield and Rothe (1951) Job Satisfaction Index (JSI), comprised this construct. The construct was comprised of ten statements on job satisfaction. The ten statements were: (a) "My friends seem more interested in their jobs than I am," (b) "I am often bored with my job," (c) "I feel satisfied with my job," (d) "most of the time, I have to force myself to go to work," (e) "I definitely dislike my work," (f) "I feel happier in my work than most other people," (g) "each day of work seems like it will never end," (h) "I like my job better than the average worker does," (i) "I find real enjoyment in my work," and (j) "I am disappointed that I took this job." A 5-point Likert scale measured these items (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5 = *Strongly Agree*).

Professional Identity

A construct adapted from Starr et al. (2006) assessed teachers' professional identity. I modified the original instrument to make it applicable to SBAE teachers. The construct was comprised of thirteen statements about professional identity. The statements were: (a) "I see myself as a teacher," (b) "I would miss teaching if I stopped doing it," (c) "It is important for me to work in the teaching profession," (d) "I feel skilled as a teacher," (e) "It is important for me to develop my teaching skills," (f) "Students and colleagues view me as an effective teacher," (g) "I belong to a community of teachers," (h) I know very few SBAE teachers in the profession, (i) "I frequently talk to colleagues about teaching," (j) "I have developed personal relationships with other SBAE teachers in the profession," (k) "I have developed personal relationships with other teachers in my

school," (l) "I feel that agricultural education state staff support my efforts as an agriculture teacher," and (m) "I feel that my building/district administration support my efforts as an agriculture teacher." A 5-point Likert scale measured these items (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5 = *Strongly Agree*).

Turnover Intentions

A construct adapted from Sorensen (2015) assessed the turnover intentions among SBAE teachers. While adapted from Sorensen (2015), the construct mirrors other literature in the *Journal of Agricultural Education* for why SBAE teachers leave the profession. Some of these reasons include retirement, career changes, better job opportunities, dissatisfaction with the job, excessive workload, a lack of support, poor compensation, a poor work environment, a desire to pursue higher education, and family or personal reasons (Castillo & Cano, 1999; Igo & Perry, 2019; Lemons et al., 2015; Sorensen et al., 2016b). The construct was comprised of twenty statements. A 5-point Likert scale measured these items (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5= *Strongly Agree*).

Pilot Test

SBAE teachers in Delaware, Maryland, and Virginia who were actively teaching during the 2023-2024 school year participated in a pilot test. I obtained the names and contact information of all SBAE teachers from each state's agriculture teacher directory. I determined a target sample size of 59 participants, following the recommendation of

Viechtbauer et al. (2015). I employed random sampling methods to select participants. Responses from these teachers were excluded from the broader research, as SBAE teachers in other states were also asked to participate. I administered the survey instrument and collected data in September and October of 2023 using the online program Qualtrics. Participants provided feedback on the ease of navigating the survey and the time it took to complete. Additionally, I conducted reliability tests on all constructs.

SBAE teachers from Delaware, Maryland, and Virginia participated in the pilot study, eliciting 74 usable responses. Participants also provided feedback on the time the survey took, the readability of the questions, and the ease of navigating the survey. The reliability tests on all constructs from the pilot data exceeded the alpha of .70, as recommended by Nunnally and Bernstein (1994; Table 3). The broader research did not include the responses from the SBAE teachers who participated in the pilot study.

Table 3

Pilot Study Construct Reliability Estimates of the Survey Instrument

Instrument Construct	Cronbach's α Pilot
Job Satisfaction	.91
Professional Identity	.80
Turnover Intentions	.93

Note: n = 74

Reliability and Validity

The instrument was reviewed by a panel of experts comprised of master-level professionals, doctoral students in career and technical education, professors in career and technical education, and agricultural educators to confirm its content and face validity.

Published research (Blackburn et al., 2017; Rice & Kitchel, 2015; Sorensen, 2015; Starr et al., 2006; Tonnessen, 2021) using similar instruments and constructs, which include reported reliability measures, guided the construction of the instrument. The Four Capital Theory of Teacher Retention (Mason & Matas, 2015) also directed the instrument's construction.

Data Collection

Once the number of SBAE teachers to receive the survey was determined for each region or cluster, I used the NAAE region map to randomly select specific states per region for survey distribution. This selection process aimed to maintain proximity to the total teacher count for each region. Next, I sourced the names and email addresses of all SBAE teachers from each state's agriculture teacher directory and conducted an attempted census of all SBAE teachers in the selected states. The study's participant pool encompassed teachers from the following states: Alaska (n = 5), Arizona (n = 112), Colorado (n = 163), Indiana (n = 355), Louisiana (n = 300), Montana (n = 127), Nebraska (n = 248), New Hampshire (n = 25), New Jersey (n = 64), New Mexico (n = 133), South Carolina (n = 163), Tennessee (n = 413), Utah (n = 175), and West Virginia (n = 110).

I administered the survey instrument and collected data from November to December 2023 using the online survey program Qualtrics. This program allowed participants to complete the survey online and enabled data to be collected and downloaded for analysis. Utilizing principles from Dillman's (2007) Tailored Design Method, I made three points of contact with the participants to elicit responses. Participants received their first contact through an email introducing them to the study and inviting them to participate. The email also contained the link to access the survey. Approximately seven days after the first email, I sent a follow-up email. This email served as a reminder for the participants and an opportunity to thank the participants who completed the survey. The third and final email was sent seven additional days or two weeks after the first email. This email served as a final reminder for participants to complete the survey and an opportunity to thank the participants who completed it.

I made every effort to reduce errors associated with survey research. This encompassed addressing issues stemming from the population frame and the individuals within the sample who participated in the survey. The goal was to decrease coverage and sampling errors through a thorough approach.

I also focused heavily on developing a survey tool to minimize potential nonresponse and measurement errors. This was accomplished by promoting positive engagement with respondents. The interaction aimed to motivate participation by highlighting the personal and professional benefits of participating in the survey, suggesting that the rewards of involvement surpass any potential drawbacks (Dillman et al., 2014).

The population parameters were all SBAE teachers in the United States and its territories who were actively teaching at least one agricultural education class during the

2023-2024 school year. The survey included two questions for the respondents before beginning the survey. The first question was their agreement to participate in the survey. The second question asked, "As of the 2023-2024 school year, are you a school-based agricultural educator (teach at least one agriculture class)?". If participants answered no to either question, the online survey would automatically send them to the *thank you* page at the end of the survey.

Human Subjects Approval and Confidentiality

Before beginning data collection, a comprehensive application detailing the data collection procedures, including participant invitation letters, all email content, and the survey tool, was necessary to the Institutional Review Board (IRB) at Utah State University. It was also important to maintain strict adherence to IRB guidelines to uphold ethical research standards and safeguard participants' privacy and responses A password-protected Box.com file securely stores all digital data.

Data Analysis

Upon collection, data were loaded into Qualtrics™ and analyzed using Statistical Package for Social Science (SPSS). I then reviewed the data for abnormalities and missing entries.

Data Transformation

The raw data within SPSS underwent a transformation process tailored to meet the analysis needs of this study. This included performing frequency counts for all variables and accurately coding any missing data to exclude it from the analysis. Variables needing modification were recoded to facilitate the required analyses. After checking for reliability to ensure the constructs were correct and okay to average, I calculated the means of individual items and aggregated them to form constructs, generating the construct variables (Field, 2018). I also modified the variables for appropriate analysis using dummy coding techniques (Field, 2018; Vaske, 2008). These data transformations were all executed in SPSS and saved in a working file, separate from the original raw data.

Statistical Assumptions

Before the analysis, I examined the statistical assumptions of the dataset to determine their suitability for conducting parametric analyses and regression modeling. This step ensures that the data is free from bias and aligns with the required statistical prerequisites, guaranteeing the validity of the subsequent analysis. To achieve this, an assessment was carried out, encompassing tests for multicollinearity (as recommended by Hair et al., 2010), which checks for overly high correlations between independent variables that could distort the results. Additionally, I conducted evaluations for homoscedasticity to verify that the data's variance remains constant across the range of values, along with tests for heteroscedasticity to ensure that the variance is not spread differently across a range of data, thereby avoiding potential estimation biases (Field,

2018). The analysis also included an examination of skewness, which assesses the symmetry of the data distribution to confirm its normality (Tabachnick & Fidell, 2013).

Following these tests, the data were determined to adhere to the assumptions of statistical analysis, namely linearity, homogeneity, and independence. Linearity ensures the correct specification of the relationship between variables; homogeneity confirms the data points exhibit consistent variance across the dataset; independence verifies the observations in the dataset do not influence each other (Cohen et al., 2013). The adherence to these assumptions, as affirmed by the thorough preliminary checks, validates the robustness and reliability of the statistical analysis. This approach to verifying statistical assumptions emphasizes the integrity of the research findings and aligns with best practices in data analysis, according to Field (2018).

Employing descriptive statistics addressed Research Objective 1 by detailing the participants' personal and professional characteristics Similarly, descriptive statistics offered insights into Research Objectives 3 through 5, as Table 2 outlines. I applied regression analysis for Research Objectives 6 and 7 to explore underlying relationships. Although descriptive statistics also informed Research Objective 2, this measure was excluded from analysis because it had undergone prior piloting, confirming its reliability.

For Objective 2, the analysis involved aligning the eighteen PCK statements with one of six designated construct areas. I aggregated these statements within each construct area and then combined the totals from all six construct areas to formulate a comprehensive PCK variable. A similar process was employed for Objectives 3-5, creating consolidated variables for job satisfaction, professional identity, and turnover intentions.

For Objectives 6 and 7, the study utilized these variables to perform Ordinary Least Squares (OLS) regression analysis, aiming to explore the relationships between teacher demographics and the key constructs of the study: PCK, job satisfaction, professional identity, and turnover intentions. The regression analysis provided predicted values for the dependent variable, influenced by each independent variable. It also offered coefficients indicating the anticipated change in the dependent variable resulting from a one-unit alteration in any independent variable.

Analysis of Research Objectives

Research Objective One

Describe the sample of SBAE teachers by certification type. The sample of SBAE teachers was described using descriptive statistics, which included demographic information and their certification path. Frequency, percentages, means, and standard deviations were used to present the findings.

Research Objective Two

Describe the PCK and professional development needs of SBAE teachers by certification type. Eighteen items comprised the PCK construct, each measured on a 5-point Likert scale (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5 = *Strongly Agree*). Descriptive statistics were reported, including each item's means and standard deviations An independent samples *t*-test was then used to compare the results by certification type. For the professional development construct, participants answered an open-ended question on their professional development need areas. I also used

descriptive statistics, reporting frequency, and percentages, comparing the results by certification type.

Research Objective Three

Describe the job satisfaction and professional identity of SBAE teachers by certification type. Ten items comprised the job satisfaction construct, each measured on a 5-point Likert scale (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5 = *Strongly Agree*). I reported the descriptive statistics, including means and standard deviations for each item. Next, an independent samples *t*-test was used to compare the results by certification type.

Additionally, thirteen items comprised the professional identity construct, each measured on a 5-point Likert scale (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5 = *Strongly Agree*). Similarly, descriptive statistics, including means and standard deviations for each item, were reported. An independent samples *t*-test was used to compare the results by certification type.

Research Objective Four

Describe the turnover intentions of SBAE teachers by certification type. Twenty items measured the turnover intentions of SBAE teachers on a 5-point Likert scale (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, 5 = *Strongly Agree*). I reported the descriptive statistics, including means and standard deviations for each item. Next, an independent samples *t*-test was used to compare the results by certification type.

Research Objective Five

Explain the relationship between PCK, job satisfaction, and professional identity among SBAE teachers by certification type. For this objective, an OLS regression determined the relationship between PCK and job satisfaction and PCK and professional identity by certification type. In this analysis, PCK was the independent variable, with job satisfaction and professional identity as the dependent variables.

Research Objective Six

Explain the relationship between job satisfaction, professional identity, and turnover intentions among SBAE teachers by certification type. For this objective, an OLS regression determined the relationship between job satisfaction and turnover intentions and professional identity and turnover intentions by certification type. In this analysis, job satisfaction and professional identity were the independent variables, with turnover intentions as the dependent variable.

Research Objective Seven

Explain the relationship between PCK and turnover intentions among SBAE teachers by certification type. An OLS regression determined the relationship between PCK and turnover intentions by certification type for this objective. In this analysis, PCK was the independent variable, with turnover intentions as the dependent variable.

Chapter Summary

The chapter outlines the methodological procedures employed in the study, covering the formulation of research questions, research design, selection of the population sample, development of the research instrument, and the methods used for data collection and analysis. The study utilized a quantitative relational research methodology to explore the interconnections among PCK, job satisfaction, and professional identity among SBAE teachers, taking into account different certification types. This methodology was selected for its ability to examine relationships between variables and provide statistical evidence to support findings, as noted by Creswell and Creswell (2018). Additionally, quantitative methods are particularly effective for studying large populations and producing generalizable results, according to Bryman (2016). The research also investigated the association between PCK and turnover intentions among SBAE teachers, with the aim of providing insights that could help develop strategies to enhance teacher retention.

The study's criteria led to the selection of an online survey as the distribution method, offering numerous benefits such as accommodating larger sample sizes, ease of use for respondents, and streamlined data collection and analysis processes. The chapter details how the survey instrument was designed to meet the research objectives and evaluate SBAE teachers' perceived PCK across six distinct areas. Additionally, the survey assessed teachers' professional development needs, professional identity, current job satisfaction levels, and their likelihood of leaving the profession. The survey, administered via Qualtrics, included 62 items across various constructs, adapting

components from existing literature to ensure validity and reliability. The chapter concludes by describing the data analysis procedures, including the use of SPSS for statistical analysis, ensuring the data's suitability for parametric analyses and regression modeling.

CHAPTER 4

RESEARCH FINDINGS

Chapter Overview

This chapter provides the findings and analysis of the quantitative data collected in this research study. Each research objective is presented with specific information, accompanied by relevant tables and figures for clarity and illustration. The primary aim of this study was to delineate the pedagogical content knowledge (PCK), professional development needs, job satisfaction, professional identity, and turnover intentions of school-based agricultural education (SBAE) teachers based on their preparation pathway and to investigate the interconnections among these variables. The subsequent research objectives guided the research:

1. Describe the sample of SBAE teachers by certification type.
2. Describe the PCK and professional development needs of SBAE teachers by certification type.
3. Describe job satisfaction and professional identity of SBAE teachers by certification type.
4. Describe the turnover intentions of SBAE teachers by certification type.
5. Explain the relationship between PCK, job satisfaction, and professional identity among SBAE teachers by certification type.
6. Explain the relationship between job satisfaction, professional identity, and turnover intentions among SBAE teachers by certification type.

7. Explain the relationship between PCK and turnover intentions among SBAE teachers by certification type.

This research focused on certified secondary SBAE teachers across the United States who taught agricultural education courses during the 2023-24 academic year. The study categorized SBAE teachers by the National Association of Agricultural Educators (NAAE) regions using cluster sampling to ensure equal representation The study then employed random sampling, selecting a state or series of states from each NAAE region for the survey. The study allowed all teachers from within the randomly selected states to complete the survey.

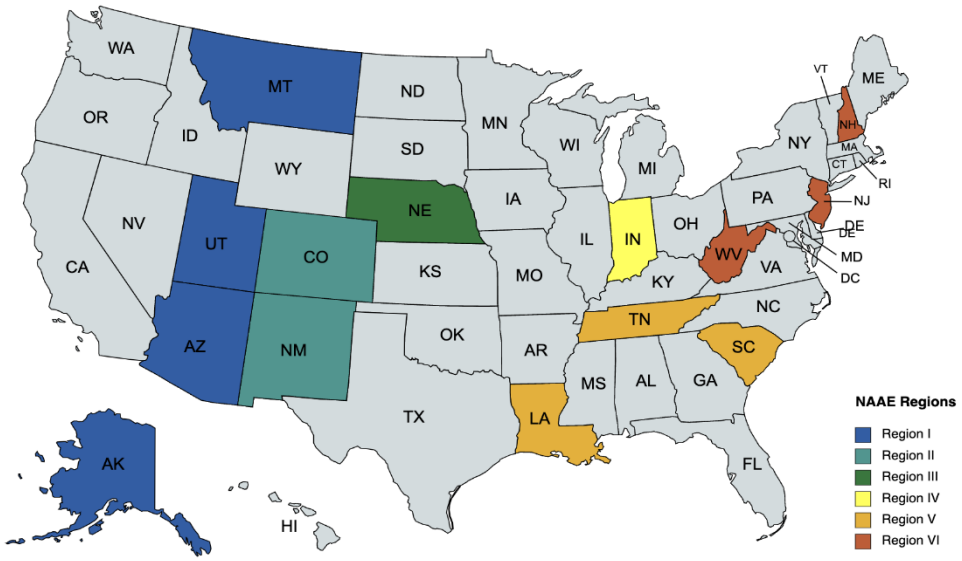
Research Objective One

The first research objective was to describe the sample of SBAE teachers. In this study, I divided participants into two groups: traditionally certified (TC) teachers and alternatively certified (AC) teachers. The TC group comprised individuals who had acquired licensure via a traditional four-year preparation program within a school of education. The study placed those who hadn't gained licensure through a traditional four-year program in agricultural education or another field in the AC category. This latter group encompassed individuals who had obtained licensure through alternative routes, those who had not fulfilled the licensure requirements, or those who self-identified as having gained licensure through a different method.

A total of 470 individuals participated in this study, representing fourteen states (Figure 4).

Figure 49

Surveyed States by NAAE Region



Among the educators surveyed, 67.2% (n = 316) identified themselves as TC teachers, with 57.6% female and 42.4% male. TC teachers' ages ranged from 22 to 70 years (M = 38.46, SD = 12.65) (Figure 5), and their teaching experience varied from 1 to 48 years (M = 15.01, SD = 10.71) (Figure 7). The TC cohort represented fourteen states, with Nebraska, Indiana, Utah, and South Carolina having the highest participation rates across the surveyed educators. Regarding NAAE regions, 25.3% of TC teachers were from Region I (n = 80), 16.1% from Region II (n = 51), 18.0% from Region III (n = 57),

11.4% from Region IV (n = 36), 21.0% from Region V (n = 66), and the remaining 8.2% from Region VI (n = 26).

As for AC teachers, 32.8% (n = 154) identified as such, with 56.5% female, 42.8% male, and the remaining 0.7% identifying as non-binary. The age range for AC educators ranged from 23 to 65 years (M = 42.09, SD = 10.41) (Figure 6), and their teaching experience spanned from 1 to 28 years (M = 10.10, SD = 7.55) (Figure 8). The AC cohort represented fourteen states, with Tennessee, Colorado, and Utah having the highest participation rates. When examining NAAE regions, 22.7% of AC teachers were from Region I (n = 35), 23.4% from Region II (n = 36), 7.8% from Region III (n = 12), 8.45% from Region IV (n = 13), 29.2% from Region V (n = 45), and the remaining 8.45% from Region VI (n = 13). Table 4 outlines the surveyed states by certification type.

Figure 65

Participant Ages among the Traditionally Certified Cohort

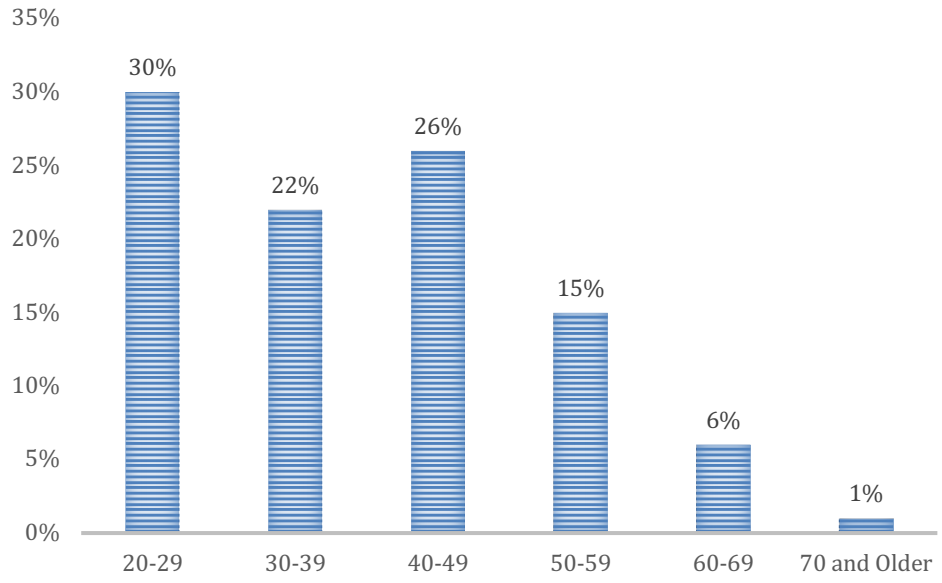


Figure 81

Participant Ages among the Alternatively Certified Cohort

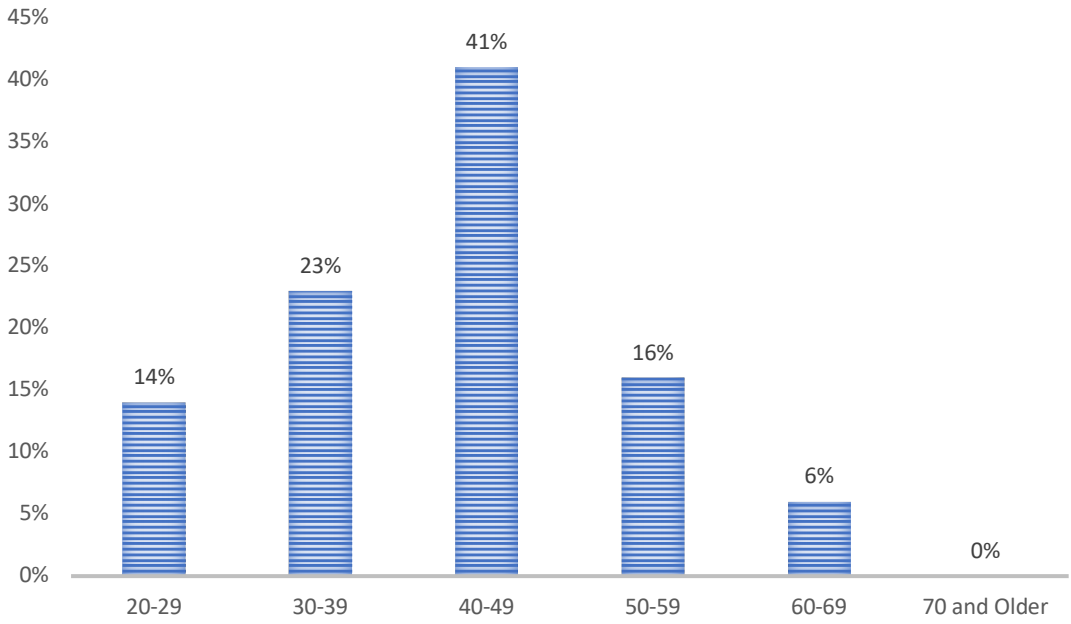


Figure 97

Years of Teaching Experience among Traditionally Certified SBAE Teachers

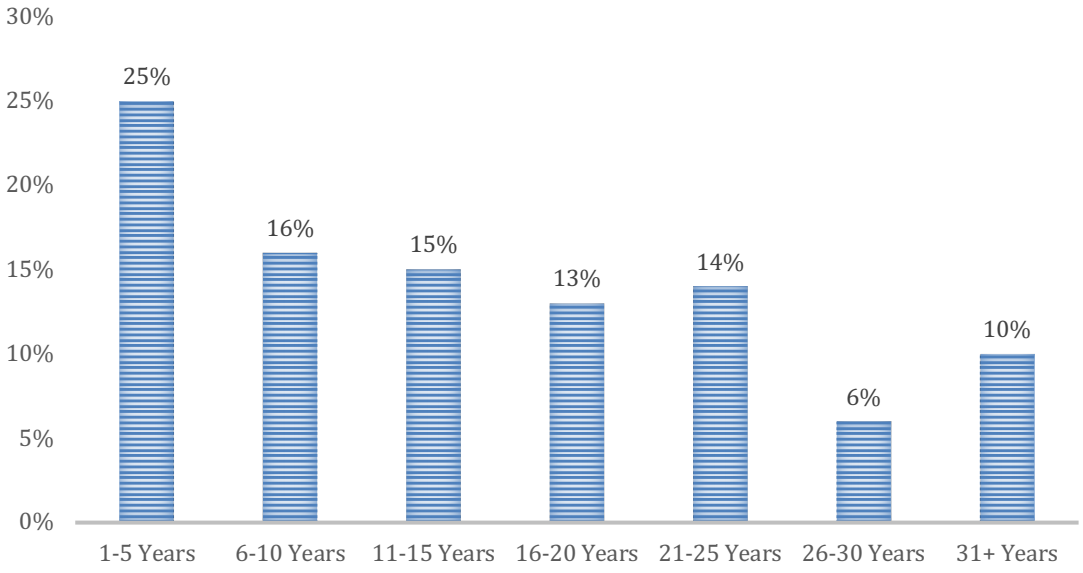
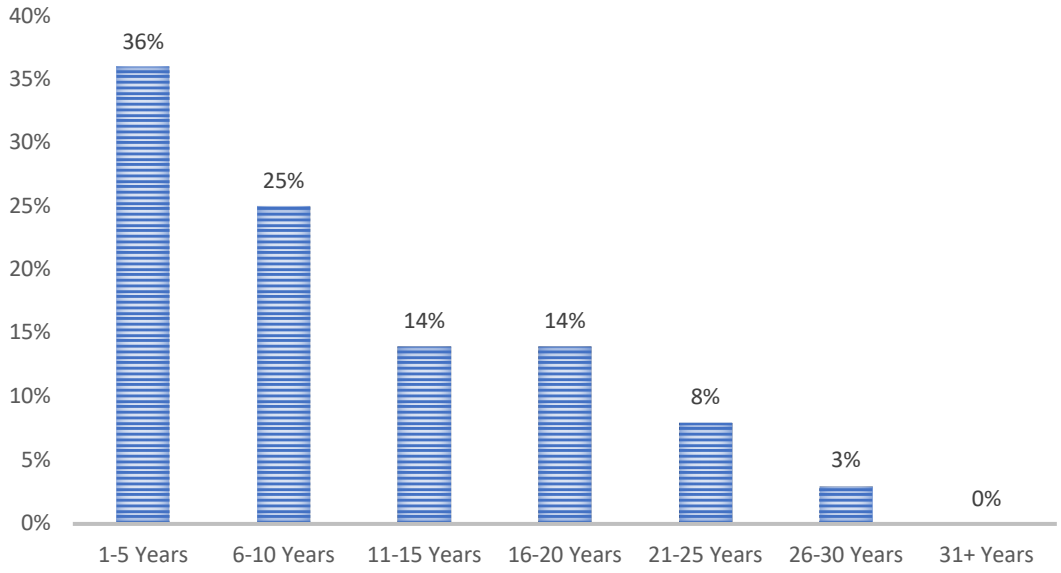


Figure 113

Years of Teaching Experience among Alternatively Certified SBAE Teachers



Regarding certification type, there is limited research specifying the number of SBAE teachers who hold traditional versus alternative certification. The National Center for Education Statistics (2018) reported that during the 2015-2016 school year, an average of 18% of all public school teachers entered the teaching profession through an alternative route. Specifically, in SBAE, Foster et al. (2020) found that 16.5% of first-year agriculture teachers were certified through an AC program. It is important to note that definitions of AC can vary significantly between states and districts, potentially influencing these figures. With the rapid growth of AC in SBAE, it is reasonable to believe that the number of TC and AC teachers surveyed in this study is representative of SBAE teachers across the United States. Table 4 outlines the surveyed states by certification type.

Table 4

Surveyed States by Certification Type

State	TC		AC	
	f	%	*f*	%
Alaska	3	0.9	3	2.0
Arizona	19	6.0	9	5.8
Colorado	29	9.2	22	14.3
Indiana	36	11.4	13	8.4
Louisiana	16	5.1	14	9.1
Montana	27	8.5	8	5.2
Nebraska	57	18.0	12	7.8
New Hampshire	4	1.3	4	2.6
New Jersey	7	2.2	5	3.3
New Mexico	22	7.0	14	9.1
South Carolina	31	9.8	9	5.8
Tennessee	19	6.0	22	14.3
Utah	31	9.8	15	9.7
West Virginia	15	4.8	4	2.6

Note: Traditionally Certified (n = 316), Alternatively Certified (n = 154)

Research Objective Two

The second research objective was to describe the PCK and professional development needs of SBAE teachers by certification type. For this objective,

participants answered a series of statements linked to one of six PCK areas. Based on the responses of the participants, it was found that Horizon Content Knowledge (HCK) was the highest-rated dimension among both TC and AC teachers. Specialized Content Knowledge (SCK) was significantly higher among AC teachers than TC teachers. Overall, AC teachers scored higher in every dimension of PCK compared to TC teachers. These findings are detailed in Table 5.

Table 5

Perceived PCK of TC (n = 316) and AC (n = 154) SBAE Teachers by Construct

	TC		AC			
Knowledge Construct	*M*	*SD*	*M*	*SD*	*t*	*p*-value
Common Content Knowledge (CCK)	4.35	0.71	4.46	0.53	1.70	.092
Specialized Content Knowledge (SCK)	4.19	0.66	4.32	0.54	2.12	.034
Horizon Content Knowledge (HCK)	4.47	0.71	4.53	0.57	0.91	.361
Knowledge of Content and Students (KCS)	3.95	0.74	3.97	0.76	0.27	.707
Knowledge of Content and Teaching (KCT)	4.22	0.67	4.33	0.56	1.76	.090
Knowledge of Content and Curriculum (KCC)	3.79	0.88	3.74	0.96	0.56	.573

Note. For observed means, 1 = Novice; 2 = Developing; 3 = Average; 4 = Proficient; 5 = Mastery
* $p < 0.05$

To consolidate the findings, I amalgamated the six PCK areas into a single PCK variable, as presented in Table 6. The PCK construct variable substantiates the previously mentioned results, indicating no significant statistical difference between the two groups.

Furthermore, the constructed variable exhibited a *p*-value of .339 and a medium to large effect size from Cohen's *d* post hoc analysis ($d = 0.58$) (Table 6).

Table 6

PCK of SBAE Teachers by Certification Type

	TC		AC				
Construct Variable	*M*	*SD*	*M*	*SD*	*t*	*p*-value	Cohen's *d*
Pedagogical Content Knowledge	4.16	0.61	4.21	0.53	-.959	.339	0.58

Note: For observed means, 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree
* $p < 0.05$

Additionally, the second research objective sought to describe the professional development needs of TC and AC teachers. As outlined in Table 7, TC teachers reported the top professional development needs in the areas of Content-Specific Topics, National FFA Organization (FFA), Technology, Curriculum Development, and Time Management/Work-Life Balance.

Table 7

Professional Development Needs of TC SBAE Teachers

Professional Development Area	*Rank*	*f*	%
Content-Specific Topics (Ex. Ag Mechanics, Greenhouse Management, Aquaponics, etc.)	1	71	21.7
FFA (Ex. Degrees, CDEs, etc.)	2	45	13.7
Technology (Ex. Integrating technology in the classroom, virtual teaching)	3	40	12.2
Curriculum Development	4	36	11.0
Time Management/Work-Life Balance	5	35	10.7
SAE & AET (Ex. Navigating the AET website, managing student SAEs, etc.)	6	32	9.8
Classroom Management/Student Engagement	7	29	8.8
Instructional Strategies	8	18	5.5
Retirement	9	8	2.4
Funding (Ex. Writing grants, Permissible use of federal grants, etc.)	10	5	1.5
Administration (e.g., teaching administration about the SBAE program)	11	4	1.2
Supporting Students (Ex. Special Education, Social-Emotional Learning, etc.)	12	3	0.9
Work-Based/Project-Based Learning	13	2	0.6

On the contrary, AC teachers reported Curriculum Development, Content-Specific Topics, Technology, Classroom Management/Student Engagement, and FFA as the areas of greatest need (Table 8). While both groups of teachers reported needing professional development in similar areas, TC teachers placed greater emphasis on the areas of Content-Specific Topics, FFA, and Time Management/Work-Life Balance. In

contrast, AC teachers emphasized the areas of Curriculum Development and Classroom Management/Student Engagement.

Table 8

Professional Development Needs of AC SBAE Teachers

Professional Development Area	*Rank*	*f*	%
Curriculum Development	1	20	19.0
Content-Specific Topics (Ex. Ag Mechanics, Greenhouse Management, Aquaponics, etc.)	2	18	17.1
Technology (Ex. Integrating technology in the classroom, virtual teaching)	3	16	15.2
Classroom Management/Student Engagement	4	13	12.4
FFA (Ex. Degrees, CDEs, etc.)	5	10	9.5
Time Management/Work-Life Balance	6	9	8.6
SAE & AET (Ex. Navigating the AET website, managing student SAEs, etc.)	7	7	6.7
Instructional Strategies	8	4	3.8
Supporting Students (Ex. Special Education, Social-Emotional Learning, etc.)	9	3	2.9
Funding (Ex. Writing grants, Permissible use of federal grants, etc).	10	2	1.9
Work-Based/Project-Based Learning	10	2	1.9
Administration (Ex. Teaching administration about the SBAE program, etc.)	11	1	1.0
Retirement	12	0	0

Research Objective Three

The third research objective examined the job satisfaction and professional identities of SBAE teachers, categorized by their certification type. Regarding job satisfaction, Table 9 shows that both TC and AC teachers reported comparable levels of job satisfaction. The TC teachers had a marginally higher average job satisfaction (M = 2.73, SD = 0.27) than the AC teachers (M = 2.72, SD = 0.27). This suggests that both groups of teachers generally feel neutral or somewhat dissatisfied with their current job positions. However, the calculated p-value of .821 indicates that the difference in job satisfaction levels between the two groups is not statistically significant. Therefore, although there is a slight difference in the mean values, this difference should be interpreted caution cautiously as it might simply be due to random chance rather than reflecting a meaningful disparity. The small effect size (d = 0.27) identified in Cohen's post hoc analysis further emphasizes the need for cautious interpretation due to the lack of statistical significance.

Table 9

Job Satisfaction of SBAE Teachers by Certification Type

	TC		AC				
Construct Variable	*M*	*SD*	*M*	*SD*	*t*	*p*-value	Cohen's *d*
Job Satisfaction	2.73	0.27	2.72	0.27	.226	.821	0.27

Note: Construct variables scale, 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree
* $p < 0.05$

The findings in Table 10 show that both TC and AC teachers have positive views of their professional identities. It appears that TC teachers (M = 3.96, SD = 0.45) feel a slightly stronger connection to the SBAE profession compared to AC teachers (M = 3.89, SD = 0.53). However, despite this observed difference, the analysis revealed a p-value of .192, indicating that this difference is not statistically significant. Therefore, while the data suggest a trend, we cannot conclusively say that TC teachers have a stronger professional identity than AC teachers in SBAE. The medium effect size from Cohen's post hoc analysis (d = 0.48) also needs to be interpreted with caution, as the lack of statistical significance means that the observed difference might be due to chance.

Table 10

Professional Identities of SBAE Teachers by Certification Type

	TC		AC				
Construct Variable	*M*	*SD*	*M*	*SD*	*t*	*p*-value	Cohen's *d*
Professional Identity	3.96	0.45	3.89	0.53	1.31	.192	0.48

Note: Construct variables scale, 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree
* $p < 0.05$

Research Objective Four

The fourth research objective aimed to explore the turnover intentions of SBAE teachers, differentiated by their certification type. The data presented in Table 11 reveal

that both TC and AC teachers show relatively low intentions to leave their jobs. Specifically, AC teachers reported a marginally higher intention to leave ($M = 2.91$, $SD = 0.37$) compared to TC teachers ($M = 2.89$, $SD = 0.38$). However, the analysis indicated a p-value of .642, which suggests that this slight difference in turnover intentions between the two groups is not statistically significant. Consequently, while the means suggest a difference, the lack of statistical significance implies that the observed turnover intention variation might be due to random chance. Therefore, we should interpret the small to medium effect size ($d = 0.38$) from Cohen's post hoc analysis with caution, as it does not reflect a statistically significant difference between the groups.

Table 11

Turnover Intentions of SBAE Teachers by Certification Type

	TC		AC				
Construct Variable	*M*	*SD*	*M*	*SD*	*t*	*p*-value	Cohen's *d*
Turnover Intentions	2.89	0.38	2.91	0.37	-.465	.642	0.38

Note: Construct variables scale, 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree
* $p < 0.05$

Research Objective Five

The fifth research objective sought to explain the relationship between PCK, job satisfaction, and professional identity among SBAE teachers by certification type. After creating the constructs of job satisfaction and professional identity, I completed an

Ordinary Least Squares (OLS) regression analysis to determine the relationship between PCK, job satisfaction, and professional identity. When setting up my regression model, I ran two separate regressions by certification type, using PCK as my independent variable and job satisfaction and professional identity as my dependent variables. Beginning with job satisfaction, a regression analysis was performed to predict the effect of PCK on the job satisfaction of SBAE teachers. For TC teachers, the model explained a minimal portion of the variability in job satisfaction (R^2 = .009), hinting at the potential influence of other variables in determining job satisfaction levels. Although PCK presented a slight negative correlation with job satisfaction (β = -.096), this relationship did not reach statistical significance (p = .124), suggesting that the impact of PCK might be marginal or overshadowed by other factors.

In the case of AC teachers, the model's explanatory power was virtually non-existent (R^2 = .000), reinforcing the notion that variables other than PCK are likely to have a more pronounced effect on job satisfaction. The beta coefficient (β = .018) and a p-value (p = .833) corroborate the assumption by clearly indicating a lack of statistical significance, which renders the influence of PCK on the job satisfaction of AC teachers insignificant within this analysis (Table 12).

Table 12

The Influence of PCK on the Job Satisfaction of SBAE Teachers by Certification Type

Certification Type	R^2	*S.E.*	*F*	β	*t*	*p*-value
Traditionally Certified	.009	.269	2.38	-.096	-1.54	.124
Alternatively Certified	.000	.274	.045	.018	.212	.833

Note: Construct variables scale, 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree
* $p < 0.05$

In the context of professional identity, a regression analysis examined the influence of PCK on the professional identity of SBAE teachers. The results revealed that PCK explained a moderate amount of variance ($R^2 = .087$) in the professional identity of TC teachers, suggesting that PCK contributes as one of several factors to their professional identity. The relationship between PCK and professional identity was positive ($\beta = .294$) and statistically significant ($p < .001$), indicating that as PCK increases, so does the professional identity among TC teachers.

PCK accounted for a substantial portion of the variance in professional identity for AC teachers ($R^2 = .285$), indicating a stronger influence of PCK on the professional identity of these teachers compared to their TC counterparts. The beta coefficient was notably positive ($\beta = .534$), with a statistically significant *p*-value ($p < .001$), indicating a strong positive relationship between PCK and professional identity. This implies that for AC teachers, PCK is a significant predictor of professional identity, with higher levels of PCK associated with a stronger professional identity (Table 13).

Table 13

The Influence of PCK on the Professional Identity of SBAE Teachers by Certification Type

Certification Type	R^2	*S.E.*	*F*	β	*t*	*p*-value
Traditionally Certified	.087	.429	24.43	.294	4.94	<.001
Alternatively Certified	.285	.452	56.16	.534	7.49	<.001

Note: Construct variables scale, 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree

* $p < 0.05$

Research Objective Six

The sixth research objective was to describe the relationship between job satisfaction, professional identity, and turnover intentions among SBAE teachers by certification type. For this objective, I completed an OLS regression analysis to determine the relationship between turnover intentions, job satisfaction, and professional identity. When setting up the regression model, turnover intentions were used as the dependent variable, with professional identity and job satisfaction as the independent variables. Beginning with the TC cohort, a regression analysis was executed to predict the impact of job satisfaction and professional identity on turnover intentions. The analysis indicated a small variance in teachers' turnover intentions ($R^2 = .035$), suggesting that other factors might also play a significant role in teachers' turnover intentions. The relationship between job satisfaction and turnover intentions was negative ($\beta = -.100$) but not statistically significant ($p = .109$). In contrast, professional identity positively and significantly influenced turnover intentions ($\beta = .143$, $p = .022$), indicating that a stronger professional identity may be associated with low intentions to leave the profession.

A regression analysis was also executed for the AC teachers to predict the impact of job satisfaction and professional identity on turnover intentions. The model revealed a slightly stronger explanatory power for these teachers, as evidenced by the R^2 value of .058. Additionally, job satisfaction ($\beta = .177$, $p = .039$) and professional identity ($\beta = .205$, $p = .017$) had significant positive relationships with turnover intentions. This indicates that for AC teachers, increases in job satisfaction and professional identity are

associated with lower intentions to leave their current positions. Table 14 outlines the regression analysis.

Table 14

The Influence of Job Satisfaction and Professional Identity on the Turnover Intentions of SBAE Teachers by Certification Type

				Dependent Variable: Turnover Intentions		
Variable	R^2	*S.E.*	*F*	β	*t*	*p*-value
Traditionally Certified	.035	.383	4.67	---	---	---
Professional Identity	---	---	---	-.100	-1.61	.109
Job Satisfaction	---	---	---	.177	2.08	.039
Alternatively Certified	.058	.380	4.22	---	---	---
Professional Identity	---	---	---	.143	2.30	.022
Job Satisfaction	---	---	---	.205	2.41	.017

Note: Construct variables scale, 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree

* $p < 0.05$

Research Objective Seven

The seventh research objective sought to explain the relationship between PCK and turnover intentions among SBAE teachers by certification type. I completed an OLS regression analysis to determine the relationship between PCK and turnover intentions for this objective When setting up the regression model, I used turnover intentions as the dependent variable and PCK as the independent variable. Starting with the TC cohort, the

analysis shows that PCK does not seem to have a meaningful impact on the turnover intentions of TC teachers. This is evidenced by a low R^2 value of 0.001, a non-significant *p*-value of 0.574, and a beta coefficient of 0.035. The corresponding *t*-value of 0.562 further suggests that the PCK's influence is not statistically significant among this group.

In contrast, AC teachers show a marked difference. With an R^2 value of 0.073, the model suggests that PCK accounts for approximately 7.3% of the variance in turnover intentions. The beta coefficient of 0.269 is significant, evidenced by a *t*-value of 3.34 and a highly significant *p*-value of 0.001. This indicates that PCK significantly predicts turnover intentions for AC SBAE teachers. This data suggests that AC teachers may exhibit a stronger relationship between their PCK and their inclination to stay in or leave their teaching roles, highlighting the importance of PCK in their retention (Table 15).

Table 15

The Influence of PCK on the Turnover Intentions of SBAE Teachers by Certification Type

Certification Type	R^2	*S.E.*	*F*	*β*	*t*	*p*-value
Traditionally Certified	.001	.387	.316	.035	.562	.574
Alternatively Certified	.073	.368	11.18	.269	3.34	.001

Note: Construct variables scale, 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree
* $p < 0.05$

Chapter Summary

This chapter presents the findings and analysis of the quantitative data collected, focusing on delineating the PCK, professional development needs, job satisfaction,

professional identity, and turnover intentions of SBAE teachers based on their certification type. The study sampled 470 SBAE teachers, divided into TC and AC groups, and collected data from fourteen states. The results showed that AC teachers scored higher in every dimension of PCK compared to TC teachers, with HCK being the highest-rated dimension for both groups. Both TC and AC teachers reported similar levels of job satisfaction and professional identity, though the differences were not statistically significant. Turnover intentions were also low for both groups, with AC teachers showing a slightly higher, but not statistically significant, inclination to leave.

The regression analyses revealed that PCK significantly influenced the professional identity of both TC and AC teachers but did not impact job satisfaction. For AC teachers, higher levels of PCK were associated with lower turnover intentions, a relationship not observed in TC teachers. Professional identity emerged as a significant predictor of turnover intentions for both groups, suggesting that a strong professional identity may reduce the likelihood of leaving the profession.

CHAPTER 5

CONCLUSIONS & RECOMMENDATIONS

This study aimed to investigate a series of longstanding challenges within agricultural education and career and technical education by focusing on the experiences of school-based agricultural education (SBAE) teachers in the United States. Considering different teacher preparation pathways, the study sought to describe and discern the relationships between pedagogical content knowledge (PCK), professional development needs, job satisfaction, professional identity, and turnover intentions. By examining a larger, more representative sample of SBAE teachers across the country, the study hoped to offer a more generalized understanding of these educators' challenges. This chapter summarizes the findings from chapter four and provides conclusions and recommendations for future research and practice, which are based on the results from the following research objectives:

1. Describe the sample of SBAE teachers by certification type.
2. Describe the PCK and professional development needs of SBAE teachers by certification type.
3. Describe job satisfaction and professional identity of SBAE teachers by certification type.
4. Describe the turnover intentions of SBAE teachers by certification type.
5. Explain the relationship between PCK, job satisfaction, and professional identity among SBAE teachers by certification type.

6. Explain the relationship between job satisfaction, professional identity, and turnover intentions among SBAE teachers by certification type.
7. Explain the relationship between PCK and turnover intentions among SBAE teachers by certification type.

Summary of Findings

Research Objective 1

The research encompassed 470 participants from fourteen states, revealing significant distinctions between traditional certification (TC) and alternative certification (AC) paths, demographics, and professional experience. TC teachers, who represented 67.2% of the sample, completed a standard four-year licensure program within a school of education. This group was predominantly female (57.6%), with ages ranging from 22 to 70 years and teaching experience spanning one to 48 years. They were distributed across various regions, with notable representation in states such as Nebraska, Indiana, Utah, and South Carolina.

Conversely, the AC teachers, constituting 32.8% of the respondents, followed non-traditional paths to licensure, including alternative routes, incomplete traditional licensure requirements, or other unique certification methods. This group also had a majority of female educators (56.5%), aged between 23 and 65 years, with teaching experience ranging from one to 28 years. AC teachers were notably prevalent in Tennessee, Colorado, and Utah. The distribution of TC and AC teachers across the states and the National Association of Agricultural Educators (NAAE) regions highlighted

diverse pathways into SBAE teaching, reflecting the varying educational backgrounds and experiences contributing to the field. This diversity underscores the complexity and richness of the SBAE teaching community, emphasizing the importance of understanding the different routes to certification and their impact on agricultural education. Prior research by Rice and Kitchel (2015) and Van Driel and Berry (2012) supports the notion that diverse educational backgrounds enhance the professional landscape, bringing varied skills and perspectives into the teaching profession.

Research Objective 2

The second research objective centered on analyzing the PCK and professional development needs of SBAE teachers, identified by their certification type (TC and AC). The study's findings revealed that both TC and AC teachers perceived their PCK levels similarly across six PCK constructs, which were later merged into a single PCK variable for analysis. The results showed close mean values for both groups, with a p-value of .339 and a medium to large effect size (Cohen's $d = 0.58$), indicating no significant difference in PCK between the two types of certification.

Regarding professional development needs, TC and AC teachers identified similar areas of interest but with differing priorities. TC teachers ranked their top needs as Content-Specific Topics, the National FFA Organization (FFA), Technology, Curriculum Development, and Time Management/Work-Life Balance. Conversely, AC teachers prioritized Curriculum Development, Content-Specific Topics, Technology, Classroom Management/Student Engagement, and FFA. This variation suggests that, while both groups see the value in enhancing their competencies across similar domains, TC

teachers are more focused on content and organizational aspects, and AC teachers emphasize curriculum and classroom management. Research indicates that PCK development is critical for effective teaching, as highlighted by Baxter and Lederman (1999) and Grossman (1990), reinforcing the importance of targeted professional development to address specific teacher needs.

Research Objective 3

The third research objective analyzed job satisfaction and professional identities among SBAE teachers, categorized by their certification type. In terms of job satisfaction, both TC and AC teachers reported similar levels, with a marginal difference indicating slightly higher satisfaction among TC teachers. The analysis revealed that the overall sentiment leaned towards neutrality or a slight dissatisfaction with their current job positions, underscored by a *p*-value of .821 and a small effect size (Cohen's $d = 0.27$), suggesting minimal distinction in job satisfaction between the two groups.

When examining professional identities, the data suggested a positive self-view among both groups of teachers regarding their connection to the SBAE teaching profession. TC teachers demonstrated a marginally stronger professional identity than AC teachers. However, the difference was not statistically significant, as indicated by a *p*-value of .192 and a medium effect size (Cohen's $d = 0.48$). This suggests that, while TC and AC teachers generally hold positive views of their professional roles, TC teachers might identify with their roles in a slightly stronger manner. These findings align with research by Beijaard et al. (2000) and Tschannen-Moran et al. (1998), which emphasize

the importance of professional identity in sustaining teacher commitment and effectiveness.

Research Objective 4

The fourth research objective was to assess the turnover intentions of SBAE teachers by certification type. The findings revealed that both groups of teachers reported moderately low intentions to leave their positions, indicating a general inclination towards staying in their current roles. The difference between TC and AC teachers was negligible, with AC teachers showing a slightly, but not significantly, higher tendency towards considering turnover ($M = 2.91$) compared to their TC counterparts ($M = 2.89$). The statistical analysis supported this observation, revealing a p-value of .642 and a small to medium effect size (Cohen's $d = 0.38$), indicating that the difference in turnover intentions between the two groups is minimal.

This outcome suggests that, despite the differences in certification pathways, both groups of SBAE teachers share similar levels of commitment to their positions. The relatively low turnover intentions across both certification types reflect a level of job satisfaction or a set of professional circumstances that discourage the pursuit of alternative employment. The small to medium effect indicates slight variations exist in how TC and AC teachers view their career longevity within agricultural education. This finding is supported by research on teacher retention, which highlights the influence of job satisfaction (Sorensen et al., 2016a) and professional identity on turnover intentions (Ingersoll, 2002; Sorensen et al., 2016b).

Research Objective 5

The fifth research objective aimed to analyze the connections between PCK, job satisfaction, and professional identity in SBAE teachers, considering their certification type. Through Ordinary Least Squares (OLS) regression analysis, the study sought to discern how PCK influences job satisfaction and professional identity separately for TC and AC teachers.

For job satisfaction, the analysis indicated that PCK has a minimal impact on the job satisfaction levels of TC teachers, with a very low R^2 value (.009), suggesting that other factors likely play a more significant role in determining their job satisfaction. The slight negative correlation between PCK and job satisfaction for TC teachers was not statistically significant, implying a marginal or non-existent influence of PCK on their job satisfaction. Similarly, for AC teachers, the influence of PCK on job satisfaction was negligible, as evidenced by an R^2 value of .000, indicating that PCK does not significantly affect AC teachers' job satisfaction.

Conversely, the relationship between PCK and professional identity revealed more substantial findings. For TC teachers, PCK accounted for a moderate portion of the variance in professional identity ($R^2 = .087$), indicating a positive and significant relationship, suggesting that higher PCK levels are associated with a stronger professional identity. This relationship was even more pronounced among AC teachers, where PCK explained a significant portion of the variance in professional identity ($R^2 = .285$), signifying a strong, positive correlation. Higher PCK levels in AC teachers strongly link to a more robust professional identity, underscoring the pivotal role of PCK in shaping professional self-concept among SBAE educators, particularly those with AC.

These findings are in line with research by Gess-Newsome (2015) and Rollnick (2018), which emphasize the critical role of PCK in developing professional identity and effective teaching practices.

Research Objective 6

The sixth research objective was to analyze the interplay between job satisfaction, professional identity, and turnover intentions among SBAE teachers, differentiated by certification type. This study utilized OLS regression analysis to understand how job satisfaction and professional identity collectively influence teachers' intentions to leave their positions.

For TC teachers, the analysis showed that job satisfaction and professional identity only slightly influenced turnover intentions, with an R^2 value of .035. This suggests that factors other than job satisfaction and professional identity might be more influential in determining TC teachers' intentions to stay or leave. The relationship between job satisfaction and turnover intentions was negative yet not statistically significant, implying a marginal influence of job satisfaction on turnover intentions. Conversely, professional identity was positively correlated with turnover intentions and reached statistical significance, suggesting that TC teachers with a stronger sense of professional identity may have lower intentions to leave their jobs.

The regression model for AC teachers displayed a somewhat stronger explanatory power ($R^2 = .058$), indicating that job satisfaction and professional identity have a more pronounced effect on AC teachers' turnover intentions. Both job satisfaction and professional identity showed significant positive correlations with turnover intentions,

which indicates a relationship between higher levels of job satisfaction, stronger professional identity, and lower intentions to leave the profession.

These findings highlight a complex relationship between job satisfaction, professional identity, and turnover intentions among SBAE teachers, with certification type playing a role in these dynamics. For AC teachers, job satisfaction and professional identity significantly contribute to their intentions to remain in their positions. This result suggests that efforts to enhance those aspects could be particularly effective in reducing turnover intentions in this group. For TC teachers, while professional identity shows a significant impact, the role of job satisfaction in influencing turnover intentions appears to be more nuanced, indicating the need for a broader understanding of the factors that help retain teachers in their positions. This aligns with research on teacher retention and professional development, which emphasizes the importance of supporting teacher identity and satisfaction to reduce turnover (Darling-Hammond et al., 2017; Rhodes et al., 2004).

Research Objective 7

The seventh research objective was to assess how PCK impacts the turnover intentions among SBAE teachers, with an analysis that differentiates TC and AC teachers. Through OLS regression analysis, the study aimed to discern the extent to which PCK could predict teachers' intentions to leave their teaching positions.

The findings indicated that PCK had a negligible effect on TC teachers' turnover intentions. The R^2 value of 0.001 supports the conclusion that PCK explains a mere 0.1% of the variance in turnover intentions among this group. The non-significant *p*-value

(0.574) and a beta coefficient ($\beta = 0.035$) further underscored the minimal impact of PCK on TC teachers' decisions to remain in or leave their roles.

Conversely, the analysis for AC teachers revealed a significantly different scenario. The R^2 value of 0.073 suggested that PCK explains approximately 7.3% of the variance in turnover intentions for AC teachers, indicating a more substantial influence. The beta coefficient ($\beta = 0.269$) was significant, highlighted by a *t*-value of 3.34 and a highly significant *p*-value (0.001). This result demonstrates that PCK is a significant predictor of turnover intentions for AC teachers, suggesting that a stronger PCK is associated with a reduced likelihood of leaving their teaching positions.

These findings highlight a distinct contrast in how PCK influences the turnover intentions of SBAE teachers based on their certification type. While PCK appears to have little to no impact on the turnover intentions of TC teachers, it plays a significant role in the retention of AC teachers. This underscores the importance of enhancing PCK, especially for AC teachers, as a potential strategy to reduce turnover intentions and improve teacher retention in agricultural education.

Conclusions

Conclusion 1: Universal Decline in Job Satisfaction Among SBAE Teachers

The findings indicate a significant decline in job satisfaction among SBAE teachers, regardless of whether they hold traditional or alternative certification. This represents a notable shift from previous studies in agricultural education that consistently reported high job satisfaction among ag teachers prior to the COVID-19 pandemic

(Easterly & Myers, 2019; Hasselquist et al., 2017). The findings are critical as they highlight a decline in job satisfaction, diverging from all previous studies.

A deeper examination of the existing literature shows that our results align with broader educational research, which suggests that environmental and systemic factors often have a greater impact on job satisfaction than the specifics of professional certification (Blackburn & Robinson, 2008; Chenevey et al., 2008; Easterly & Myers, 2019; Hasselquist et al., 2017). This pattern across different educational contexts underscores the necessity of addressing factors beyond certification types when considering teacher satisfaction.

Several reasons may underlie this decline in job satisfaction. Research has documented the significant influence of external factors such as administrative support and school climate on job satisfaction (Blackburn & Robinson, 2008; Chenevey et al., 2008; Hasselquist et al., 2017). In the context of SBAE, the pressures of resource constraints, the demand for diverse expertise, and the challenge of integrating practical agricultural education with standard curricular requirements may exacerbate these issues.

The COVID-19 pandemic likely played a crucial role in this decline. During the pandemic, teachers faced unprecedented challenges, including transitioning to online instruction, managing health risks, and coping with increased workloads. These stressors likely intensified existing problems within the educational environment, contributing to the observed decrease in job satisfaction. Therefore, the decline in job satisfaction may reflect broader systemic issues that were amplified by the pandemic rather than the specific details of certification pathways.

Conclusion 2: Positive Professional Identity Despite Job Dissatisfaction

The research unveiled a striking contrast within the SBAE teaching community: despite experiencing job dissatisfaction, both TC and AC teachers maintain a positive professional identity. This suggests a resilient alignment with their roles and the broader educational profession, with TC teachers showing a marginally stronger professional identity. Immersive experiences in TC programs, such as extended student teaching or internships, might account for this difference, fostering a deeper connection with the profession. Comparison with existing studies reveals that this phenomenon of maintaining a strong professional identity in the face of job dissatisfaction is not isolated. Similar patterns have been observed in other educational contexts, indicating a broader trend where educators remain committed to their profession despite challenges (Shu, 2022). This alignment underscores the complex nature of teaching, where the sense of identity and purpose can transcend immediate job conditions.

The underlying reasons for this positive professional identity, particularly in the realm of SBAE, can be linked to the significance of PCK. For AC teachers, who might have entered the profession through less traditional routes, PCK emerges as a pivotal element in developing a robust professional identity. This suggests that deep engagement with subject matter content and pedagogical skills can cultivate a strong sense of professional self, even in less traditional pathways into teaching.

Theoretically, these findings enrich our understanding of professional identity in teaching, illustrating how it can remain robust against job dissatisfaction. They contribute to the narrative that professional identity is multifaceted and deeply influenced by factors like PCK, extending beyond the immediate environment or job conditions. This

perspective can enhance theoretical models that examine the interplay between professional identity, job satisfaction, and the underlying educational frameworks.

In sum, the findings advocate for a nuanced approach to addressing the needs of SBAE teachers, emphasizing the value of strengthening professional identity through focused professional development in PCK. This approach could provide a strategic pathway to enhance teacher retention and satisfaction, resonating with the broader educational mandate to support teachers effectively, irrespective of their certification pathway.

Conclusion 3: Low Turnover Intentions Contradict Job Dissatisfaction

The research unveiled an intriguing paradox within the SBAE teaching community: despite reporting significant job dissatisfaction, teachers exhibit low intentions to leave their positions. This contradiction suggests that factors deeper than job contentment—such as a strong professional identity, dedication to students, and a passion for teaching agriculture—play a crucial role in retaining teachers. The negligible impact of certification type on turnover intentions further highlights the complexity of teacher retention, indicating that simple, one-size-fits-all solutions are insufficient.

Comparative analysis with existing literature indicates that this phenomenon is not unique to SBAE teachers but is reflected across various educational settings, where teachers' commitment often transcends their satisfaction levels (Bowling et al., 2022). These findings align with studies emphasizing intrinsic motivators over external job conditions as key to understanding teacher retention.

The reasons behind this scenario are multifaceted. While job satisfaction is typically a significant predictor of turnover, the unique context of SBAE, where teachers are often deeply committed to their subject matter and the agricultural community, might foster strong intrinsic motivators. These motivators can include a sense of duty, the rewarding nature of student progress, and the personal fulfillment derived from teaching a subject they are passionate about. Theoretically, this situation challenges and expands existing turnover models by underscoring the complex interplay between job satisfaction and turnover intentions, suggesting that the latter may be more deeply rooted in personal and professional values than previously thought.

In essence, the findings urge a nuanced approach to addressing teacher turnover, emphasizing the complexity of the decision to stay and the importance of aligning retention strategies with the deeper motivations of teachers. Such an approach promises to enhance retention and foster a more engaged, committed, and satisfied teaching workforce.

Conclusion 4: PCK's Varied Influence on Professional Experience

The findings illuminate the complex role of PCK in shaping the professional experiences of SBAE teachers. While PCK does not markedly affect job satisfaction, it significantly influences teachers' professional identities, particularly for AC teachers. This reveals a crucial distinction: PCK fosters a strong sense of professional identity by providing teachers with the content expertise and pedagogical skills essential for confidence and self-efficacy. However, job satisfaction is influenced by a broader array of factors that extend beyond individual competencies.

A deeper dive into this finding reveals that PCK's contribution to professional identity stems from its role in defining a teacher's expertise and self-assurance. When teachers possess deep content knowledge and effective pedagogical skills, they are more likely to feel competent and capable in their roles, which strengthens their professional identity. This sense of mastery and belonging within the teaching profession is crucial for AC teachers who may rely heavily on their content knowledge to establish credibility and confidence in their teaching abilities.

Comparative analysis with existing literature indicates that this nuanced impact of PCK aligns with broader educational research. Studies by Rice and Kitchel (2017, 2018) corroborate that while PCK is essential for teaching, its effects on various aspects of professional experience can differ. PCK's influence extends beyond classroom instruction, shaping professional identity and contributing to a teacher's sense of purpose and belonging.

However, job satisfaction is influenced by a wider range of factors that often include environmental and systemic elements such as school culture, administrative support, workload, and external pressures (Hasselquist et al., 2017; Sorensen & McKim, 2014). These elements play a significant role in determining a teacher's overall job satisfaction, often overshadowing the individual sense of competence derived from PCK. Thus, while PCK enhances a teacher's professional identity by bolstering their confidence and expertise, it does not directly address the broader, systemic issues that contribute to job satisfaction.

From a theoretical perspective, these findings enhance our understanding of the multifaceted role of PCK in teaching. They underscore the necessity of broadening

current theoretical frameworks to acknowledge the distinct pathways through which PCK impacts different aspects of the teaching profession. This reinforces that professional identity and job satisfaction, while interconnected, are influenced by diverse factors, with PCK primarily affecting professional identity.

In summary, the nuanced impact of PCK on professional experiences in SBAE highlights the need for comprehensive strategies in teacher development. These strategies should emphasize the cultivation of content knowledge as a cornerstone for fostering professional identity while also addressing the broader systemic factors that influence job satisfaction.

Conclusion 5: Professional Development Needs Alignment Across Certification Types

The study's findings indicate a unified demand for professional development among TC and AC SBAE teachers, focusing on content-specific topics, technology integration, FFA involvement, and curriculum development strategies. This convergence suggests a collective acknowledgment of the essential areas for enhancement, highlighting a universal requirement for support in these specific domains, regardless of the certification background of the teachers.

Comparative analysis with existing literature indicates that such a consensus on professional development needs is reflective of broader trends within the educational sector, where demands for technological proficiency, content-specific expertise, and innovative curriculum design are universally recognized (Coleman et al., 2020; Roberts et al., 2020; Stair et al., 2019). These parallels affirm the pertinence of the findings and

suggest that the identified professional development needs are not isolated but part of a larger educational narrative.

The rationale behind these shared professional development needs may stem from the evolving landscape of agricultural education, which increasingly requires educators to be adept in a range of competencies, from technological savvy to specialized content knowledge. The emphasis on these areas likely reflects the sector's response to contemporary educational challenges and the need to equip teachers with the skills necessary to navigate and excel in this changing environment.

Theoretically, these findings contribute to the discourse on professional development by reinforcing the theory that effective professional growth opportunities should align with educators' needs and challenges in their specific contexts. This alignment is crucial for ensuring that professional development is relevant and effective in enhancing teachers' competencies and satisfaction, positively impacting the quality of education delivered.

In essence, the alignment in professional development needs underscores the necessity for targeted, comprehensive, and responsive professional development strategies that cater to the contemporary demands of SBAE educators, fostering an environment where teachers feel equipped, supported, and motivated to meet the educational challenges of today and tomorrow.

Limitations

All research contains limitations. I discussed the limitations of this research in Chapter I, but will revisit them here.

1. This research focused on SBAE teachers during the 2023-2024 school year and may not be generalizable to teachers in other disciplines, subjects, school years, or grade levels.
2. The data collected for this research used an online instrument that required participants to self-report information, which may threaten validity.
3. Online instruments limit the data collected from participants and, as such, may not offer opportunities for more in-depth and meaningful information related to this study's variables.
4. The survey was administered to SBAE teachers in October. Different results may have been obtained if the survey had been conducted at other times of the year, as the varying demands and experiences throughout the academic calendar could influence teachers' responses.
5. The professional development section of the survey consisted of only one question, which may not have accurately gauged participants' need for professional development. Some respondents might have listed topics they are interested in rather than those they need or could benefit from.
6. As an SBAE teacher, I tried to remain objective. However, my lived experiences and values related to the topic area may have influenced my decisions associated with the research topic, development of the instrument,

variables selected for study, data collection, analysis, conclusions, and implications.

Recommendations

This section presents recommendations for practice and future research for the agricultural education profession. Knowledge from this research can inform pre-service teacher preparation programs and in-service professional development initiatives.

Recommendations for Practice

Implement Mentorship Programs

Incorporating mentorship programs is crucial to address the universal decline in job satisfaction among SBAE teachers. According to the Four Capital Theory of Teacher Retention, human capital development is vital, and mentorship plays a significant role in enhancing the knowledge, skills, competencies, and experiences of teachers (Belay et al., 2021). This professional support system can help novice teachers integrate effectively into the school culture, thereby strengthening social capital by fostering strong relationships and a sense of community within the school (Shoulders & Myers, 2011). Additionally, mentorship can provide the necessary support to navigate the complexities of the job, enhancing teacher efficacy, a critical component of psychological capital (Noel & Finocchio, 2022).

School administrators, state education staff, and university faculty responsible for teacher support and development should focus on implementing these mentorship programs. By connecting novice SBAE teachers with experienced educators, mentorship programs can support the development of professional identity and job satisfaction. Research indicates that teachers with strong social capital are more likely to remain in the profession (Naylor, 2021; Solomonson et al., 2018). Tailoring these programs to address the unique challenges faced by TC and AC teachers ensures that all SBAE educators receive the support they need, ultimately fostering a positive and supportive educational environment.

Tailor Professional Development Programs

Educational institutions and organizations should create professional development programs that closely align with the needs of SBAE teachers. These programs should be tailored to address the distinct challenges faced by TC and AC teachers, ensuring that both groups receive relevant and effective training (Roberts & Dyer, 2004; Stair et al., 2019). Professional development should cover content-specific topics, technology integration, FFA involvement, and curriculum development, reflecting the priorities identified by both TC and AC teachers.

State education staff, school administrators, and university faculty responsible for teacher development and support should focus on providing professional development opportunities that cater to the unique needs and motivations of teachers at different career stages. Recognizing the distinct challenges and priorities of early-career, mid-career, and late-career teachers is essential for effective professional development. By addressing

these needs, educational institutions can support teachers' professional growth, enhance job satisfaction, and improve teacher retention (Blackburn & Robinson, 2008; Sorensen & McKim, 2014). Implementing targeted professional development programs ensures that all SBAE teachers have access to the resources and learning opportunities necessary for their professional growth and retention.

Focus on Enhancing PCK through Professional Development

To develop PCK among SBAE teachers, school administrators and state education staff should prioritize professional development programs tailored to PCK. PCK is a distinct form of human capital that combines specialized content knowledge with an understanding of how to teach that content effectively (Aksu & Kul, 2019; Shulman, 1986). These programs should emphasize both content knowledge and pedagogical skills to ensure teachers are well-equipped to deliver effective and engaging lessons.

School administrators and state education staff should customize professional development initiatives to address the unique challenges and backgrounds of AC teachers, bridging gaps in their preparation and supporting their successful integration into the teaching profession (Roberts & Dyer, 2004; Stair et al., 2019). Establishing ongoing support structures, such as mentoring and peer collaboration, can reinforce the professional development efforts and provide continuous growth opportunities for teachers (Ball & McDiarmid, 1990; Zembal-Saul et al., 2002). Adequate resources should be allocated for professional development, including funding, time, and access to expert trainers and materials. By enhancing the PCK of SBAE teachers, particularly with AC

teachers, administrators can improve their professional identity, job satisfaction, and overall teaching effectiveness (Morrison & Luttenegger, 2015).

Promote Reflective Practice and Professional Engagement

To enhance the professional identity of SBAE teachers, it is essential to incorporate structured reflective practice and professional engagement into teacher education programs. Reflective practice involves activities such as journaling, case study discussions, and participation in professional communities, which help teachers align their personal and professional values, fostering a sense of purpose and commitment to the field (Shoulders & Myers, 2011; Wenger, 1998). Professional engagement, a form of social and psychological capital, is critical for nurturing strong professional identities among SBAE teachers (Keiler, 2018).

University faculty and stakeholders responsible for designing teacher preparation curricula should prioritize these elements. The integration of reflective practice allows future teachers to critically evaluate their experiences, gain insights from their reflections, and continually improve their teaching practices. Professional engagement activities, such as networking with colleagues and participating in professional organizations, provide opportunities for teachers to build relationships and communities of practice. These elements are crucial for maintaining a resilient professional identity, enhancing job satisfaction, and reducing turnover intentions (Ashton & Webb, 1986; Sorensen & McKim, 2014).

Establish Holistic Support Systems

Developing holistic support systems that address the multifaceted factors influencing job satisfaction is crucial for enhancing teacher retention. Schools should create environments that focus on pedagogical support, improving the workplace environment, providing administrative support, and recognizing teachers' efforts and achievements (Edinger & Edinger, 2018; Leslie, 1989). A supportive work environment is instrumental in developing a teacher's professional identity and ensuring job satisfaction.

School administrators and state education staff should prioritize initiatives that create supportive workplace environments, acknowledge teachers' efforts, and provide pedagogical support. Research indicates that school climate and administrative support are critical to job contentment (Blackburn & Robinson, 2008; Sorensen & McKim, 2014). By addressing these areas comprehensively, schools can improve teacher retention rates and ensure a more stable and motivated teaching workforce. Implementing these holistic support systems will help create a positive and conducive environment for effective teaching and learning.

Enhance Teacher Preparation Programs

Enhancing teacher preparation programs is critical in addressing the broader challenges identified in the research regarding job dissatisfaction among SBAE teachers. These programs should incorporate elements that specifically aim to enhance job satisfaction, such as courses on classroom management, curriculum development, and strategies to improve teacher-student relationships (Rice & Kitchel, 2015). By focusing

on these areas, preparation programs can equip future teachers with the skills and knowledge necessary to navigate the complexities of the classroom effectively and find fulfillment in their teaching roles. This approach aligns with the human capital component of the Four Capital Theory, emphasizing the importance of developing teachers' knowledge and competencies (Eck et al., 2019).

University faculty responsible for the design and implementation of teacher preparation programs should integrate reflective practice and professional engagement into their curricula. Activities such as reflective journaling, case study discussions, and participation in professional communities foster a sense of purpose and commitment to the field (Keiler, 2018). This aligns with the social and psychological capital aspects of the Four Capital Theory, emphasizing the role of relationships and motivation in teacher retention. By supporting future SBAE teachers in these areas, stakeholders can address the underlying factors contributing to job dissatisfaction and enhance overall job satisfaction (Blackburn & Robinson, 2008; McKim & Velez, 2016).

Develop Collaborative Recruitment and Retention Strategies

Developing collaborative recruitment and retention strategies involves leveraging the interconnected elements of the Four Capital Theory of Teacher Retention. Human capital can be enhanced by establishing partnerships with agricultural organizations and industry partners to offer scholarships, internships, and job placements for students pursuing teaching careers in agriculture (Blackburn et al., 2017). These initiatives attract new teachers and provide them with the necessary skills and knowledge to succeed. Social capital is built through public awareness campaigns and teacher ambassador

programs, showcasing the success stories and positive impacts of SBAE teachers, thereby creating a sense of community and professional identity among educators.

State education staff, school administrators, and university faculty should work together to develop and implement these collaborative strategies. To improve retention, addressing systemic conditions that contribute to teacher dissatisfaction is crucial. Providing adequate resources, reducing workload, and offering strong administrative support enhances structural capital, ensuring that teachers have the necessary tools and support to perform their duties effectively (Noel & Finocchio, 2022). Continuous professional development opportunities aligned with teachers' interests and career goals further develop human capital, fostering job satisfaction and career commitment (Eck et al., 2019). By implementing these collaborative strategies, stakeholders can leverage the intrinsic motivations of SBAE teachers, such as their dedication to their roles and strong professional identity, to enhance job satisfaction and reduce turnover (Smet, 2021).

Recommendations for Future Research

Investigate Factors Impacting Job Satisfaction

Given that PCK has minimal influence on job satisfaction, it is imperative to examine other significant factors. Understanding why some elements have more impact can guide the development of interventions to bolster job satisfaction and teacher well-being. Future research should explore the role of administrative support, school climate, workload, and professional autonomy in shaping teachers' job satisfaction, providing a

more holistic view of the factors that contribute to a positive working environment (Blackburn & Robinson, 2008; Sorensen & McKim, 2014).

The Four Capital Theory highlights the importance of structural and psychological capital in job satisfaction. By examining how these forms of capital influence job satisfaction, researchers can identify the key factors that contribute to a positive work environment. This research can inform the design of interventions that enhance teacher well-being and satisfaction, ultimately improving retention rates and educational outcomes (Edinger & Edinger, 2018; Noel & Finocchio, 2022).

Comprehensive Research on Turnover Intentions

Despite low turnover intentions among SBAE teachers, a paradox exists against the backdrop of job dissatisfaction. It is crucial to understand why teachers stay. Research should delve into how workplace environment, compensation, and career advancement opportunities contribute to their decisions, thereby aiding the development of effective retention strategies. By exploring these factors in-depth, future studies can uncover the intrinsic and extrinsic motivators that influence teachers' decisions to remain in the profession, providing a more comprehensive understanding of teacher retention (Blackburn & Robinson, 2008; Sorensen & McKim, 2014).

The Four Capital Theory identifies structural and psychological capital as significant factors in teacher retention. Investigating these elements in the context of turnover intentions can help clarify the reasons behind teachers' commitment to their roles despite dissatisfaction. Understanding these dynamics can inform the design of

interventions that address specific retention challenges and leverage the positive aspects of professional identity and career commitment (Noel & Finocchio, 2022).

Longitudinal Studies on Turnover Intentions

Given that turnover intentions are low but may fluctuate over time, it is important to investigate why these intentions change. Longitudinal studies would shed light on the evolution of these intentions and the specific career stages or factors at which SBAE teachers are most at risk of leaving, to formulate timely and targeted interventions. Such research can provide valuable insights into the critical periods when teachers are most vulnerable to leaving and help in designing support mechanisms that address these specific needs (Ashton & Webb, 1986; Dembo & Gibson, 1985).

Theoretical frameworks like the Four Capital Theory highlight the importance of human and social capital in teacher retention. By conducting longitudinal studies, researchers can track how changes in these capitals influence turnover intentions over time. This can help identify critical intervention points and develop strategies to support teachers at different career stages, ultimately enhancing retention and job satisfaction (Blackburn & Robinson, 2008; McKim & Velez, 2016).

Career Stage and Turnover Intentions

Assessing how turnover intentions vary among teachers at different career stages and by certification type is crucial for developing targeted retention strategies. Understanding teachers' specific challenges and needs at various points in their careers can help tailor support mechanisms to prevent turnover at critical junctures. This research

should examine the unique pressures and motivations of early-career, mid-career, and late-career teachers to provide a nuanced approach to retention (Boone & Boone, 2007; Smalley & Smith, 2017).

The Four Capital Theory suggests that different forms of capital—human, social, structural, and psychological—play varying roles at different career stages. By investigating how these capitals influence turnover intentions at different career stages, researchers can develop tailored interventions that address the specific needs of teachers at each stage. This can enhance teacher retention by providing the right support at the right time (Noel & Finocchio, 2022; Sorensen & McKim, 2014).

Examining Other Factors Influencing Turnover

Beyond PCK, other forms of human capital, such as mentoring, may significantly sway teachers' turnover intentions. Exploring why and how these factors influence the decision to remain in the profession could lead to more finely tuned and effective retention strategies, underscoring the importance of support networks and ongoing professional growth. Future research should investigate the role of mentoring, peer collaboration, and other support mechanisms in retaining teachers and enhancing their job satisfaction (Eck et al., 2019; Shoulders & Myers, 2011).

Recruitment and Retention Strategies

In light of the discovery that SBAE teachers maintain a positive professional identity despite job dissatisfaction, future research should evaluate recruitment and retention strategies that fortify this identity and job satisfaction. Understanding why these

strategies succeed or fail will inform the creation of supportive environments for SBAE teachers. Investigating the effectiveness of various recruitment incentives and retention programs can help identify best practices and develop more effective policies to attract and retain talented educators (McKim & Velez, 2016; Sorensen & McKim, 2014).

Comparative Studies Across Disciplines

Researchers should undertake comparative studies across different teaching disciplines to understand the role of PCK in job satisfaction and professional identity more broadly. This approach could reveal discipline-specific trends and inform cross-disciplinary strategies for teacher support, enhancing the effectiveness of teacher education and professional development programs. By comparing SBAE teachers with educators in other fields, future research can identify unique challenges and strengths within agricultural education and apply successful strategies from other disciplines (Rice & Kitchel, 2015).

The Four Capital Theory highlights the importance of human, social, and structural capital in teacher retention. By conducting comparative studies, researchers can examine how these forms of capital interact within different educational contexts, providing a more comprehensive understanding of the factors that influence job satisfaction and professional identity. This research can inform the design of targeted interventions that address the specific needs of teachers across various disciplines, ultimately improving retention and job satisfaction (Edinger & Edinger, 2018; Noel & Finocchio, 2022).

Longitudinal Studies on Professional Identity

Conducting longitudinal research to track changes in professional identity among SBAE teachers, especially focusing on how PCK and other professional development activities contribute to these changes, is vital. Such studies can illuminate the long-term impact of professional development on teachers' sense of identity and commitment to the profession. Understanding how professional identity evolves over time can help design more effective support and development programs that sustain teachers' commitment and satisfaction (Keiler, 2018).

The Four Capital Theory emphasizes the role of psychological and social capital in professional identity development. By conducting longitudinal studies, researchers can track how these forms of capital influence professional identity over time. This research can provide valuable insights into the long-term effects of professional development and support programs, helping to design interventions that sustain teachers' professional commitment and satisfaction (Shoulders & Myers, 2011; Sorensen & McKim, 2014).

Investigate Other Forms of Capital

The influence of social, psychological, and structural capital on SBAE teachers' turnover intentions deserves further exploration. By examining these forms of capital individually and collectively, researchers can uncover nuanced strategies to improve teacher retention, addressing the complex interplay of factors that influence teachers' decisions to stay or leave the profession. Future studies should explore how relationships, mental well-being, and institutional support impact teacher retention and satisfaction (Edinger & Edinger, 2018; Noel & Finocchio, 2022).

Further Exploration of PCK Areas

Considering the varied influence of PCK on SBAE teachers' professional experiences, further study into the six PCK areas could reveal critical insights into the effectiveness of teacher preparation and professional development. Identifying the reasons behind the differences between TC and AC teachers in this domain can enhance teacher training programs. Research should focus on how specific PCK components contribute to teaching efficacy and professional identity, helping to design more targeted and impactful professional development initiatives (Rice & Kitchel, 2015; Shulman, 1986).

The Four Capital Theory highlights the importance of human capital in teacher retention. By exploring the specific PCK areas that impact teaching efficacy and professional identity, researchers can provide valuable insights into how teacher preparation programs can be improved. This research can help develop targeted interventions that enhance the professional competencies of both TC and AC teachers, ultimately improving job satisfaction and retention (Eck et al., 2019; Morrison & Luttenegger, 2015).

Impact of Certification Pathways

In light of findings suggesting that certification type has negligible effects on job satisfaction and turnover intentions, research into how different certification pathways influence PCK development and, in turn, professional identity and job satisfaction could provide insights into why refinements in certification processes might be necessary for better preparation of educators. Future studies should explore the specific training and

support needs of TC and AC teachers, examining how these pathways impact their long-term success and satisfaction in the profession (Roberts & Dyer, 2004; Stair et al., 2019).

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APPENDICES

Appendix A

IRB Approval

Research
UtahStateUniversity

Institutional Review Board

Exemption #2
Certificate of Exemption

From: Melanie Domenech Rodriguez, IRB Chair

Nicole Vouvalis, IRB Director

To: ***Tyson Sorensen***

Date: ***September 21, 2023***

Protocol #: ***13708***

Title: ***Examining the Influence of Pedagogical Content Knowledge, Job Satisfaction and Professional Identity on the Turnover Intentions of Traditionally Certified and Alternatively Certified School-Based Agricultural Education Teachers: A National Study***

The Institutional Review Board has determined that the above-referenced study is exempt from review under federal guidelines 45 CFR Part 46.104(d) category #2:

> *Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: (i) The information obtained is recorded in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subject; (ii) Any disclosure of the responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation, or (iii) the information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and the IRB conducts a limited IRB review to make required determinations.*

This exemption is valid for five years from the date of this correspondence, after which the study will be closed. If the research will extend beyond five years, it is your responsibility as the Principal Investigator to notify the IRB **before** the study's expiration date and submit a new application to continue the research. Research activities that continue beyond the expiration date without new certification of exempt status will be in violation of those federal guidelines which permit the exempt status.

If this project involves Non-USU personnel, they may not begin work on it (regardless of the approval status at USU) until a Reliance Agreement, External Research Agreement, or separate protocol review has been completed with the appropriate external entity. Many schools will not engage in a Reliance Agreement for Exempt protocols, so the research team must determine what the appropriate approval mechanism is for their Non-USU colleagues. As part of the IRB's quality assurance procedures, this research may be randomly selected for audit during the five-year period of exemption. If so, you will receive a request for completion of an Audit Report form during the month of the anniversary date of this certification.

In all cases, it is your responsibility to notify the IRB **prior** to making any changes to the study by submitting an Amendment request. This will document whether or not the study still meets the requirements for exempt status under federal regulations.

Upon receipt of this memo, you may begin your research. If you have questions, please call the IRB office at (435) 797-1821 or email to irb@usu.edu.

The IRB wishes you success with your research.

Appendix B

Informed Consent

Protocol # 13708
IRB Exemption Date: September 21, 2023
Consent Document Expires: October 14, 2023

v.2

Informed Consent

Exploring Retention Challenges of Traditionally and Alternatively Certified School-Based Agricultural Education Teachers

You are invited to participate in a research study by Matthew Wood, a Ph.D. Student and Tyson Sorensen, Associate Professor in the Applied Sciences, Technology, and Education department at Utah State University.

The purpose of this research is to identify the pedagogical content knowledge, professional development needs, current level of job satisfaction, professional identity, and turnover intentions of School-Based Agricultural Education (SBAE) teachers. You are being asked to participate in this research because of your involvement as a SBAE teacher in one of the states being studied by the research team.

Your participation in this study is voluntary. Additionally, you may withdraw your participation at any time for any reason. This includes but is not limited to skipping questions, submitting an incomplete survey, or closing out your browser. Only responses that are submitted will be analyzed. Since this survey is anonymous, we cannot withdraw you from the study once you complete and submit it.

If you take part in this study, you will be asked to complete one anonymous Qualtrics survey that will take approximately 10 minutes. There is no cost to you except your time. You may answer some or none of the questions.

This is a minimal-risk research study. That means that the risks of participating are no more likely or serious than those you encounter in everyday activities. The foreseeable risks include the potential for the loss of confidentiality.

We will make every effort to ensure that the information you provide remains confidential. Online activities always carry a risk of a data breach, but we will use systems and processes that minimize breach opportunities. Information collected online can be intercepted, corrupted, lost, destroyed, arrive late or incomplete, or contain viruses. In order to minimize those risks and discomforts. **This survey data will be securely stored in a restricted-access folder on Box.com.**

While you will not be compensated for your participation in this research study, your responses will greatly contribute **to the field of Career & Technical Education, and Agricultural Education, allowing us to understand the challenges facing SBAE teachers by certification type.**

You can decline to participate in any part of this study for any reason and can end your participation at any time. If you have any questions about this study, you can contact Matthew Wood at matthew.wood@usu.edu or Tyson Sorensen at tyson.sorensen@usu.edu. Thank you again for your time and consideration. If you have any concerns about this study, please contact Utah State University's Human Research Protection Office at (435) 797-0567 or irb@usu.edu and reference IRB Protocol #13708.

By clicking "Next" below and continuing to the survey, you agree that you are 18 years of age or older and wish to participate. You agree that you understand the risks and benefits of participation and that you know what you are being asked to do.

Appendix C

Survey Instrument

Overview & Exclusion:

Thank you for taking the time to complete this survey. Your responses are extremely valuable to your profession and your fellow agriculture teachers across the nation. Please complete each question as accurately as possible. Do not click the back button/arrow on your internet browser, instead use the "Back" and "Next" buttons to navigate through the survey. A screen will appear upon completion of the survey.

As of the 2023-2024 school year, are you a school-based agricultural educator (teach at least one agriculture class)?

☐ Yes
☐ No

SECTION I: Demographic Questions

1. Which state do you currently teach in?

☐ Alabama	☐ Illinois	☐ Missouri
☐ Alaska	☐ Indiana	☐ Montana
☐ Arizona	☐ Kansas	☐ Nebraska
☐ Arkansas	☐ Iowa	☐ Nevada
☐ California	☐ Kentucky	☐ New Hampshire
☐ Colorado	☐ Louisiana	☐ New Jersey
☐ Connecticut	☐ Maine	☐ New Mexico
☐ Delaware	☐ Maryland	☐ New York
☐ Florida	☐ Massachusetts	☐ North Carolina
☐ Georgia	☐ Michigan	☐ North Dakota
☐ Hawaii	☐ Minnesota	☐ Ohio
☐ Idaho	☐ Mississippi	☐ Oklahoma
☐ Oregon	☐ Tennessee	☐ Washington
☐ Pennsylvania	☐ Texas	☐ West Virginia
☐ Rhode Island	☐ Utah	☐ Wisconsin
☐ South Carolina	☐ Vermont	☐ Wyoming
☐ South Dakota	☐ Virginia	☐ Other

2. What gender do you identify with?

☐ Male
☐ Female
☐ Prefer to self-describe _____
☐ Prefer not to disclose

3. What is your age (in years, please use whole numbers)? _____

4. Years of teaching experience (including this year) _____

5. What was your path to licensure? (select all that apply)

☐ I completed a teacher preparation program (university) in agriculture/ag education
☐ I completed a teacher preparation program (university) in a content area other than agriculture/ag education
☐ I completed my certification in agriculture/ag education but through an alternative licensing program
☐ I have not yet completed the requirements to teach agriculture
☐ Other _____

SECTION II: Pedagogical Content Knowledge

6. Please read each statement below and answer based on a course that you currently teach. Select the extent to which you agree with each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
When given information, I can easily discern accurate from inaccurate information	1	2	3	4	5
When presented with a problem, I can find multiple ways to get an answer	1	2	3	4	5
I can easily explain the definitions of commonly used terms in each of my course units	1	2	3	4	5
I can explain how all of my course units link to core content areas	1	2	3	4	5
When a student makes an error, I can accurately interpret why that error was made	1	2	3	4	5
I can explain how the course I teach links to other courses/areas within agriculture.	1	2	3	4	5
I can easily explain processes behind various concepts	1	2	3	4	5
I am able to easily identify when a student gives an incorrect answer when teaching	1	2	3	4	5
I can easily explain why a student answer is incorrect	1	2	3	4	5
I am able to easily predict student misconceptions	1	2	3	4	5
I can easily identify advantages and disadvantages of various instructional strategies	1	2	3	4	5
I know where my student should be developmentally	1	2	3	4	5
I can utilize questioning techniques to enhance student learning	1	2	3	4	5
I am able to fluidly sequence my material	1	2	3	4	5
I am able to easily locate outside resources to aid in my teaching	1	2	3	4	5
I can easily predict what course concepts will be most challenging for my students	1	2	3	4	5
When a student makes a remark, I know when to use it to make a point in my instruction effectively.	1	2	3	4	5
Designing curriculum is easy for me	1	2	3	4	5

1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

SECTION III: Professional Development

7. At this point in my career, I would benefit from professional development on... (list all that may apply). _____

SECTION IV: Job Satisfaction

8. Select the extent to which you agree with each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My friends seem more interested in their jobs than I am	1	2	3	4	5
I am often bored with my job	1	2	3	4	5
I feel satisfied with my job	1	2	3	4	5
Most of the time, I have to force myself to go to work	1	2	3	4	5
I definitely dislike my work	1	2	3	4	5
I feel happier in my work than most other people	1	2	3	4	5
Each day of work seems like it will never end	1	2	3	4	5
I like my job better than the average worker does	1	2	3	4	5
I find real enjoyment in my work	1	2	3	4	5
I am disappointed that I took this job	1	2	3	4	5

1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

SECTION V: Teacher Identity

9. Select the extent to which you agree with each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I see myself as a teacher	1	2	3	4	5
I would miss teaching if I stopped doing it	1	2	3	4	5
It is important for me to work in the teaching profession	1	2	3	4	5
I feel skilled as a teacher	1	2	3	4	5
It is important for me to develop my teaching skills	1	2	3	4	5
Students and colleagues view me as an effective teacher	1	2	3	4	5
I belong to a community of teachers	1	2	3	4	5
I know very few agriculture teachers in the profession	1	2	3	4	5
I frequently talk to colleagues about teaching	1	2	3	4	5
I have developed personal relationships with other agriculture teachers in the profession	1	2	3	4	5
I have developed personal relationships with other teachers in my school	1	2	3	4	5
I feel that agricultural education state staff support my efforts as an agriculture teacher	1	2	3	4	5
I feel that my building/district administration support my efforts as an agriculture teacher	1	2	3	4	5

1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

SECTION VI: Turnover Intentions

This is the final page of the survey. Thanks for sticking with it!

10. Select the extent to which you agree with each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
If I could get another job different from being an agriculture teacher, I would take it	1	2	3	4	5
I plan to leave agriculture teaching sometime before I am eligible to retire	1	2	3	4	5
I am preparing to take advantage of the right opportunity to leave my position as an agriculture teacher	1	2	3	4	5
I plan to leave my job as an agriculture teacher as soon as I am able	1	2	3	4	5
I plan to remain teaching agriculture until I am eligible to retire	1	2	3	4	5
It would take a unique set of circumstances for me to leave my position as an agriculture teacher	1	2	3	4	5
I do not plan to leave my job as an agriculture teacher	1	2	3	4	5
I plan to remain teaching agriculture until I am physically no longer able to teach	1	2	3	4	5

1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

Appendix D

Email to Participants

SUBJECT: Important Study: Exploring Retention Challenges of Traditionally and Alternatively Certified School-Based Agricultural Education Teachers (Protocol # 13708)

Dear Agriculture Teacher:

You have been selected to participate in an important agricultural education research study.

This research study aims to identify the pedagogical content knowledge, professional development needs, current level of job satisfaction, professional identity, and turnover intentions of School-Based Agricultural Education (SBAE) teachers. As an agriculture teacher myself, I understand the unique challenges we face, especially related to teacher burnout and retention. Therefore, your input is extremely valuable.

Your participation in this study is voluntary. Additionally, you may withdraw your participation at any time for any reason. This includes but is not limited to skipping questions, submitting an incomplete survey, or closing out your browser. Only responses that are submitted will be analyzed. Since this survey is anonymous, once you complete and submit it, we cannot withdraw you from the study.

The survey will take approximately 10 minutes to complete. For your convenience below is a link to the survey,

Link here…

If you have any questions about the survey, please feel free to contact Matthew Wood (matthew.wood@usu.edu) or Dr. Tyson Sorensen (tyson.sorensen@usu.edu). Thank you for helping to improve the profession!

Sincerely,

Matthew Wood
Graduate Student
Utah State University

Curriculum Vitae

Matthew Joseph Wood

Curriculum Vitae

Education

Doctor of Philosophy, Career and Technical Education May 2024
Focus: Agricultural Education
Utah State University, Logan, Utah
Dissertation: Examining the Influence of Pedagogical Content Knowledge, Job Satisfaction and Professional Identity on the Turnover Intentions of Traditionally Certified and Alternatively Certified School-Based Agricultural Education Teachers: A National Study
Advisor: Tyson Sorensen, Associate Professor

Master of Science, Agricultural Education May 2019
University of Arkansas, Fayetteville, Arkansas
Thesis: Exploring High School Agriculture Students' Perceptions of Agricultural Careers: A National Study
Advisor: Donna Graham, University Professor

Bachelor of Science, Agricultural Education December 2016
West Virginia University, Morgantown, West Virginia
Advisor: Dr. Harry Boone, Professor Emeritus
Minor in Special Education

Professional Experience

Laurel High School August 2019-Present
Laurel School District, Laurel, Delaware
Agriculture Teacher and FFA Advisor

- Taught five courses encompassing Plant Sciences, Animal Science and AP Environmental Science. Built the agriculture program at Laurel from a one-teacher to a two-teacher program, and expanded the program to offer multiple agriculture education content areas. Received over $50,000 in grant funding to improve program equipment and technology, and to build a small livestock barn on campus. Managed a classroom, small animal lab, greenhouse, hydroponic and aquaponic lab, and livestock barn. Advised local FFA chapter, worked closely with our program advisory committee, oversaw student SAE projects, collaborated with other agriculture teachers in my district and state, and facilitated work-based learning initiatives.

- Leadership Activities:
    - FFA Advisor, CTE Department Chair, Teacher Mentor, District Aspiring Administrators Academy, Data Team Member, District PLC Team Member

Department of Agriculture and Applied Sciences August 2022-December 2022
Utah State University, Logan, Utah
Graduate Teaching Assistant

- Served as a co-instructor for ASTE 4210- Cognition and Evaluation of Student Learning in CTE. Responsibilities included preparing course materials, communicating with undergraduate students, and providing feedback to students through the Canvas LMS portal.

Laurel Middle School January 2019-June 2019
Laurel School District, Laurel, Delaware
Middle School Science Teacher

- Taught 7th grade students at Laurel Middle School. Covered topics included Cells, Growth, Development, and Reproduction of Organisms, Natural Selection, Molecular Structure, and Effects of Thermal Energy.

Wicomico High School August 2018-January 2019
Wicomico County Public Schools, Salisbury, Maryland
Technology Education Teacher

- Taught students in grades 9-12 at Wicomico High School. Covered topics included Foundations of Technology, Advanced Design Applications, and Technological Design.

Appoquinimink High School January 2017-July 2018
Appoquinimink School District, Middletown, Delaware
Agriculture Teacher and FFA Advisor

- Taught seven courses encompassing Plant Sciences, Animal Science and Environmental Sciences. Managed a classroom, small animal lab, and greenhouse. Advised local FFA chapter, oversaw student SAE projects, collaborated with other agriculture teachers in my district and state, and facilitated work-based learning initiatives.

Referred Publications

Wood, M.J., Sorensen, T.J., Burrows, M.S., Judd-Murray, R., & Boschetto, L.R. (In Review). Roots of retention: Exploring job satisfaction, the professional identities, and turnover intentions of SBAE teachers by certification type. *Journal of Career and Technical Education Research.*

Wood, M.J., Sorensen, T.J., Burrows, M.S., Judd-Murray, R., & Boschetto, L.R. (In Review). Sowing success: The impact of pedagogical content knowledge and professional development on the turnover intentions of SBAE teachers. *Journal of Agricultural Education.*

Pehrson, S., Sorensen, T.J., Burrows, M.S. & **Wood, M.J.** (In Review). Examining AI perceptions and utilization in school-based agricultural education. *Journal of Agricultural Education.*

Wood, M.J., Sorensen, T.J., & Rubenstein, E. (2024). Assessing the pedagogical content knowledge of school-based agricultural Education teachers and determining their individualized need for professional development by licensure type. *Journal of Agricultural Education.*

Moser, E., Vincent, S., Headrick, J., Schmidt, K., Steede, G., & **Wood, M.J.** (2024). Evaluating the Multidimensional Attitudes of Post-Secondary Agricultural Education Students Toward Lesbian and Gay Identities. *Journal of Agricultural Education.*

Wood, M.J., Sorensen, T.J., & Burrows, M.S. (2023). Attitudes and professional development needs of school-based agricultural education teachers related to inclusion, diversity, and equity. *Journal of Agricultural Education*, *64*(2), 194–211. https://doi.org/10.5032/jae.v64i2.58

Refereed Poster Presentations

Wood, M.J., Bennett, J.E., & Sorensen, T.J. (In Review). Investigating identity and the integration of female teachers in the school-based agricultural education profession. *Proceedings of the 2024 Western Region AAAE Research Conference,* Chico, CA.

Wood, M.J., & Sorensen, T.J. (In Review). Exploring the pedagogical content knowledge and professional development needs of school-based agricultural education teachers by certification type. *Proceedings of the 2024 Western Region AAAE Research Conference,* Chico, CA.

Wood, M.J., & Sorensen, T.J. (2024). Tracing the turnover intentions of SBAE teachers by certification type and career stage. *Proceedings of the 2024 AAAE Research Conference,* Manhattan, KS.

Wood, M.J., & Sorensen, T.J. (2024). Investigating identity and the integration of alternatively certified teachers in the school-based agricultural education profession. *Proceedings of the 2024 AAAE Research Conference*, Manhattan, KS.

Wood, M.J., & Sorensen, T.J. (2023). Analyzing the sources of knowledge and pedagogical content knowledge of SBAE teachers by licensure type. *Proceedings of the 2023 AAAE Research Conference,* Raleigh, NC.

Wood, M.J., & Sorensen, T.J. (2023). Does a one size fits all approach work?: Comparing the professional development needs of alternatively certified and traditionally certified SBAE teachers. *Proceedings of the 2023 AAAE Research Conference,* Raleigh, NC.

Wood, M.J., Sorensen, T.J., & Burrows, M.S. (2022). Positionality of teachers regarding DEI professional development in SBAE. *Proceedings of the 2022 AAAE Research Conference,* Oklahoma City, OK.

Wood, M.J., Sorensen, T.J., & Burrows, M.S. (2022). SBAE teacher attitudes regarding the utilization and implementation of culturally relevant education practices. *Proceedings of the 2022 AAAE Research Conference,* Oklahoma City, OK.

Refereed Manuscript Presentations

Wood, M.J., Sorensen, T.J., Burrows, M.S., Judd-Murray, R., & Boschetto, L.R. (2024). Roots of retention: Exploring job satisfaction, the professional identities, and turnover intentions of SBAE teachers by certification type. *Proceedings of the 2024 AAAE Research Conference,* Manhattan, KS.

Wood, M.J., Sorensen, T.J., Burrows, M.S., Judd-Murray, R., & Boschetto, L.R. (2024). Sowing success: The impact of pedagogical content knowledge and professional development on the turnover intentions of SBAE teachers. *Proceedings of the 2024 AAAE Research Conference,* Manhattan, KS.

Wood, M.J., Sorensen, T.J., & Burrows, M.S. (2022). Attitudes and professional development needs of school-based agricultural education teachers related to inclusion, diversity, and equity. *Proceedings of the 2022 AAAE Research Conference,* Oklahoma City, OK.

Media References

Myers, B., Retallick, M. & Haddad, B. (2024). *Professional Development for Inclusion, Diversity, and Equity.* Owl Pellets: Tips for Agriculture Teachers, [Audio Podcast]. Featuring: **Matthew Wood** & Michelle Burrows. Available at: https://owlpelletsforag.podbean.com/e/professional-development-for-inclusion-diversity-equity/

Awards and Recognition

- Laurel High FFA Chapter Advisor 2019-Present
  - Delaware FFA State Officer- *Joey Nowotny (2023-2025)*
  - National Chapter Award Winner
  - Three-time National Finalist in Agriscience Fair
  - Seven-time National CDE Qualifier (*Marketing Plan, Dairy & Horse Evaluation, Food Science, Farm Business Management, Agricultural Communications*)
  - Six-time State Proficiency Award Winner
  - Five State FFA Degree Recipients
  - Two American Degree Recipients
- National AAAE Conference Outstanding Research Poster (Top 10) 2024
- Laurel School District Teacher of the Year 2023-2024
- Laurel High School Teacher of the Year 2022-2023, 2023-2024
- Delaware Association of Ag Educators- *Outstanding Program* 2023
- Delaware Association of Ag Educators- *Outstanding Teacher Nominee* 2022
- National FFA Grants for Growing Recipient 2021 & 2022
- National FFA Organization Teacher Ambassador 2021-2022
- Laurel High School Teacher of the Month Nov. 2020 & Sept. 2021
- National Teach Ag Ambassador 2016-2017
- Maryland FFA State Officer 2012-2013

Leadership & Service Activities

- Reviewer, Journal of Agricultural Education 2022-Present
- Reviewer, Western Region AAAE Poster Session 2022-Present
- Delaware Association of Agricultural Educators (DAAE) 2017-Present
  - *Committee Chairperson, Marketing Plan CDE Chairperson, Food Science CDE Co-Chair*

Professional Organizations

- National Education Association (NEA) 2023-Present
- American Association for Agricultural Educators (AAAE) 2021-Present
- Minorities in Agriculture, Natural Resources, and Related Sciences 2021-Present
- Association for Career and Technical Education (ACTE) 2019-Present
- Delaware Association of Agricultural Educators (DAAE) 2017-Present
- National Association of Agricultural Educators (NAAE) 2019-Present
- Maryland Agricultural Education Foundation (MAEF) 2013-Present
- National FFA Alumni Association 2013-Present