Agricultural Teacher Creativity: An examination of agricultural teachers' creative identity and creative behaviors

Patricia Lane Woodward

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

Doctor of Philosophy
In
Agricultural, Leadership, and Community Education

Rick Rudd
Curt Friedel
John Ricketts
Gary Skaggs

April 12, 2019
Blacksburg, VA

Keywords: Creativity, Agricultural teacher, Creative Identity, Creative Behavior

Agricultural Teacher Creativity: An examination of agricultural teacher's creative identity and creative behaviors

Lane Woodward

ABSTRACT (Academic)

Education is a complex and diverse field of study that encompasses both how we learn and what practices are most effective at ensuring that learning occurs. Studies within this area often focus on student achievement of success, but not the teacher. We know that agricultural teachers identify differently and require specialized professional development and teacher preparation programs as compared to traditional educators. Some existing research on agricultural teacher identity is available but not on creative identity experienced by agricultural educators. Identity development occurs over time in the context of individual experiences as social interactions. Identity is not static and is constantly under development. To understand identity formation, one must begin to understand the multidimensional components that lead to a particular identity. Although the agricultural teacher may have a primary identity of agricultural educator, we also know a component of the identity is creativity. Because all people are problem-solvers and creative we know that all people have creativity as one of the many dimensions of their primary identity. By using the lens of symbolic interaction (SI) we can begin to understand and recognize how our social interactions contribute to identity development. By using the "looking glass" concept supported by SI we can examine the relationships of the opinions of others and the impact those opinions have on the development of our individual identity. SI also supports the discovery of social roles and social definitions used to construct identity.

Findings informed recommendations for both teacher preparation programs and agricultural teacher professional development. Teacher preparation programs should initiate the

inclusion of identity development by providing experiences for student teachers followed by reflection. The reflection is to provide time for the teacher to reflect on their role as a creative teacher. Identity is used by an individual to determine behavior and set goals. Because identity influences decision making it is important that both the agricultural teacher identity, as well as the creative identity, be formed and continually supported. When a teacher recognizes creative behavior or the ability to create as a part of their identity, they are more likely to behave creatively or set goals relying on reflecting creativity leading to creative problem-solving.

ABSTRACT (Public)

Identity development is not a subject formally covered in coursework or professional development, but it is still important. Identity is used to determine behavior and actions as well as to set goals. Our identities shape who we are and what we do. If I identify as creative then I am more likely to practice creative behavior as well as set goals that include creativity.

With the day to day problems we face as a society grow in number as well as in level of difficulty, creative solutions are needed. However, often we hear "you're not creative" or say "I'm not creative." These words are said because our creative identity is not active nor is it developmentally supported. Understanding the development of creative identity and the behaviors that demonstrate creativity level can help develop creative problem-solving skills and practices.

I found that generally, agricultural teachers find they are creative whether their creative score indicates a strong creative ability or not. I found that for teachers to feel their administrators and peers view them as creative they must hear words of affirmation; however, a teacher uses clues from student actions of engagement or questions to feel that their students view them as creative. I found that teachers credit mentors, peer teachers, books, and professional development with how they define and act creatively within their classrooms. I found that the predominant creative behaviors were storytelling, movement, colorfulness, and fantasy.

These findings indicate the need to develop a teacher's creative identity by purposefully designed professional development. We should also begin to recognize creativity and verbally acknowledge creativity when observed. Teacher preparation programs should include creative

mentors and books that further develop instructional creative behaviors that were observed. The behaviors that appeared the least should also continue to be developed.

DEDICATION

I dedicate this dissertation research and all progress to degree to my father' Thomas Cleveland Woodward, mother, Deborah Adair Woodard, and sister, Adair Woodward. Education has always been a driving force within our family right alongside agriculture. The experiences I have had with my father as I learned and practice a variety of agricultural practices instilled a love and admiration for the field of agriculture.

The support I have received from my father during both my educational and professional journeys cannot be measured or adequately described in this dedication, but they are without a doubt the cornerstone of why I have chosen a career and profession as well as education focus in agricultural education. The work ethic my father demonstrated served as an example of how I should approach both my education and profession. My father has as also made sacrifices over the years to help me to reach my full potential.

I observed my mother teach for 31 years in a mathematics classroom both at the middle and high school level. I often asked her why she did not enter administration or the academy. She often answered that she does her best and most impactful work in those four walls within the public education system. Her understanding and acceptance of her role as an educator developing young minds is one factor that shows me the importance of public education and quality teachers. Her dedication deserves matched professional development initiatives as well as quality teacher preparation programs to equip teachers with the skills to carry out one of the most powerful professions. She has challenged me as I have been delivering professional development and researching teaching methods to not just tell teachers what they should do, but tell them how and to never forget what it is like to be in those four walls teaching and shaping young minds.

My sister is eleven years younger than I am, and perhaps my greatest and most knowledge nonformal teacher. My sister inspires me with ideas and practical applications for the theories learned in my coursework. She is a middle school science teacher with a degree in agriculture education. Through her educational background and her career, I am reminded that our agricultural teachers can and will do any type of job if duty calls. It is without any doubt that she is successful as a science teacher because she was trained to be an agricultural teacher. It is because of her that I approached this doctoral research not only for agricultural teachers but for student success.

ACKNOWLEDGMENTS

This research and progress to degree would not have been possible with one but it has taken many to support me during this academic journey. My journey started with my family who inspired me and believed that I could achieve something that no one in our family as attempted. My family support combined with a solid faith that I can do all things through Christ who strengthens me (Philippians 4: 13). My family initiated the journey but my peers and friends also supported me emotionally and made many sacrifices as I worked to find a balance and reprioritize my life.

A special thank you to my friends outside of my department for always understanding when I needed to cancel plans or could not travel to see you or visit. Thank you for checking in on me to make sure I continued to be social and sharing many laughs. Thank you for not having me feel guilty for putting my personal and social lives on hold at times. Thank you for the gifts, visits, and words of encouragement during his process.

The staff of the Agricultural, Leadership, and Community Education (ALCE) have helped organize meeting times and coordinate space. Staff members have completed funding or travel requests so that I can receive training and present research at professional conferences. The staff has also navigated paperwork with me to ensure posters are printed correctly or cars are rented for the correct time period for travel.

The students of ALCE have had a huge impact on my mental wellbeing. You've been there for the small papers and the hours of analysis by offering a social outing, an office conversation, a vacation, professional conferences, and joined me on this path reassuring me that this degree can be accomplished. Asha Shayo, thank you for taking classes with me and always being that wise ear that helped to keep me focused and remember to be true to myself. Chantel

Simpson, thank you for reminding me to take time for myself and to continue to be involved in the community, and not to be forgotten the hours spent discussing and trying to visualize theory. Shannon Wiley, you have influenced me more than you know. Your humbleness and work ethic have touched me and I will try to use you as a guide as I navigate my own path. Thank you for being my dissertation accountability buddy not only did you check on my progress, but you talked me through the process and always answered my call or text. Crystal Kyle, you are a force to be reckoned with, your example as you completed your dissertation and your standard of work helped to shape my idea and process. Thank you for the social outings and many laughs. Jessica Deslauriers, our relationship started professionally and then morphed into a friendship. You started as an ALCE student and then transitioned, but you will always be ALCE to me. Thank you for always talking me off the edge and the many laughs and nights at Abby's or wherever. Jessica, thank you for serving as a peer editor on almost everything! Michelle Greaud, your role may typically be as ALCE staff, but thank you for talking through this process with me and the much-needed social breaks to step away for a bit as well as a shared love for coffee. A special thank you to all of my past and present office mates (Arogeanae, Nesma, Dami, Helen, Robert, Roberto, Mauren, Natalie, Crystal, Shannon, Courtney, Chantel, Rachelle, Rachel, Kayla, Dayo, and Lorien) you all have been a source of energy and support if it was talking about what happened over the weekend to the theory that was discussed during class it has been a pleasure to spend my academic time with you. To all ALCE students even if I didn't mention you by name thank you for being an active part of my community both professionally and socially.

The faculty of ALCE have all added something to my growing academic knowledge. I have taken a class from most of you and if I did not, I have participated in a research team with you or discussed your research, teaching practices, and other academic endeavors. My progress

towards degree experience would not have been as rich and well-rounded without you. Thank you for your kind words and smiles in the hallway. Your words and actions of support have not gone unnoticed or unappreciated. Thank you, Dr. Tiffany Drape, for sharing research with me as well as teaching me how to use the Noldus software for analysis and a special thank you for always checking in on my progress. Thank you, Dr. Hannah Scherer, for offering professional opportunities of service with the teaching methods students as an observer. Thank you, Dr. Westfall-Rudd, for working to include me during teacher professional development workshops and working to support the diversity and inclusion initiative of the university, college, and department.

My advisor and major professor, Dr. Rick Rudd you served as more than an advisor and mentor, but also as a colleague. I would not have started this academic path without your vision and support. You recognized something in my passion that I knew was there, but was too scared to pursue or take the risk. Thank you for motivating me and having faith that I can do this and will fulfill my potential as I pursue my passion for agricultural education. Thank you also for supporting travel to professional conferences and having patience with me as I continue to overcome my imposter syndrome. Thank you for sharing your passion for critical thinking and creativity. Thank you for having faith in my ability and financially supporting my certification in both KAI and the TTCT. These certifications have truly enriched my educational and professional experience.

My doctoral committee has made this process a growing process by challenging me during my written preliminary examination and the oral defense of my preliminary exams. The review and discussion for my dissertation proposal and now the final product of my dissertation. The ideas and interests of Dr. Rick Rudd (chair), Dr. Curt Friedel, Dr. John Ricketts, and Dr.

Gary Skaggs have shaped me as a researcher and provided me with a skillset to be successful in my academic and professional future. Thank you!

Thank you, Dr. Curt Friedel, for sharing your interest in KAI. Thank you for your support as I develop research to explore KAI in the context of Agriculture education. Thank you for the times spent formally in class and informally as you check on my progress as well as my understanding of topics. I especially appreciated the opportunity to work with the governor's school sharing the topic of creativity as it applies to communicating science.

Thank you, Dr. Gary Skaggs, for sharing your skillset in mental measures and instrument design. Your course in instrument development and the use and application of the jMetrick software will help me as I continue my professional path. Thank you for the time spent understanding and developing validation plans for instruments as well as how to collect validation evidence. I now have a better understanding and hope when provided the opportunity to develop mental measures to make sure I remember and use the skillset you have shared with me.

Thank you, Dr. John Ricketts, for being a strong and dedicated agricultural educator. I am lucky to have had our paths cross early as I gained the skillset and experiences that made me the teacher that I am. I am a better instructor and I am sure my passion is partly due to the interactions I was lucky to have as both an undergraduate and graduate student at the University of Georgia. You have always recognized my inclusive practices and passion for teaching agriculture and thank you for inspiring me and having the faith that I can and will add to the profession.

A special thanks to the agriculture education community that allowed me into your identity development and observe your creative behaviors. Thank you to Amy McAlister who

scheduled my creativity workshops during the summer conference. Thank you to Dr. Kyle Gilliam for working with me to offer a teacher professional development workshop in conjunction with your fall FFA leadership conference. Thank you to Dr. Rick Rudd for the inspiration and support as I prepared and presented these workshops as well as for providing the TTCT manuals.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

KAI	Kirton's Adaption-Innovation Theory
FFA	Future Farmers of America
SI	Symbolic Interactionism
TTCT	Torrance Test of Creative Thinking

CHAPTER 1
INTRODUCTION TO THE STUDY

Education is a complex and diverse field of study that encompasses both how we learn and what practices are most effective at ensuring that learning occurs. The term education denotes both a basic science as well as an applied science. Since much of what we learn and how we learn takes place in a social environment (Lave, 1996) education fits nicely within the discipline of social sciences and sociology. Because of the level of social involvement involved, exploring and examining teaching and learning phenomena is essential for the progression of the teaching profession as we continue to hone our craft in an effort to improve our human condition. As we grow individually our society grows as well, creating complex problems that require a variety of strategies for a solution to be achieved (Jablokow, 2005).

The quest for understanding both how the human brain works and how humans develop knowledge has been a task many scientists have undertaken. One characteristic separating humans from other animals is intellect. The task to define learning is difficult but not impossible. As an applied sociologist, it is noted that learning and behavior are both involved as we gain new knowledge. The research often focuses on measuring if learning or how learning occurs. Instead of focusing on the learners (students), research concentrated on the experienced teacher provides insights specific to teacher behavior that will impact student achievement in a meaningful way. Encouraging the education programs that nurture desired practices in teachers should positively impact student achievement.

Research Problem

Every individual is different and that is reflected cognitively. This cognitive difference drives a need to diversity teaching methods and teacher training. By working to prepare our

educators we can more effectively support serving a variety of cognitive styles and levels. Society is diverse and fostering the notion of diversity and inclusion in classrooms aids in preparing students for the future. Each experience a student is exposed to during the time of development is used for the formation of who they are as individuals (Van Linden & Fertman, 1998). Diverse cognitive ability among students requires teachers to rely on creativity to satisfy the instructional needs of their students. Teachers not only need to foster their individual creativity but find ways to integrate creative behavior into lesson planning and assignments.

The problems we as a society are encountering are complex in nature and require creative problem-solving (Jablokow, 2005). In an effort to develop creative students we must first support our Agricultural teachers in their development of a creative identity. Teacher identity combines both personal and professional attributes but is important to a teacher's success (Block & Betts, 2016). Teacher creative identity is rarely discussed in Agricultural education. By identifying a teacher's level of creativity, the process of identity formation is supported. Because all people are problem solvers; therefore, they are also creative (Kirton, 2003). Because all people are creative, creative identity exists and can be influenced by social interactions over time (Block &Betts, 2014). Agricultural teachers should be aware of their creativity level and creative behaviors as well as developing their identity to support students develop skills for creative problem-solving.

Purpose

This qualitative study includes the collection of data for a deeper understanding of the formation of an agricultural teacher's creative identity. In this study quantitative data was used to measure the level of an individual's creativity. Qualitative data was collected to identify creative practices as well as explore a teacher's creative identity. A qualitative research design utilizing quantitative data for descriptive data was used to provide enhancement for the researcher to view

the phenomenon from a variety of facets to develop a deeper understanding of the following research questions:

Research Questions

1) What is the teacher's level of creativity?
2) How do teachers describe what creativity means to them as well as their own creative identity?
3) How do teachers develop their creative self-concept from their interactions in a learning environment and creativity level?
4) How do teachers display creativity in the classroom during instruction?
5) What is the relationship between a teacher's creativity level and the classroom instruction they utilize?

Explanation of Manuscripts

Manuscript 1: Agricultural teacher identity. The purpose of this study was to begin an exploratory process of agricultural teacher identity. Specifically, do teachers identify as creative and what is that relationship to creativity level as well as what influences their views of creativity as well as their individual creative identity. This study satisfied the following research questions: 1. what is the teacher's level of creativity; 2. how do teachers describe what creativity means to them as well as their own creative identity; 3. how do teachers develop their creative self-concept from their interactions in a learning environment and creativity level? Question one was answered using the collection of data from the figural form of the Torrance Tests of Creative Thinking (TTCT). Research questions two and three were answered using data collected from semi-structured interviews that led to emerging themes.

Manuscript 2: Agricultural teacher creative behaviors during instruction. The purpose of this study was to examine the creative behaviors of agricultural teachers. More specifically the data collected was used to confirm the creative constructs from the Torrance Tests of Creative thinking (TTCT) as behaviors of agricultural teachers. The study was designed to identify behaviors that are indicative of high-level creative teachers compared to moderate and low-level creative agricultural educators. The researcher utilized the descriptive quantitative data collected from the TTCT score reports to describe the creativity level of each case and well as examine any relationships.

Manuscript 3: Agricultural teacher creative identity and instructional behaviors conclusions and recommendations. The purpose of this study is to develop best practices for preparing agricultural teachers by developing their creative identity and instructional creative behaviors in the form of a qualitative study with the findings being used to confirm creative behaviors of agricultural teachers. This study used quantitative data to measure creativity level, and qualitative data to examine creative identity and creative behaviors. This study supports the American Association for Agricultural Education National Research Agenda, by supporting research priority area five: Efficient and Effective Agricultural Education Programs (Thoron, Myers, and Barrick, 2016). This research area specifically fits with this manuscript because it asks for continued research in professional identity.

The significance of the Problem

This study contributed to the literate on agricultural education teacher preparation and professional development opportunities. It also contributed to the literature specifically on creativity and career and technical education. These studies also contributed the growing knowledge and literature in creativity as it applies to identity development of teachers.

This research study addresses priorities outlined in the *National Research Agenda" American Association for Agricultural Education's Research Priority Areas for 2016-2020 (*Roberts, Harder, & Brashears, 2016). This specific study identified teacher creativity as a starting point for a greater examination into creativity, therefore, this study aligns most specifically with "Research Priority 5: Efficient and Effective Agricultural Education Programs" (Thoron, Myers, & Barrick, 2016, p.41) by supporting the development of skills needed by agricultural education practitioners. Creativity, as it applies to the agricultural teacher, has not been examined in depth which places this study as innovative with the continued potential to develop professional development that allows for teachers to hone their skills in the classroom.

Methods

Research Design

To examine the phenomenon of creativity and answer the research questions the researcher used a qualitative research design that used a case study approach. A case study permitted the researcher to "focus on a single unit to produce an in-depth description that is rich and holistic" (Ary, Jacobs, Sorensen, & Walker, 2014, p. 485). For the purpose of this study, the units that were identified as the cases are agricultural education teachers in the South Eastern United States. These teachers represented either secondary or middle school Agricultural education programs. Because the education field varies from state to state due to curriculum, training, and boards of education the case boundaries naturally exist allowing this phenomenon to be examined within Agricultural teachers in their individual classrooms.

Data were collected sequentially. Equal priority was given to all data strands based on the purpose for each study. Data that were collected sequentially occurred at different points of time and the data strands are separated (Creamer, 2018). Data analysis techniques will depend upon

the type and source of the data. Data strands will be either analyzed side by side or merged (Creswell, 2014). The side by side analysis will occur sequentially and with equal priority.

The quantitative data collected from the TTCT was analyzed first followed by interview data that was then followed by the analysis of video data. The meta-inference emerged from merging all analysis as the researcher reviewed the data strands from all sources (Creamer, 2018). The meta-inference lead to answering the fifth and final research question that is examined the relationship of creativity level, identity, and behavior in an effort to produce best practices for teacher preparation programs and agricultural teacher professional development opportunities.

Population and Sample

The process of identifying the population began with the researcher developing a professional development workshop that introduced the use of creativity in the classroom. The workshop began with the researcher alongside the participants discussing the various definitions of creativity. The researcher used Sternberg's creativity definition as the focus of the workshop. The workshop then introduced convergent and divergent thought processes and what types of lesson design and student activities use these types of thought processes to further develop a student's creativity. By strategically developing a creativity workshop the researcher was able to identify a sample with an interest in creativity and therefore leading to a purposeful sample of agricultural teachers.

The population consisted of agricultural instructors in the South Eastern United States that participated in creativity workshops offered in their respective states during regularly scheduled FFA events or professional development conferences. The population consisted of 21 teachers (N = 21) that responded to the recruitment efforts of the researcher by attending the

workshops held in each state independently. The sampling procedure for this study was convenience. The researcher chose participants that were available and easily accessible (Ary, et al., 2014). This type of sampling procedure ensured that the teacher that received study invitations did have an existing interest in creativity. Because this research utilized is a case study approach a small population and even smaller sample the researcher cannot guarantee anonymity, but the research did assign non-gender specific pseudonyms and did not release the individuals' states to allow for increased confidentiality. To address reciprocity the researcher provided participant feedback regarding their individual creativity score accompanied with a score report. The score report included tips and next steps for the participant to use to continue to use and develop their creative identity in the classroom.

Basic Assumptions

The study required several assumptions that were made by the researcher. The most critical assumptions made by the researcher are that everyone is creative, develops an individual identity, and uses creativity during instructional times. The researcher assumed the data collection tool, the TTCT, yielded accurate measurements and is valid based on previous research and testing. The researcher assumed that all participants participated in the instrument, videos, and interviews truthfully and fully. The researcher assumed that the videos capturing the instructional creative behaviors were not only truthful but were captured the most creative instructional method because the researcher prompted the teacher to record a lesson in which they felt they were creative. The researcher assumed the case boundaries, as well as the sampling method and categorization, was sound.

Limitations of Study

The research designed this study to reduce the limitations as much as possible while increasing reliability and validity. However, there are unavoidable limitations that still apply. The major limitation is the lack of generalizability for the findings. Because the sample is bound to teachers in the South East the findings can only be used to describe agricultural teachers who are the participants in the study. However, the researcher has worked to ensure the study can be replicated with any population of Agricultural teachers by providing a description of the design and analysis processes.

Statement of Positionality

The following statements are intended to add transparency to the research by detailing how the researcher's experiences and background may have influenced the study. The researcher is currently positioned outside of the participant population but was previously an active participant within the South Eastern United States. The researcher was not only an agricultural teacher but also held a leadership role in the professional organization. While the researcher never taught agriculture in some of the states included in the South East the researcher held a position of power as a state leader for the career and technical student organization (CTSO) associated with agricultural education.

The researcher identifies as a teacher and more specifically an agricultural teacher and utilizes this identity and research lens formed from nine and half years of teaching experience in an agricultural education classroom. The researcher’s background may have had an effect on which members of the population participated in the study based on previous relationships and experiences between individuals in the study’s population and the researcher. This relationship

could impact the quality and the responses presented during both interviews and video submissions.

Definitions of Terms

Appropriate: An act is defined as appropriate when it is suitable for a particular purpose.

Creative: An individual is described as creative or an act is creative when a unique solution to a problem is developed or used (Sumners, 2017).

Creativity: Creativity is commonly defined as an act that is both novel and appropriate (Sternberg, 2004).

Creative Identity: Creative identity is a form of identity and may be a primary or secondary identity for an individual depending on how the individual perceives their role in a social environment. (Petkus, 1996).

Creative Problem Solving: Creative problem solving uses creativity to find new and useful solutions as well as develop opportunities for enhancing situations (Treffinger, 1995).

FFA: The FFA is a national intracurricular youth organization for students interested in agriculture leadership and is one of the three components of an agricultural education program. (National FFA Organization, 2019).

Novel: Novel, when associated with creativity, is commonly defined as a new idea (Riquelme, 1994).

References

Ary, D., Jacobs, L. C., Sorensen, C., & Walker, D. A. (2014). *Introduction to Research in Education* (9th ed.). Belmont, CA: Wadsworth.

Block, L.A., & Betts, P. (2014). Sustaining/containing agency in an alternative teacher education program. In L. Thomas (ED.), *Becoming teacher: Sites for teacher development in Canadian Teacher Education* (pp. 13-31). Retrieved from https://www.researchgate.net/profile/Julie_Mooney3/publication/328006982_Contemplative_Practice_to_Compassionate_Learning_Community_Developing_and_Sustaining_the_Teacher's_Inner_Life_as_a_Site_for_Faculty_Development/links/5bb2896092851ca9ed33b18a/Contemplative-Practice-to-Compassionate-Learning-Community-Developing-and-Sustaining-the-Teachers-Inner-Life-as-a-Site-for-Faculty-Development.pdf#page=13

Creamer, E. G. (2018). *An Introduction to Fully integrated Mixed Methods Research*. Thousand Oaks, CA: SAGE Publications.

Creswell, J. W. (2014). *Research Design* (4th ed.). Thousand Oaks, CA: SAGE Publications.

Jablokow, K. W. (2005). The catalytic nature of science: Implications for scientific problem solving in the 21wt century. *Technology in Society 27*, 531-549. doi:10.1016/j.techsoc.2005.08.006

Kirton, M. J. (2003). *Adaption-Innovation in the Context of Diversity and Change*. New York, NY: Taylor & Francis Group.

Lave, J. (1996). Teaching, as learning, in practice. *Mind, Culture, and Activity, 3*(3), 149-164. Retrieved from http://www.mathcs.duq.edu/~packer/Courses/PSI3962/Lave%201996%20Teaching,%20as%20learning,%20in%20practice.pdf

National FFA Organization. (2019). About Us. Retrieved from https://www.ffa.org/about/

Petkus, E. (1996). The creative identity: Creative behavior from the symbolic interactionist perspective. *Journal of Creative Behavior* 30 (3). Retrieved from

Riquelme, H. (1994). Information processing theory and its explanation of the creative process. *Creativity and Innovation Management*, *3*(2), 85-90.

Roberts, T. G., Harder, A., & Brashears, M. T. (Eds). (2016). *American Association for Agricultural Education national research agenda: 2016-2020.* Gainesville, FL: Department of Agricultural Education and Communication.

Sternberg, R. J. (2004). *Handbook of creativity.* New York, NY: Cambridge University Press.

Sumners, S. E. (2017). E. Paul Torrance: His life, Accomplishments, and Legacy. Presented at Torrance Tests of Creative Thinking, Figural Workshop. Athens, GA; UGA Torrance Center for Creativity and Talent Development.

Thoron, Myers, & Barrick, (2016). Research priority 5: Efficient and effective agricultural education programs. In T.G. Roberts, A. Harder, & M. T. Brashears (Eds.) *American Association for Agricultural Education national research agenda: 2016-2020* (pp. 41-48). Gainesville, FL: Department of Agricultural Education and Communication.

Treffinger, D. J. (1985). Test review of Torrance Tests of Creative Thinking. In Mitchell, J.V. (Ed.), *The Ninth Mental Measurements Yearbook.*

van Linden, J. A. & Fertman, C. I. (1998). *Youth Leadership: A Guide to Understanding Leadership Development in Adolescents.* San Francisco, CA: Jossey-Bass Publishers.

CHAPTER 2
LITERATURE REVIEW

Chapter one included the statement of the problem, research objectives, and basic introduction information to the research study as a whole divided into three manuscripts. This chapter provides a more in-depth review of the theories and background literature surrounding the three manuscripts within this study. The chapter is separated into five major sections: (a) learning theory and creativity; (b) a creativity measure comparison; (c) identity; (d) theoretical foundations; and (e) the conceptual model.

Learning Theory and Creativity

Theory assists us in understanding the world around us, but a theory is amplified and provided purpose when given a context (Abend, 2008). By exploring learning theory in the context of creativity it allows for a deeper understanding of both the theory and individual creativity. Creativity is defined as an act that is both novel and appropriate, but what does it mean to be novel. Riquelme (1994) provides two operational definitions for novel. The first is from the point of view of the person originating and owning the idea. This type of novel answers the question "is this a first time thought for this individual" (Riquelme, 1994). A second definition used by Riquelme (1994) defers to Torrance's (1965) idea that an act is novel in the cultural context answering the question "has anyone ever had this idea before." Kirton (2003) identifies all people creative and capable of problem-solving. Therefore, all individuals are capable of creating an act that is both novel and appropriate. All individuals benefit from instruction that promotes creativity during the development of creative identity. Before the focus can be on student creativity, we need to explore teacher creativity and the individual creative identities of both the student and the teacher. A research interest not limited to a description of

creative identities or the creative behavior exhibited, but how each creative identity is constructed.

Learning theories develop explanations and statements about how people learn. Learning is defined as a process that involves acquiring and modifying knowledge, skills, strategies, beliefs, attitudes, and behaviors (Schunk, 2015). Because all people are creative it is difficult to narrowly define the theoretical implications that influence teaching pedagogy as well as develop a conceptual framework by which those may be described. Many educational researchers are grounded in behaviorist theory where a discovery of response to stimuli was explored by Watson and Skinner. However, finding there is more to learning than a conditioned response; learning theorist began exploring experiential learning and the cognitive theories.

This historical progression of learning theories follows Abend's (2008) suggestion that theory starts at a very basic level and then evolves to a more abstract concept. Just because behaviorism began the research focusing on learning theories does not mean it is completed. Kubina, Morrison, and Lee (2006) utilized reinforcement to identify novel behavior and how it relates to creativity. Kubina et al (2006) also divide creativity further into "big C" and "little C" creativity. "'Big C' creativity refers to the rare creations such as the work produced by the Aristotles, Newtons, and Tolstoys (Kubina et al., 2006). 'Little C' creativity refers to the less prominent innovations done by less recognized people" (Kubina et al., 2006, p. 225). Creativity with a "Big C" may be limited in that it is a world view, but that does not mean we should not continue to develop "Little C" behavior.

Imitation occurs when an individual can replicate the behaviors of another individual (Kubina et al., 2006). Because creativity is defined as a novel act, how can imitation be novel? It is suggested that this learned behavior from observation of another can be applied differently;

therefore, the imitated behavior is novel to the individual, yet still appropriate. This highlights the significance of differentiating between "big C" and "little C." These glimpses of novel behavior are limited to "little c" creativity, but when viewed with a constructivist lens the building of creative output can begin to be seen as learners build responses to stimuli onto one another.

Instruction occurs verbally when as an individual tells another what to do or not to do within a certain context (Kubina et al., 2006). An individual can also provide self-instructions. This occurs when instructions are internalized. This phenomenon is observed by using the TTCT because individuals are asked to caption a picture or tell a story. "For example, a general writing strategy may involve coming up with a number of potential storylines or main ideas" (Kubina et al., 2006, p. 233). This example supports the idea of telling oneself a set of instructions. Reinforcement can increase this novel behavior. Depending on the impact of the novel behavior this could be viewed as either "big C" or "little C" creativity. Are students simply responding to stimuli because of conditioning then yes, the product is appropriate, but where is the novelty even if we use "big C" and "little C" to differentiate? If teachers are modeling creative behavior students will begin to imitate the behaviors creating classroom environments that foster and support not only creative behavior but creative problem-solving.

Experiential learning occurs in both formal and non-formal learning settings but is focused around the experience in which the learner is participating. Traditionally a learning theory focused on adults, has many applications for younger learners specifically when developing creativity. Experiential learning is understood as radical as well as associated with empowerment for the learner (Fenwick, 2003). Experiences provide the individual with a background to assist in determining what is novel and appropriate during that particular point in

time leading to the display of creativity and not necessarily Creativity. As mentioned previously teaching and learning is social and therefore lends itself nicely to experiential learning. Just as knowledge generation occurs socially so does identity formation. Petkus (1996) states social interactions and the perceptions shared in social exchanges lead to identity formation. Therefore, creative behavior is experienced during the social exchange enabling the development of creative identity.

Social cognitive theorists "stress the idea that much human learning occurs in a social environment; by observing others" (Bandura, 1986, 1997, 2001 as cited by Schunk, 2016, p. 117). Therefore, learning is a component of social practices (Lave,1996). Teachers and learners, share their experience with each other during our educational transactions. When learning and identity formation is partnered with social cognitive theory the effects of a relationship are supported because of imitation, vicarious learning, and self-efficacy.

Because self-efficacy is the belief you have about your abilities and skill level then that can be influenced by the individuals as well as the environment. The interaction between components is explained by the triadic reciprocity model of causality (Schunk, 2016). Kirton (2003) posits that we never have the same thought leading to the understanding that no two thoughts are the same. This idea of no two thoughts being the same supports the reciprocity model of causality because the relationship and the interactions between parts are explained. This reciprocity model also supports a teacher's identity formation. The teacher displays a behavior and then receives feedback from themselves as well as the environment. From that feedback creative self-efficacy is determined and adds to the forming identity of the teacher.

Everyone is creative (Sternberg, 2004; Kirton, 2003), but as discussed creativity can be classified as “Big C” or “Little C” (Kubina et al., 2006). Utilizing these definitions and

assumptions leads to the conclusion that an individual in an environment that is fostering higher self-efficacy and indirectly can be encouraged to exhibit more creative behavior; therefore, driving the generation of novel and appropriate ideas. Self-efficacy is the belief individuals have about their ability and skill level that is influenced by the individuals you have around you as well as your environment as explained by the triadic reciprocity model of causality (Schunk, 2015).

Because all learners are creative and problem solvers as previously mentioned there is a process that everyone engages in to produce creative output to problems they encounter. Jablokow (2005) identifies the elements required for problem-solving in figure 1-1. For problem-solving to occur the links between the problem solver (person), the process used, and the product (Jablokow, 2005).

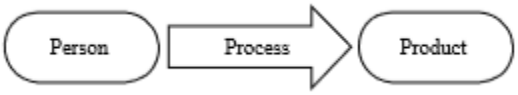

Figure 2-1. The key elements of problem-solving (Jablokow, 2005, p. 534)

This path to problem-solving capacity is driven by social cognitive learning theory. A conceptual model that works to solve problems creatively is one that merges these two as well as includes components mentioned in experiential learning. First is the integration of both the person (problem solver) and the process. The process depends on the person as well as the individual's experiences, creativity level. The experiences can be found as part of the environment. It is important to note that included with experiences are transformative experiences as well that provide radical shifts in thought and action that then influence behavior. Kirton (2003) identifies an individual's cognitive preference for action not as a behavior, but as

an influence to behavior which can also be seen in this model because both the individual and the environment interact with the behavior and vice versa.

By utilizing components of Bandura's social cognitive theory Learning occurs in the social environment from observing others (Bandura, 1971) The core of symbolic interaction lies in the center of social life (Sandstorm, Martin, & Fine, 2010). By combining both social cognitive theory and symbolic interactionism we can begin to understand the formation of teacher creative identity and ultimately how that influences students in becoming creative problem-solvers.

Creativity Measures

Creativity is defined as producing a product that is both novel and appropriate (Sternberg, 2004). There are many creativity and creative thinking measures available for use. Some focus on motivation, the flexibility of thought, originality, and fluency. All of those attributes of creativity are found in the definition Sternberg supplies. Motivation and flexibility of thought are connected to the idea of production and may connect to the generations of ideas for a divergent thought and problem-solving. Originality is mirrored in the concept of novelty. In general, something is considered novel when it is unique and not typical. The remaining suggested component is fluency and is a measurable form of appropriate. Generally, things are appropriate with they make sense in the context they are being used.

Creativity as a large item in itself is difficult to construct a measure for that is useful and valid. The Guilford Alternate uses test is one that tests the verbal creativity of an individual by asking the respondent to list non-ordinary (novel) uses for a common object and provides a score rooted on the flexibility of thought and originality (Guilford, Christensen, Merrifield, &Wilson, 1978). The Torrance Tests of Creative Thinking (TTCT) also uses flexibility and originality as a

basis, but goes beyond the verbal test and utilizes a nonverbal test as well. The TTCT also adds in a fluency component, therefore, supporting the appropriateness of the responses.

When designing research, the task of instrument selection is imperative. The researcher must select the best instrument to best serve the needs of the purpose of the study. One tool to aid in the decision-making process is the collection and evaluation of validity evidence. Messick validity model includes the following categories of evidence: content, substantive, structural, generalizability, external, and consequential (Messick, 1995). The Messick model utilizing the aspects of construct validity will be utilized to assist the researcher in deciding between two measures that are still used currently today to measure similar aspects of creativity.

Guilford's Alternate Uses Test

Description and Purpose of the Guilford's Alternate Uses Test. Alternative Uses test is used to evaluate the divergent thinking abilities of an individual and was designed by Guilford et al. (1978). This creativity test was designed by Guilford in 1967 (Creative Huddle, 2018). Although the test is designed to measure a level of creativity it can also be used as a brain exercise to assist an individual in developing divergent thinking skills. This type of test focuses on divergent thinking and showcases how an individual can generate a variety of solutions to one singular problem.

Test Specifications of the Guilford's Alternate Uses Test. Participants are asked to list uses for a common object, more specifically non-obvious uses. Common objects may be but are not limited to a brick, paperclip, or a shoe. Each common object is accompanied by a statement of that objects ordinary use (mind garden, n.d.). The test is traditionally timed but varies by the researcher, participant, population, or use. The testing procedure manual requires that

individuals respond to the prompt with six ideas within the time provided, and the responses given are used in scoring (Guilford et al., 1978).

An individual is given a score based on an individual's ability to generate multiple different ideas. There are four sub-categories are fluency, originality, flexibility, and elaboration. Scores from those for sub-categories are combined for a total score. The instrument shows significant loadings on a factor named "spontaneous flexibility" (Guilford et al., 1978). This factor was so named because responses indicated that the participant was shifting thought, therefore, displaying flexibility and because it was not part of the instructions it was an action that was considered spontaneous (Guilford et al., 1978).

Traditionally the Alternate Uses test is given to groups of participants. The test is broken into two individually timed parts each with three items (Guilford et al., 1978). The test is also available in two formats (Form B, Form C). Guilford et al. (1978) suggest that researcher that would like to compare forms or increase reliability utilize both forms of the test. The original form A of the instrument has been discontinued, but can be replicated by combining all of form B and part of form C (Guilford et al., 1978).

Validation Plan Utilizing Messick's Framework of the Guilford's Alternate Uses Test

Content evidence includes content relevance, representativeness, and technical quality (Messick, 1995). Although the test developers were clear in the purpose of the instrument many researcher and practitioners have found that it is also a development tool as well as a psychometric measurement tool. The instrument authors agree that the intended purpose is to measure divergent thinking (Guilford et al., 1978).

The development of the test specification does follow the purpose as well as the intended use because the test is so simply named. By asking the participant to respond to a prompt with

six responses in a given time is related to producing novel ideas. Although this instrument is simple in design and execution it does allow for the responded to generate novel and appropriate ideas, however, limited to only requiring six. This requirement of six does set a limitation for the participant. Because of the described factor analysis completed by the test authors and additional researcher the test items, instructions, and scoring are supportive of flexibility and divergent thinking.

The 1960 instrument was developed by revising and improving the Unusual Uses test developed in 1954 by Wilson, Guilford, Christensen, and Lewis (Guilford et al., 1978). The instrument improvements were chosen to not only investigate creative thinking but to "represent an expected factor of ‘flexibility of thinking'" (Guilford et al., 1978, p. 5). Guilford et al. (1978) examined the instrument and found that it did indeed have significant loadings on a factor labeling flexibility.

The instrument manual is easily purchased online and does not require any significant training for a reviewer, researcher, or practitioner. Because there is not required training the manual does provide a page describing possible answers that assist the reviewer with scoring the instrument. The most current edition of the manual and instrument was copyrighted in 1978 and has not been updated. The lack of training of reviewers regarding scoring can be problematic for ensuring the content and responses are adequately measuring the construct.

Without a thorough explanation of why the test is developed in the style of only requiring or requesting six responses, it is difficult to identify the difficulty of the instrument's items. This is compounded by the lack of explanation for a score summation as well as interpretation (Quellmalz, 1985). Therefore, the practitioner or researcher is left without an understanding of what the scores mean or how the scores may be used.

Substantive evidence refers to empirical evidence that the theoretical processes are actually engaged by respondents when completing the measure (Messick, 1995). There are theory and research that was used in the original development but is left underexplained in the manual. Quellmalz, 1985) advises that the potential user of the Alternate Uses test carefully evaluate the knowledge required by the instrument and its relationship with creative thinking processes the user wishes to measure. Even though the construct maps and internal and external models may be missing the operational definition is intact as a measure investigating creative thinking by use of documenting flexible thinking (Guilford et al., 1978). No further evidence has been provided in the manual or review of the measure regarding think-aloud protocol that asks if the respondents' thinking process is in line with the construct and concepts being measures (Messick, 1995).

Structural evidence refers to the degree to which relationships between items conform to a theoretical view of the construct (Messick, 1995). Instrument authors have determined by using factor analysis that the test items load on to two factors. The original factor identifying flexibility eventually became identified as divergent production of semantic classes (DMC), and the second factor was identified as divergent production of semantic transformations (DMT) (Guilford et al., 1978). Although the researcher has found a variety of uses for the instrument it is still determined to measure creativity, therefore following and continuing to support the theoretical constructs originally identified by the instrument's authors.

Generalizability refers to the degree to which test score properties and interpretations generalize to and across population groups, settings, and task including validity generalization of instrument criterion relationships (Messick, 1995). The instrument can be used with populations that range from grades 6-16 and adults as well (Quellmalz, 1985). Reliability has been calculated

according to population and Form combinations. The population with the highest reliability is sixth grade with reliability scores that range from 0.85 to 0.91 with the highest reliability when combining forms B and C to create an instrument with 12 items (Guilford et al., 1978). Reliability is slightly lower but ranges from 0.75 to 0.86, and as with the sixth grade, the combined forms B and C produced the higher reliability score (Guilford, et al., 1978).

Specification of the target population

To determine score raters are used, but there is not a training program or expert detail provided in the instrument's manual. The gaps in rater training, as well as lack of expert score, damages the norming ability of the instrument. Instrument authors did complete a few studies and concluded that although norming scores were found they should not serve for a national norm, "but they can serve as basic frames of reference" (Guilford et al., 1978). The authors suggest using the median of the score group to scale scores to create the ability to normalize the score distribution.

Other researchers have used the instrument if various populations and have found some item discrepancy across sub-groups. Guilford et al. (1978) cited an Iscoe and Pierce-Jones (1964) study that identified how race affected item fluency but not flexibility. Because of the lack of producing a national norm is it concluded that the item characteristics would not function the same across various sub-groups of participants. However, Guilford et al. (1978) do recognize that gender differences are small; therefore, the suggested norm scores can be applied to any participant regardless of gender.

External evidence refers to how the construct is expected to relate to other constructs and variables (Messick, 1995). As previously discussed, there is some difference between sub-groups when observing fluency. This difference was further explored to find that the form of the

creativity test, either verbal or nonverbal when comparing race, gender, and socioeconomic status (SES) of participants. This difference is not reflected in the literature provided for test development by the instrument's authors. Overall the relationships identified in the Alternate Uses constructs show correlations between intelligence and creativity. Correlations have also been found with personality traits, student achievement, effects of training, and as expected an indicator of creativeness (Guilford et al., 1978). These correlations between the measure and other personality tests weaken this measure in the category of external evidence because it provides the opportunity to question what the measure is actually measuring.

Consequential evidence includes the value implications of score interpretation as well as the actual and potential consequences of measure use regarding bias and fairness (Messick, 1995). A Bias or fairness review of instrument items is not reported in the testing manual, but the test only measures verbal creative skills. As previously mentioned, there was a difference between groups when comparing types of creativity test. Because this test only observed verbal fluency, flexibility, originality, and elaboration it does not provide potential instrument users with a consistent measure of creativity. After reviewing the test forms there does not appear to be any offensive language or obvious bias.

There is not a documented impact on individuals or systems but does have research that supports this form of creative thinking test to be used as a predictor of student achievement. Because there is some difference in SES groups regarding verbal and nonverbal creativity that supports participants with higher SES score higher on verbal forms of creativity as compared to participants in low SES (Guilford et al., 1978). Therefore, there is a bias for this instrument towards high SES. This bias may predict or identify individuals from a low SES as having a lower creative ability and possibly preventing access to various interventions or predictions of

student achievement. This negative impact is not only at the participant level, but also at the system level because of the tie to student achievement.

Torrance Tests of Creative Thinking

Description and Purpose of Torrance Tests of Creative Thinking

The Torrance Tests of Creative Thinking (TTCT) measure was developed for identifying and evaluating the creative potential of the respondent. This instrument can be used for participants that are in kindergarten through graduate school. The TTCT is used to identify gifted students by identifying the individual's creativity level as well as predicting achievement (Chase, 1985). The instrument is designed to be given in two parts a figural form and a verbal form. Torrance (2017) developed the TTCT to serve as a measure of creative thinking abilities and not a measure of intelligence nor should it be used alone as the basis for a clinical decision.

Test Specifications of Torrance Tests of Creative Thinking

The TTCT can be given respondents in an individual or group setting. It can also be given to a respondent orally if the respondent cannot write. Creativity researchers have shown that there are two ways creative thinking can manifest; therefore, the TTCT was designed to have both a verbal and nonverbal component (Sumners, 2017b). Both the figural and the verbal also have two forms available for use. The activities (items) in both forms are designed and approached as games to engage the participants (Chase, 1985). Both the figural and verbal TTCT forms are norm-referenced. Scores are calculated for a standard and then transformed to a standard score which is then transformed to a national percentile score (Torrance, 2017).

The figural forms A and B consist of three activities that are each timed independently for a total time of 30 minutes (Torrance, 2017). The figural form requires that participants respond to the prompt by drawing and are scored on fluency, originality, elaboration, the

abstractness of title, and resistance to premature closure. Not all activities are included in the calculation of all score categories. Fluency is identified as the gatekeeper score; therefore, all figures must be fluent to be included in the other areas as well as part of the total score (Cramond & Sumners, 2011). The figural also includes bonus scoring in the form of a checklist of creative strengths.

The verbal forms A and B consist of six activities each timed independently for a total time of 40 minutes. The verbal form requires participants to respond to the prompts with written responses. If the participant is not able to write the responses can be written for them by the test administrator or another test proctor (Torrance, 2016). As with the figural, the verbal uses a fluency score as a gatekeeper identifying only responses that should be scored further and included in the total score. Unlike the figural, the verbal form uses fluency, flexibility, and originality to calculate scores, but does not have a checklist of strengths to add bonus points.

Validation Plan Utilizing Messick's Framework of the Torrance Tests of Creative Thinking

Content evidence collected consists of information obtained from both testing and direction manuals. These materials identify a clear purpose but also add warning form the author of the instrument of not to use the TTCT alone in clinical decisions. This is a warning and not a requirement, so many states, and school systems do rely on the TTCT for placement in gifted or accelerated learning programs (Sumners, 2017b).

Development of test specifications is related to the purpose and the intended use of the measure. The manual and scoring guides are clear and easy to follow (Chase, 1985). Because the TTCT does use both verbal and nonverbal responses to prompts this does include the majority of possible tasks that are associated with creativity and the forms are designed to be given together (Sumners, 2017b). Because there is not a requirement of artistic ability meaning the drawing

does not have to be "good" for a response to receiving credit (Chase, 1985); therefore, it allows for the measure to represent a variety of levels of creative thought.

Although the TTCT has not undergone any major content changes since the 1980's the instrument relies on scientific data collected in longitudinal research studies. These longitudinal studies include the following: seven and 12-year high school students follow up and a 22, 40, and 50 year follow up study of elementary school students (Sumners, 2017b). These studies have aided in the updating of scoring parameters, deletion of activities, and used to update the normed scores. These studies also aided the test author as well as the researcher involved in the Torrance Center to ensure those test items were still relevant and effective.

Substantive evidence demonstrates that participants are engaged in the constructs of theoretical structures used to develop the measure. TTCT sores would suggest they are derived by structuring a theory of creativity to describe what the relationship of these variables to creativity but there is a gap in connecting the theory to the constructs (Chase, 1985). Treffinger (1985) admits that “Creativity” is a much larger construct, but the TTCT can be used to assess the more relevant and a sub-component of the overarching “Creativity.” The operational definition is rooted in fluency that supports the notion that creative output is not only novel, but appropriate, but is not completely addressed by the measure. The item organization does appear to be presented in a hierarchical order. Less and less guidance is provided to the respondent or less of a picture or scenario is provided requiring the participant to process at a variety of levels to complete the measure.

Structural evidence has been collected in the form of score norming. The longitudinal data previously mentioned has been consistent in describing the measure as a tool for predicting creative thinking ability. The purpose of the instrument is rooted in the measurement of

creativity to be used for prediction of future creativity as well as the current level (Treffinger, 1985). Chase (1985), finds that “Torrance provides a definition for creativity which appears to be only partly assessed by the tasks in the test. The test does not entirely operationalize the definition” (p. 2). Correlational analyses have demonstrated “intercorrelations among the verbal fluency, flexibility, an originality score… (0.74 to 0.80)” (Chase, 1985); therefore, indicating there is much overlap. The majority of the subset correlations are reported to be in the 0.30 to .050 range (Chase, 1985).

Generalizability of the instrument lies in the reliability of the measure within and across populations accounting for differences in subsets of populations as well. The use of the TTCT is so wide that determining reliability can be difficult, but this wide range does allow for some generalizability. Treffinger, (1985) found that reliability is reported from anywhere between 050 to 0.93, and suggests that "it seems that the TTCT display reasonable reliability for group and research applications" (p.1). Reliability reported at $\alpha = 0.93$ would indicate the evidence of precision.

Raters are trained and requested to attend additional training either as needed or once every 10 years (Sumners, 2017a). Raters are required to reach the reliability of an expert rater before being permitted to utilize the instruments (Sumners, 2017a). Raters do not have to be trained on both the figural and verbal. Chase (1985) found that the correlation between taters was high and ranged between 0.86 and 0.99. These correlations supported the reliability coefficients that were found to be in the 0.90’s (Chase, 1985). Treffinger (1985) found that across a variety of subgroups “there is reasonable support for the position that TTCT data are significant predators of later creative accomplishment” (p 2). Treffinger (1985) also reports that researcher have found that test administration differences can influence TTCT results such as changing of time limits

External evidence has been collected by Torrance and others to illustrate how the construct is expected to relate to other constructs and variables. Treffinger (1985) found the following:

> TTCT data are significant predictors of later creative accomplishment. TTCT scores have been positively and significantly correlated with creative achievement criteria in several studies involving periods as short as nine months and as long as 22 years. Higher TTCT scorers in the high school years, for example, had selected and attained more unusual occupations, developed original career patterns, and pursued more relevant but unusual educational and work activities when assessed 12 years later (p.2).

Treffinger (1985) also cited a study conducted by the instrument's author Torrance that included,

> findings from a 22-year longitudinal follow-up of students tested for several years while in elementary school (1958-64). Follow-up data obtained in 1979-80 showed that TTCT data were significant predictors of five measures of creative attainments (high school and post high school creative accomplishments, creative "style of life" accomplishments, and ratings of quality of highest creative accomplishments and aspirations) (p.3).

By reviewing both of these studies it is understood that the instrument and its predictions are consistent with the creativity constructs that are used in the development of the TTCT.

As for comparing responses across subset, there is not sensational information reported. The scoring guide is not divided by gender but is organized by either grade level or age. Sumners (2017a) suggests that respondents are scored using the scoring guide organized by age instead of the grade. Since there is not adequate data to develop normative scores for adults over age 20 the score charts do not exceed 20 years old or grade levels greater than grade 13. The same is true for the other side of the age continuum. The score charts start with age five or kindergarten.

Consequential evidence indicates the value implications of score interpretation as we well as the actual and potential consequences of the TTCT utilizing bias and fairness of the instrument. Because the instrument is used in multiple countries without alteration it is understood to be both fair and has reduced bias (Cramond & Sumners, 2011). Because the activities in both the figural and verbal forms are pictures or partial figures there is no inappropriate langue use. As mentioned with creativity there are two ways it can be observed and the TTCT utilized both methods.

Both Chase (1985) and Treffinger (1985) agree that Torrance (2017) in the manual admits that this measure is not to be used alone to make clinical decisions. This is a measure that when combined with other methods of observation or measurement can be part of an equation to determine a clinical position (Treffinger, 1985). With this warning, it is assumed that this measure if used incorrectly could have a negative outcome on both the participant and the system. It was found that this test does not inherently create a bias for one particular population or subgroup to provide an advantage or restrict access.

Treffinger (1985) sited many research studies that mentioned test administration influences a participant's score. This supports the importance of a test administrator or proctor to follow the guidelines and instructions listed in Torrance's (2016) TTCT Directions manual that identifies the exact time parameters for each activity within any form of the measure. Therefore, if the researcher or practitioner utilize the TTCT as recommended by the author then the majority of the negative impacts on both the individual and system would be avoided.

Guilford Alternative Uses Test vs Torrance Tests of Creative Thinking

A first glance at either the Alternative Uses test of the TTCT a casual observer may see many similarities because of the requirement on the participant to generate ideas to satisfy a

prompt. For general or non-research based uses the Alternate Uses test seems to be a better fit because of access to materials and it does not require training for scoring or administration. There is also a difference in test length which may also sway preference towards the Alternate Uses test. After collecting the readily available validity information that fits the Messick model for validity evidence the TTCT appears to be the more valid instrument.

An evaluation of the validity evidence shows both instruments are weak within the content and substantive categories with weak explanations of constructs related to the theoretical background. The TTCT makes an effort to operationalize the definition it uses for creativity, but falls short (Chase, 1985). The Alternate Uses test make little to no effort to ensure the definition used is operationalized. There is insufficient data to support that either of the instruments follows their respective internal and external models. However, the TTCT does demonstrate a connection to the external model when related to the prediction of achievement utilizing its longitudinal studies (Treffinger, 1985). Both instruments utilized research to develop the measure and improved on the measures over time either by eliminating items or updating scoring procedures.

When reviewing the evidence available for the structural component there becomes a larger difference between the two based on the evidence presented. The Alternate Uses test provided results from a factor analysis that demonstrated that the items loaded on two factors and in a greater number on the flexibility of thought or DMC factor. The TTCT did not supply the actual factor analysis but did report correlations among fluency, flexibility, originality which Chase (1985) concluded represented much overlap.

One key component of quantitative research is that the results be generalizable. The generalizability of a measure is a key factor in selecting a measure because if an instrument is not generalizable to your population your study will be lacking. The Alternate Uses test lack in

generalizability. Quellmalz (1985) concluded that the Alternate Uses test was lacking in generalizability because of the populations that were used in studies reporting instrument reliability were specialized and specific. The opposite is found for the TTCT. The generalizability across populations for the TTCT is well documented with both national and international users with thousands of respondents (Sumners, 2017b). Both instruments report high reliability suggesting both provide precise measurements of creativity.

The external evidence collected demonstrates a further difference between the two measures. The Alternate Use as reported by Quellmalz (1985) shows bias towards sup-groups of populations and correlations with other constructs other than creativity. Treffinger (1985) found that there were several studies that hand findings that supported the proposed measurement for the TTCT. These findings connect the TTCT to its predictive ability of future engagement with and production of creative products.

The two measures become again similar when reviewing the consequential evidence. Both instruments are clear in their respective testing manuals of the intended use and purpose. However, when misused by test administrators or researcher the negative impacts on the individual or the system cannot be prevented. In the TTCT manual Torrance (2017) does warn about the importance of not relying on this a sole measure of creativity to be used in any clinical decisions. The Guilford (1978) manual for the Alternate Uses test does not include this warning or mention any possible negatives of using this test for clinical decisions. With the common association with creativity to intelligence, it is important for the warning to be given to guard against negative outcomes.

Overall these two instruments are similar even in time of development. The difference is the amount of effort and scientific study put into the continued development of the TTCT. The

Alternate uses test appears to be a starting point and is an affordable and useful tool for recreational use, but insufficient for research purposes. The lack of generalizability and external support weakens the instrument. Additionally, the Alternate Uses test also has a bias between sub-groups due to only using verbal skills. This weakness is avoided with the TTCT because the measure uses both verbal and nonverbal creativity skills. Many of the practice exercises offered by Sumners (2017a) are similar to the Alternate Uses test and help develop or prepare a respondent's brain for divergent thinking. As a result of this evaluative process, the TTCT is recommended for use in a study measuring teacher creativity.

Identity

It can be argued and supported that teacher identity influences the decisions educators make in regards to teaching methods and selection of content as well as relationships and involvement in continued professional development (Beijaard, Meijer, & Verloop, 2004: Hammerness, Darlin-Hammond, & Bransford, 2005). Izadinia, (2013) found that teacher preparation programs are considered to be an important platform and opportunity for teacher identity development. Because the teacher preparation time period is found to be the best opportunity for development it can be concluded that this time period would also be the best opportunity to develop a teacher's creative identity as well.

One important fact to note regarding identity is that it is not stable and can be reinforced, changed, and dissolved at any point while a teacher is learning or gaining experience through teaching (Trent, 2010). This lack of stability is both powerful and limiting. This means that we have time to foster solid identities that allow for teachers to feel and practice creativity if we as researcher and teacher educators continue to reform teacher preparation to include identity development as well as structure professional development to allow teachers to explore and

reinforce their identities as teachers and as creativity. Understanding identity and a teacher being self-aware of their own identity empowers the teacher to set goals and better achieve those goals Izadinia, 2013).

Identity is not known to only to be unstable but is it also recognized as multidimensional allowing for different roles (Akkerman &Meiger, 2011). The idea of identity being multidimensional supports the idea of intersectionality where various demographics meet and work to further identify the diversity and flexibility within an individual. This means that as teacher educators if we focus on the development of teacher identity and then support the further development of roles within the teacher identity as a whole such as creativity then we are better supporting the teacher in understanding themselves as a whole and not requiring them to form into something they are not.

This idea of a multidimensional identity also supports the specific need of agricultural teachers. Often agricultural teacher's identity is different from other educators because of the many dimensions that include diverse backgrounds and interests (Shoulders, 2018). Shoulders, (2018) further recommends the strategic development of agricultural teacher professional development that aligns with the specialized identity of agricultural educators. It can be recommended that if teacher professional development can benefit from this individualized and focused specifically for the agricultural teacher then teacher preparation efforts should also be designed and constructed to meet those needs as well.

During teacher preparation, students adopt and reject information based on their perception of what good teaching is (Horn, Nolen, Ward & Campbell, 2008). "The idea of good teaching may come from student teachers' own school experiences or from images and representations they are given, for example during teacher education" (Hahl & Mikulec, 2018).

Because teachers form visions of good teaching through this method it can also be understood that students can work to define creativity like this as well. As discussed earlier there can be either big "C" or little "c" creativity. While it would be great to have everyone fall into the categorization of Creative it is more likely that everyone can be recognized as creative. By including creativity in descriptions for methods, program planning, and classroom management students can begin to shape what creativity as a teacher looks like just as they begin to shape their vision of what behaviors are indicative of good teaching is.

Creativity Constructs and Theoretical Foundation

This research study relies on creativity constructs, the TTCT, and symbolic interaction (SI) for the development of the design, interviews, and data analysis. The researcher utilized the constructs found in the TTCT to design the qualitative study to confirm creative behaviors as identified by the TTCT creative checklist. The assumption of the SI theory shaped the development of interview questions as well as inform the analysis, discussion, and recommendations for teacher identity.

Creativity and Divergent Thinking

There are several lenses that can be used to develop an approach and understanding of creativity (Torrance, 1993). Torrance (1993) identifies that creativity can be considered from the following viewpoints person, process, product, and the environment. The constructs used to develop the TTCT are rooted in the process of creativity. As an education phycologist Torrance was "concerned with the learning, thinking, teaching, problem-solving, creative, development, and other processes" (Torrance, 1993, p. 232). The act of creativity and creative thinking is the "process of sensing difficulties, problems, gaps in information, missing elements, something askew; making guesses and formulating a hypothesis about these deficiencies; evaluating and

testing these guesses and hypotheses; possibly revising and retesting them; and, last communicating the results" (Torrance, 1993, p. 233). At the base of all of these are human needs and the need to correct incompleteness is satisfied when creative behavior is used (Torrance, 1993).

The use of creativity is simply something done to relieve a tension to solve problems around us so that something is not missing or out of place (Torrance, 1993). As solutions are being developed is the point where divergent thinking enters. Divergent thinking is searching for all possible solutions. This search for all possible solutions and finding an answer with trial and error is supported by Torrance's (1993) inclusion of hypothesis testing for solutions. It is because of human needs being the catalyst for creative behavior that creativity is a component of everyday thinking and not merely reserved for high achievement (Torrance, 1993).

Torrance Tests of Creative Thinking

As previously discussed, the TTCT is a measure used to identify the creativity level of an individual and not necessarily a theory. By understanding the scoring and operationalized definitions of the constructs of the TTCT the researcher can develop assumptions about creativity and creative behavior. Each construct or behavior that is measured is defined and described in detail in the certification manual that is part of the required certification course to become a TTCT practitioner.

The TTCT does rely on the participant responses to be fluent which supports the appositeness required by Sternberg's, (2004) definition of creativity. The TTCT also scores individuals on originality, abstractness titles, elaboration, and resistance to premature closure. These score categories are the five constructs the instrument measures to identify an individual's creativity level. Torrance developed the TTCT not to reward individuals with high levels of

creativity but in an effort to recognize an area of need for an individual and know exactly where that individual might need development (Sumners, 2017b).

The TTCT does not only measure those main constructs but also includes a creative checklist of possible specific creative behaviors that may add to the overall creativity score of an individual. The creative behavior checklist for the figural form includes the following: emotional expressiveness, storytelling articulateness, movement or action, expressiveness of titles, synthesis of incomplete figures, synthesis of lines or circles, unusual visualization, internal visualization, extending or breaking boundaries, humor, richness of imagery, colorfulness of imagery, and fantasy (Torrance, 2016).

Symbolic Interaction

In the social science discipline what is known as Symbolic interaction (SI) theory was developed form the work of C. H Cooley in 1902 and G. H. Mead in 1934 (Krutilla &Benson, 1990). Krutilla and Benson (1990) noted that it was Blumer in 1972 who actually began to use the term "symbolic interaction." Blumer (1972) argues that SI rests on three assumptions as cited in Krutilla and Benson (1990),

> 1) human beings initiate activity with physical objects, other human beings, categories of human beings, institutions, and abstract concepts; 2) meaning is entirely derived from the social interaction one as with others; 3) meaning are created, modified, stabilized or dismantled as people interact with one another and their common environment (p. 9).

These main assumptions of SI lend the theory very well with identity formation of agricultural teachers during teacher preparation programs. The basics of identity development are rooted in social experience and that aligns with the third SI assumption that meaning is either developed, sustained, or dismantled as people interact with one another. By interacting with

others, the second assumption is fortified and can be found in identity development because "people become keenly attuned to how they think others see them" (Krutilla &Benson, 1990, p. 9). This awareness is especially impactful when the awareness of others perceptions is coming from people who are viewed as important (Krutilla &Benson, 1990). This idea of seeing yourself as others see you is known as "The Looking Glass Self."

Symbolic interaction (SI) theory assumes that identity is formed from social interactions (White, Klein, & Martin, 2015). Because learning occurs and is situated in social situations (Lave, 1996) it allows for the classroom and teacher interactions to facilitate the shaping of identity. SI uses the process of self-reflection as individuals use the looking glass approach to see how others see them as individuals and from that identity is formed (White, et al., 2015).

The Conceptual Model

To examine creative identity, creativity constructs and symbolic interactionism theories are combined as shown in figure 1-2. This combination allows for the social context of learning to be accounted for and identifies as well as shows the interactions of the three components when developing a creative identity of the teacher by included social cognitive theory. Lave (1996) and Bandura (1971) both place learning as a component of a social practice and with symbolic interaction occurring in the center of the social experience where parts are intersecting (Sandstorm, Martin, & Fine, 2010) this particular depiction of the process for the development of a creative identity making leading to student achievement a possibility.

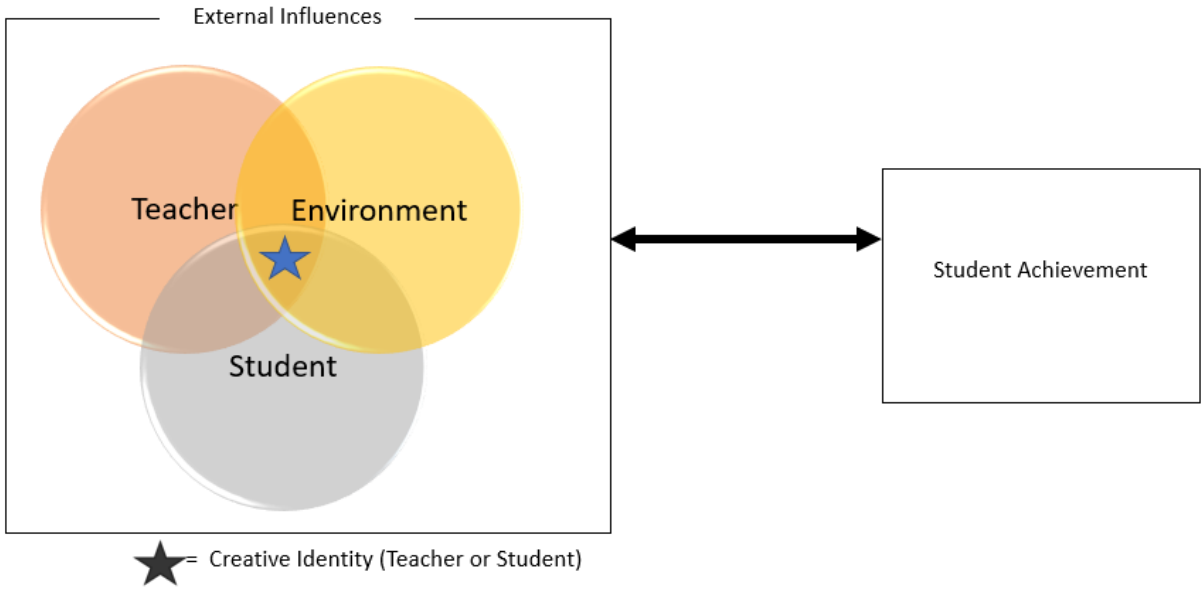

Figure 2-2. Theory Construction Map for Creative Identity and Student Achievement

Let us take a look at the model piece by piece. First, we will look at the external influence square this boundary forms the boundary for the education experience. These external factors may be but are not limited to federal, state, and local education regulations and policies. An example of this would be the state standardized test or the required number of seat hours a student must have to earn credit. These influences may also be financial in nature. These influences can determine the size of the three contained components as well as how much overlap and interaction there is.

Next, let us examine the social context of learning. Bandura (1971) identified the three components and described the reciprocal effect. The teacher component is everything related to the teacher such as; education and training, experiences, creativity, problem-solving, subject expertise, and resources. The environment component is the learning environment which includes things such as physical classroom space, decorations, and equipment, lesson plans, texts, relationships (interactions). The third component is the student and consists of the

individual experiences, self-efficacy, and abilities. The overlap of the circles illustrates the ability of these three components to interact and influence each other.

The focus area for this model is the center of the Venn diagram where all three components meet. This is the center of social interactions and is where symbolic interaction functions and is used as a method of discovery. Because all individuals are believed to be capable of creativity and problem solving (Kirton, 2003) then everyone has a creative identity. This overlap is where the creative identity is formed and informs the other components.

It is important to note that no movement or influence is unidirectional but every relationship is bidirectional. Even as you move outside of the social interaction of learning there is a bidirectional relationship that occurs between learning and student achievement. The results that can be identified as student achievement may be measured as graduation or test scores then influence how those three components interact. In some cases, the achievement outcomes may even influence the external influences.

As with theories, there are assumptions, and the same can be said for this model. Social cognitive theory tells us that learning is built from the experiences of individuals. Symbolic interaction describes an individual's behavior as being motivated by self-concept. When combining both theories, the assumption is that the learning environment is social. These three assumptions contain the following constructs: experiences, social interactions, and self-concept. These concepts are all found in the center focus of the model that contains the experiences of both the teachers and the students as well as the interaction of all three components. These interactions and shared space lead to the development of the self-concept that will lead to the formation of creative identity.

Identity is present in each component of the model. The teacher and student each have identities that are influenced by interaction among all components, although it is indicated with the star in the center of the model where the components overlap. The model does work to explain how the components of a learning environment interact with each other for identity development leading to student achievement but what is not visually displayed are the creative behaviors that are exhibited by either the teacher or the student within the learning environment.

As previously mentioned, identity shapes an individual's beliefs and actions; therefore, if a person believes and identifies as creative then they are more likely to exhibit creative behaviors. By using the TTCT to identify possible creative behaviors we can visually observe these behaviors in the social interactions of the learning environment. It is expected that someone that scores as having a high level of creativity will also demonstrate high frequencies of creative behaviors. These behaviors would be brought to the learning environment by individuals, but the social interaction would be where the experiences shape the individuals furthering the development of creative identity and leading to student achievement.

Although the outcome of the model suggests the measurement of student achievement this study focused on the teacher and more importantly the description of the teacher as it falls into the section of overlap. This overlap represents the social nature of teaching and learning and is where components of symbolic interaction will appear with the greatest evidence. Understanding the teacher is the key to teacher development and a crucial piece of this model describing the process that leads to student achievement.

Chapter Summary

This chapter included literature that addressed learning theory and its connection to creativity. A comparison of two creativity tests and detailed validation of the TTCT. Literature

focused on the development of identity and identity specific to agricultural teachers. The identity literature exposed a need to not only include identity development in teacher preparation program but to continue to develop identity throughout a teaching career by offering professional development that is specific to the multidimensional properties of agricultural teacher identity. SI theory assumptions were introduced as well as identified connections to the social aspect of identity development. The chapter concluded with the introduction of the conceptual model that describes the educational setting as a whole but identifies where the teacher identity is held as well as the areas that shape that identity as described and supported by SI.

References

Abend, G. (2008). The meaning of theory. *Sociological Theory 26*(2), 173-199. Retrieved from http://www.jstor.org/stable/20453103?origin=JSTOR-pdf

Akkerman, S. F., & Meiger, P. C. (2011). A dialogical approach to conceptualizing teacher identity. *Teaching and Teacher Education 27*, 308-319. Retrieved from https://www.sciencedirect.com/science/article/pii/S0742051X10001502?via%3Dihub

Bandura, A. (1971). *Social Learning Theory*. General Learning Corporation. Retrieved from https://www.dl.icdst.org/pdfs/files1/91fcebcd73499a3a43173cca1a1ea1ef.pdf

Beijaard, D., Miejer, P. C., & Verloop, N. (2004). Reconsidering research on teachers' professional identity, *Teaching and Teacher Education, 20,* 107-128. Retrieved from https://www.sciencedirect.com/science/article/pii/S0742051X04000034?via%3Dihub

Chase, C.I. (1985). Test review of Torrance Tests of Creative Thinking. In Mitchell, J.V. (Ed.), *The Ninth Mental Measurements Yearbook*. Retrieved from http://marketplace.unl.edu/buros/

Cramond, B. & Sumners, S. F. (2011). Scoring the Torrance Tests of Creative Thinking. Presented at Torrance Tests of Creative Thinking, Figural Workshop. Athens, GA; UGA Torrance Center for Creativity and Talent Development.

Creative Huddle (2018). The Alternative Uses Test. Retrieved from http://www.creativehuddle.co.uk/the-alternative-uses-test

Guilford, J. P., Christensen, P. R., Merrifield, P. R., & Wilson, R. C. (1978). Alternate Uses Manual & Sample Manual, Test Booklet (B&C), Scoring Key (B&C). Sheridan Supply Co.

Fenwick, T., J. (2003). *Learning Through Experience: Troubling Orthodoxies and Intersecting*

Questions. Malabar, FL: Krieger Publishing Company.

Hahl, K. & Mikulec, E. (2018). Student reflection on teacher identity development in a year-long secondary teacher preparation program. In *Australian Journal of Teacher Education 43* (12). Retrieved from https://ro.edu.edu.au/ajte/vol43.iss12/4

Hammerness, K., Darling-Hammond, L. & Bransford, J. (2005). How teachers learn and develop, In L. Darling-Hammond & J. Bransford (Eds.), *Preparing teachers for a changing world: what teachers should learn and be able to do* (pp. 358-389). San Francisco, CA: Jossey-Bass.

Horn, I. S., Nolen, S. B., Ward, C., & Campbell, S. S., (2008). Developing practices in multiple worlds: The role of identity in learning to teach. *Teacher Education Quarterly*,*35*(3), 61-72. Retrieved from https://www.jstor.org/stable/23478981

Izadinia, M. (2013). A review of research on student teachers' professional identity. *British Educational Research Journal, 39*(4), 694-713. Retrieved from https://onlinelibrary.wiley.com/doi/epdf/10.1080/01411926.2012.679614

Jablokow, K. W. (2005). The catalytic nature of science: Implications for scientific problem solving in the 21wt century. *Technology in Society 27*, 531-549. doi:10.1016/j.techsoc.2005.08.006

Kirton, M. J. (2003). *Adaption-Innovation in the Context of Diversity and Change*. New York, NY: Taylor & Francis Group.

Krutilla, J. O, Benson, D. E. (February, 1990). The reflected-self identity of learning disabled adolescents: Perceptions of "I Am" using symbolic interaction theory. Paper presented at the *International Conference of the Learning Disabilities Association* in Anaheim, CA.

Kubina, R., M., Morrison, R., S., & Lee, D., L. (2006). Behavior analytic contributions to the

study of creativity. *Journal of Creative Behavior, 40*(4), 223-242, doi: 10.1002/j.2162-6057.2006.tb01275.x

Lave, J. (1996). Teaching, as learning, in practice. *Mind, Culture, and Activity, 3*(3), 149-164. Retrieved from http://www.mathcs.duq.edu/~packer/Courses/PSI3962/Lave%201996%20Teaching,%20as%20learning,%20in%20practice.pdf

Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. American Psychologist, 50, 741-749.

mind garden (n.d.) Alternate Uses (Guilford's Alternate Uses). Retrieved from http://www.mindgarden.com/67-alternate-uses

Petkus, E. (1996). The creative identity: Creative behavior from the symbolic interactionist perspective. *Journal of Creative Behavior* 30 (3). Retrieved from

Riquelme, H. (1994). Information processing theory and its explanation of the creative process. *Creativity and Innovation Management*, *3*(2), 85-90

Sandstorm, K., Martin, D. D, & Fine, G. A. (2010). *Symbols, Selves, and Social Reality; A Symbolic Interactionist Approach to Social Psychology and Sociology.* Portland, OR: Ringgold Inc.

Schunk, D. H. (2015). *Learning Theories: An Education Perspective.* Pearson.

Sternberg, R. J. (2004). *Handbook of creativity.* New York, NY: Cambridge University Press.

Shoulders, C. W., (May,2018). A description of the professional identities of Arkansas agricultural teachers. A research presentation at *American Association for Agricultural Education (45)* held in Charleston, South Carolina.

Sumners, S. E. (2017a). Administering the Torrance Tests of Creative Thinking. Presented at

Torrance Tests of Creative Thinking, Figural Workshop. Athens, GA; UGA Torrance Center for Creativity and Talent Development.

Sumners, S. E. (2017b). E. Paul Torrance: His life, Accomplishments, and Legacy. Presented at Torrance Tests of Creative Thinking, Figural Workshop. Athens, GA; UGA Torrance Center for Creativity and Talent Development.

Thoron, Myers, & Barrick, (2016). Research priority 5: Efficient and effective agricultural education programs. In T.G. Roberts, A. Harder, & M. T. Brashears (Eds.) *American Association for Agricultural Education national research agenda: 2016-2020* (pp. 41-48). Gainesville, FL: Department of Agricultural Education and Communication.

Torrance, E. P. (1993). Understanding creativity: Where to start. *Psychological Inquiry, 4*(3), 232-234. doi:10.1207/s15327965pli0403_17

Torrance, E. P. (2016) *Torrance Tests of Creative Thinking Directions Manual*. Bensenville, IL; Scholastic Testing Service, Inc.

Torrance, E. P. (2017) *Torrance Tests of Creative Thinking Norms-Technical Manual*. Bensenville, IL; Scholastic Testing Service, Inc.

Torrance, P. (1965). *Rewarding Creative Behavior, Experiments in Classroom Creativity.* Englewood Cliffs, NJ: Prentice Hall.

Treffinger, D. J. (1985). Test review of Torrance Tests of Creative Thinking. In Mitchell, J.V. (Ed.), *The Ninth Mental Measurements Yearbook*. Retrieved from http://marketplace.unl.edu/buros/

Trent, J. (2010). Teacher education as identity construction: insights from action research. *Journal of Education for Teaching, 36*(2), 153-168. Retrieved from https://www.tandfonline.com/doi/pdf/10.1080/02607471003651672?needAccess=true

Quellmalz, E.S. (1985). Test review of Alternate Uses. In Mitchell, J.V. (Ed.), *The Ninth Mental Measurements Yearbook*. Retrieved from http://marketplace.unl.edu/buros/

White, J. M., Klein, D. M. & Martin, T. F. (2015). *Family theories: An introduction* (4th ed). Thousand Oaks, CA: Sage.

CHAPTER 3
MANUSCRIPT #1

Agricultural teacher creative identity

Abstract

Everyone has a collection of identities that guide who they are and the actions or goals they set. Agricultural teachers have a specific identity that differs from traditional teachers. Identity is also multidimensional and includes creativity. This study defines creativity from the perspective of agricultural teachers as well as identifies the influences on creativity and creative identity. The concept from symbolic interaction (SI) theory of the "looking glass" is also explored. The researcher presents the findings and discusses the connections between creativity level and certain identity influencers. The researcher also recommends topics and creative approaches to be integrated into both teacher preparation programs and agricultural teacher professional development opportunities.

Introduction

Identities are constructed from the following traits and characteristics: social relations, roles, and social group memberships (Oyserman, Elmore, & Smith, 2012). Together, these factors define an individual (Oyserman, Elmore, & Smith, 2012). Teacher identity includes the role and how the individual views their role as a teacher. Because this is a causal relationship it can be understood that if the teacher does not view themselves as creative and filling a creative problem-solving role their identity is impacted. By identifying the creativity level, the teacher can be self-aware and begin the steps of formalizing their role as a creative problem solver leading to the development of creative identity.

Identity formation is an iterative process and is not necessarily fixed during any point in time (Petkus, 1996). Thus, teachers can form new identities and build on existing identities at

any point in their career. However, research has shown that teachers are more successful and have greater agency when they begin constructing their identity as a teacher during their teacher education programs (Block &Betts, 2014). To influence teacher education programs an understanding of how agricultural teachers create their creative identity must serve as a starting point. In an effort to understand the phenomena of creative identity generation the researcher developed a study that combines a teacher's creativity level with interviews to explore identity.

Research Problem

Teacher identity combines both personal and professional attributes but is important to a teacher's success (Block & Betts, 2016). Teacher creativity identity is rarely discussed in Agricultural education. By identifying a teacher's level of creativity, the process of identity formation can begin. Because all people are problem solvers, they are also creative (Kirton, 2003); therefore, creative identity exists and can be influenced by social interactions over time (Block &Betts, 2014). Agricultural teachers should be aware of their creativity level and develop their identity to support the development of students' capacity for creative problem-solving.

Purpose and Research Questions

This qualitative study includes the collection of data for a deeper understanding of the formation of agricultural teachers' creative identity. In this study quantitative data was used to measure the level of an individual's creativity. Qualitative data was collected to identify creative practices as well as explore teacher creative identity with the help of SI. A qualitative design was used to provide enhancement for the researcher to view the phenomenon to develop a deeper understanding of the following research questions:

1) What is the teacher's level of creativity?

2) How do teachers describe what creativity means to them as well as their own creative identity?
3) How do teachers develop their creative self-concept from their interactions in a learning environment and creativity level?

Literature Review

Symbolic Interaction and Creativity

There are several lenses that can be used to develop an approach and understanding of creativity (Torrance, 1993). Torrance (1993) identifies that creativity can be considered from the following viewpoints person, process, product, and the environment. The constructs used to develop the TTCT are rooted in the process of creativity. As an education phycologist Torrance was "concerned with the learning, thinking, teaching, problem-solving, creative, development, and other processes" (Torrance, 1993, p. 232). The act of creativity and creative thinking is the "process of sensing difficulties, problems, gaps in information, missing elements, something askew; making guesses and formulating a hypothesis about these deficiencies; evaluating and testing these guesses and hypotheses; possibly revising and retesting them; and, last communicating the results" (Torrance, 1993, p. 233). At the base of all of these are human needs and the need to correct incompleteness is satisfied when creative behavior is used (Torrance, 1993).

The use of creativity is simply something done to relieve a tension to solve problems around us so that something is not missing or out of place (Torrance, 1993). As solutions are being developed is the point where divergent thinking enters. Divergent thinking is searching for all possible solutions. This search for all possible solutions and finding an answer with trial and error is supported by Torrance's (1993) inclusion of hypothesis testing for solutions.

We can answer to what extent someone is creative as well as how is creativity displayed, but by adding in SI the researcher examined the question of why someone is creative or displays creative behavior. "The sociological perspective of symbolic interactionism may help to explain the motivation of creative behavior" (Petkus, 1996, p. 188). Therefore, the researcher used SI to examine the meanings of social experiences and interactions of the participants. Petkus (1996) also suggested role-identity theory within SI to explain that people exhibit behaviors that meet their expectations or their perceived expectations from others. This idea of perception and expectations was used by the researcher to develop interview questions that asked the participant to explore their expectations for themselves and those expectations from various stakeholder groups specific to creativity.

Creativity is defined as an act that is both novel and appropriate (Sternberg, 2004), but what does it mean to be novel. Riquelme (1994) provides two operational definitions for novel. The first is from the point of view of the person originating and owning the idea. This type of novel answers the question "is this a first time thought for this individual" (Riquelme, 1994). A second definition used by Riquelme (1994) defers to Torrance's (1965) idea that an act is novel in the cultural context answering the question "has anyone ever had this idea before." Kirton (2003) identifies all people creative and capable of problem-solving. Therefore, all individuals are capable of creating an act that is both novel and appropriate. Understanding that all people are creative and all people develop identities is concluded that all people can and do form a creative identity. Since identities are multidimensional (Akkerman & Meiger, 2011), then creativity identity may not stand alone, but be included within a larger identity, such as the identity of "teacher". Therefore, all individuals benefit from instruction that promotes creativity

during the development of a creative identity or another professional identity such as "agricultural teacher".

To explain and understand identity development symbolic interaction is used. Symbolic interaction (SI) theory assumes that identity is formed from social interactions (White, Klein, & Martin, 2015). Because learning occurs and is situated in social situations (Lave, 1996) it allows for the classroom and teacher interactions to facilitate the shaping of identity. SI uses the process of self-reflection as individuals use the looking glass approach to see how others see them as individuals and from that identity is formed (White, et al., 2015). Thus, it is understood that once a teacher learns their creativity level it will have an effect on their individual creative identity. A creativity score is a powerful tool in shaping how individuals view their own creativity. For example, if a teacher viewed themselves as not creative, but received a score that indicated a high level of creativity the teacher would begin to identify themselves as creative.

Methods

Research Design

When designing research, the task of instrument selection is imperative. The researcher must select the best instrument to best serve the needs of the purpose of the study. One tool to aid in the decision-making process is the collection and evaluation of validity evidence. Messick validity model includes the following categories of evidence: content, substantive, structural, generalizability, external, and consequential (Messick, 1995). The Messick model utilizing the aspects of construct validity will be utilized to assist the researcher in deciding among measures that are still used currently today to measure similar aspects of creativity.

By understanding the constructs of the instrument, the researcher can unpack the results with participants to assist in the understanding of what the identified level means. The score is a

total of all constructs. The TTCT uses flexibility and originality as a basis but goes beyond to identify humor, movement, and titles. The TTCT adds a fluency component, therefore, supporting the appropriateness of the responses.

The analysis of the TTCT led to identifying teachers as either high, moderate, or low levels of creativity. The categorization allowed the researcher to analyze the additional data strands in subsequent studies. This analysis led to an overall understanding of individual level to begin and continue evolving the participants' teacher and creative identity. By understanding the individual scores earned for the various constructs the teacher can then begin to focus on specific areas to improve and continue to foster their own creativity and therefore influence the creative development with their students.

Population and Sample

The process of identifying the population began with the researcher developing a professional development workshop that focused on creativity in the agricultural education classroom. The researcher used Sternberg's creativity definition as the focus of the workshop. The workshop introduced the creativity constructs measured by Torrance Tests of Creative Thinking (TTCT). Lesson and activity examples were discussed and practiced by participants. Participants also completed the TTCT during the three-hour workshop. By strategically developing a creativity workshop the researcher was able to identify a sample with an interest in creativity and therefore leading to a purposeful sample of agricultural teachers.

The population for this study was identified as Agricultural educators in the South Eastern United States that had an interest in creativity in the classroom. The researcher developed and delivered a creativity workshop what was part of an agricultural teacher professional development course as part of a conference. All teachers in attendance of the

workshops were invited to the study (N = 21). The sampling method utilized was convivence sampling because the study participants were the teachers in attendance. This sampling method allows the researcher to identify study participants that are easily accessible and available (Ary, Jacobs, Sorensen, &Walker, 2014). Four teachers (n = 4) returned the consent forms and completed a phone interview.

Data Collection

There are many creativity and creative thinking measures available for use. Some focus on motivation, the flexibility of thought, originality, and fluency. All of those attributes of creativity are found in Sternberg's (2004) definition of creativity as an act that is both novel and appropriate. Motivation and flexibility of thought are connected to the idea of production and may connect to the generations of ideas for a divergent thought and problem-solving. Originality is mirrored in the concept of novelty. In general, something is considered novel when it is unique and not typical. The remaining suggested component is fluency and is a measurable form of appropriate. Generally, things are appropriate with they make sense in the context they are being used. Creativity as a large item in itself is difficult to construct a measure for that is useful and valid.

The quantitative data strand for this study was collected independently and sequentially from all study participants. Each participant completed a figural form A of the Torrance Tests of Creative Thinking (TTCT). The instrument is divided into three sections and is timed by the researcher. Participants were given 10 minutes to complete each of the sections with a total time of 30 minutes to complete the entire instrument. This figural creativity test was scored by the researcher and its analysis was used to answer research question one. The researcher is trained and has been identified as a reliable scorer for the TTCT figural form. This data strand will be

collected first as a participant enters the study as part of a creativity workshop. The workshop was part of a teacher professional development opportunity during a conference. The timing for this collection is important to ensure an accurate score. The subsequent interactions between the research and participant will also be influenced while interpreting scores and providing feedback.

The semi-structured interviews were scheduled with each participant individually and at a time and that was convenient for both the participant and researcher. Each interview was audio recorded and lasted for at least 60 minutes. The recordings were transcribed verbatim and provided to the participant for member checking. The researcher used member checking to ensure the transcript captured the conversation correctly and represented the participant accurately (Rossman & Rallis, 2012). The researcher used Atlas.ti8 to code and identify themes that emerge from the analyzed transcripts.

Data Analysis

The participant interviews were coded and the researcher identified themes in stages adapted from the model suggested by Bryman (2008). During the first stage, the researcher observed the data as a whole by reading over interview transcripts and notes. From this review, the researcher identified the theme categories and began to identify and define possible codes. The second stage included the researcher uploading the transcript data into Atlas.ti8. Once the text was uploaded into the software the researcher began to highlight passages of importance and identifying keywords and phrases. Stage three included the majority of the coding of key phrases shared by the participants. This stage also included the grouping of similar codes to limit repetition and the identification of any connections. The final stage is where the researcher began to interpret the meanings of the codes and constructing themes that supported the previously identified categories identified by the existing literature.

Findings

Participant Descriptions

The researcher used both quantitative and qualitative data strands to develop participant descriptions. Constructs of creativity, identified and measured using the TTCT, were used to describe the participants' creativity level including strengths and weaknesses. During the interview, participants were asked for their years of experience and what led them to be agricultural educators.

Avery has been teaching agriculture for 24 years. Avery entered into the field of agricultural education by accident. Avery has a bachelor's degree in agricultural sciences, and both parents were agricultural educators. Avery wanted a job in the field of agriculture and fell into an open teaching position where the administration felt confident, Avery could be successful in the position. Avery's former agricultural teachers came together to offer guidance and support. Avery now feels comfortable in her career. However, Avery did note that if another opportunity came along that sounded interesting, there would possibly be a career change. Avery completed the TTCT and has a moderate creativity level. Avery falls into the 90th national percentile in fluency and in the 80th national percentile in originality. Both fluency and originality are the strengths of Avery's creativity. Elaboration or addition of details and is Avery's weakest area of creativity. Within the TTCT's creative checklist Avery's strengths are found in emotional expression, movement, the expressiveness of titles, and humor.

Cameron has been teaching middle school agriculture for 31 years. Cameron credits the experience in agricultural education and FFA during middle and high school as what led to becoming an agricultural educator. Cameron completed the TTCT and was identified to have a low level of creativity. Cameron scored in the 97th national percentile in fluency. Cameron's

largest area for growth, as identified by the TTCT, is elaboration. Within the TTCT's creative checklist Cameron's strengths are found in, the expressiveness of titles, extending boundaries, and colorfulness. Cameron's interview responses were very concise and to the point and very clearly conveyed love and dedication to agriculture education.

Dakota is an excited first-year teacher that has completed about six months of teaching middle school agriculture at the time the study began. Dakota was enrolled in agriculture education courses in high school and was a State FFA officer. Dakota did not originally think of a future working in a classroom, but after spending a year facilitating leadership workshops for FFA members during time as a state officer, Dakota decided to become an agricultural educator. Dakota completed the TTCT and has a high level of creativity scoring in the 92nd national percentile. Dakota scored above the 90th national percentile in both fluency and originality. Dakota's creative weaknesses, as identified by the TTCT, are abstract of title and elaboration. Within the TTCT's creative checklist Dakota's strengths are found in emotional expression, storytelling, movement, the expressiveness of titles, synthesis of lines, extending boundaries, and colorfulness. Dakota self-selected to enter the study by attending a workshop on creativity that was offered as part of a leadership conference. During the interview, Dakota shared that time is spent talking with the art teacher at school about creativity and what it means to be creative. Dakota shared the frustration that participation in paint night fundraisers is low because people feel that they are not creative enough to participate.

Emery is in the 18th year of teaching. Emery credits experiences in 4-H, prior to enrolment in agricultural courses, combined with experiences in agricultural courses with leading to become an agricultural educator. Emery completed the TTCT and has a high level of creativity scoring in the 92nd national percentile. Emery scored in the 99th national percentile in

fluency, and in the 93rd national percentile in originality. Emery's creative weaknesses, as identified by the TTCT, is elaboration. Within the TTCT's creative checklist Emery's strengths are found in emotional expression, movement, and expressiveness of titles.

Table 3-1 includes the national percentile scores for each of the participants in the five constructs of creativity measured using the TTCT which are: fluency (F), originality (O), elaboration (E), abstract of titles (AT), and resistance to premature closure (C). Scores are also reported for the creativity checklist. The overall creativity index is the creativity level of the participant. The creativity index scores are shown as a national percentile. For the purposes of this study, the researcher identified scores as high, moderate, and low based on score ranges. Scores that are identified as high are found in a range of 80-100. Moderate scores are in a range from 50-79, and sores are identified as low in the range of 0-49.

Table 3-1
Participant Torrance Test of Creative Thinking (TTCT) Scores

Participant Name	F	O	AT	E	C	Checklist	Score	Level
Avery	92	88	61	15	48	14	69	Moderate
Cameron	97	54	20	4	48	11	35	Low
Dakota	97	92	35	55	81	19	92	High
Emery	99	93	75	55	70	13	92	High

Emergent Themes

Creativity Defined

SI assumes that individuals collectively define terms by using social interactions and ques. This assumption reinforces that participants in the study formed a definition of creativity. The interview data revealed the following collective definition of creativity in the context of the agricultural classroom.

Theme: Creativity is defined as problem-solving, adaptability and is just teaching.

Teachers identified and described creativity as problem-solving. Participants recognized that creativity is recognized as problem-solving for the teacher because of the need to determine which teaching methods and lesson structure can best meet the needs of the students. Participants also agreed that creativity in the form of problem-solving is exhibited by students as students work to complete various assignments. Just as important as problem-solving was the ability of an agricultural teacher to adapt to class dynamics or daily tasks take require creativity.

Dakota shared that typically creativity is discussed in an "artistic way," but continued to share that "creativity is more about adapting to your situations. The situations develop from working with a diverse group of learners that have different needs. Dakota explained connected that the problem being solved is how to engage a variety of students and the solution is made possible by creativity enabling the skill of adaptability. Emery shared that "creativity is a person being able to create things and express yourself in different ways." Emery's use of expressing oneself in different ways is similar to the adaptability described by Dakota when needing to utilize creativity to develop lesson plans and class activities that can engage a diverse classroom.

One agricultural teacher explained creativity as "madness" (Avery). Avery continued to explain that creativity is elaborating on concepts during instruction or the ability "to take something and turn it into something else, seeing things outside of the box more or less." Cameron shared that "creativity has to do with solving problems and findings solutions to things that present themselves in your classroom." Dakota equated creativity to the ability to come "up with new and innovative ideas to come to a solution whether that is what art supplies or whether that's with people skills and communication or just simply problem-solving." Emery defined "creativity as thinking outside the box."

Just as important as problem-solving is the ability of an agricultural teacher to adapt to class dynamics or daily tasks require creativity. Dakota shared that typically creativity is discussed in an "artistic way," but continued to share that "creativity is more about adapting to your situations. This statement made by Dakota demonstrates the form that creativity takes in the classroom is adaptability, so creativity is used to add variety and flexibility into classroom and instructional methods. Emery shared that "creativity is a person being able to create things and express yourself in different ways."

As teachers thought about what creativity is and how to define it Avery simply stated that "I think I see it just like teaching." Emery shared that the "idea of creativity is so that it is not the same boring thing all of the time." Cameron added that sometimes "creativity may just be confused with working a little harder on something to make it happen." Avery also shared that "I think that [creativity] is kind of what we do." These ideas presented by these teachers supports that creativity is a part of the daily skills needed to be a teacher.

The "Looking Glass Self"

This category of themes was identified by the researcher as to how teachers view their creative identity from the point of view of either students, administrators, or peers. This category also includes the teachers' view of themselves as creative or not. The themes are organized into three categories the viewpoint from the student looking glass, the administrative and peer looking glass, and finally their individual view of their own creativity.

These three themes emerged from teacher statements made in response to being asked first if a student or administrator viewed them as creative. Once a response was given then a follow-up question asking the participant to explain how they knew this or to give of example of something that supports what they feel they see in the looking glass. Participants shared stores of

past interaction between themselves and a student as well as described interactions with peers or administrators. Several times participants reflected back to their own individual experiences from their past as a student enrolled in an agricultural education course to understand their interaction as a teacher with a student.

Theme: Teachers know their students view them as creative because of action.

Teachers reported that their students behave a certain way or take action because they recognize the creativity of their instructor. Avery said, "do I dare say yes? Because I am always silly, they never know what to expect." Avery continues with "they [students] come in and they want to share ideas with me." Dakota said that "I would hope so." Dakota continued by sharing a story of a student coming to her for help with a project which led Dakota to share "I thought you know if I were a student who would I ask and I am like well I'd ask my ag teacher, mostly because if they don't have what you need they can often time figure out a way to get them something similar." Dakota finished the story with "we got him what he needed and it made me feel good about it, so, yeah." From the interaction described by Dakota combined with the reflection of personal past experience as a student action is seen as an indicator of a student viewing their teacher as creative.

Emery said that the upperclassmen feel Emery is creative whereas the freshman or first-year students may not. "I think more upperclassmen probably do because that is where we tend to get to have more fun hands-on activity…my freshmen right now, probably not as much" (Emery). Emery explained this based on the type of engagement and the lesson structure utilized during instruction. Emery's comments suggested that advanced classes work more independently; therefore, utilizing more creativity and variety in instruction. The activity level of

the student suggests engagement which then allows Emery to feel the independently engaged upperclassmen view Emery as creative.

Theme: Teachers know their administrators and peers view them as creative because of words of affirmation. For teachers to recognize that peers and administrators view them as creative they must hear directly from them or infer from conversations. One teacher shared that "probably so, I've heard them say things" (Cameron). Cameron is clearly able to understand how an administrator view Cameron as creative because of statements that clearly included creativity. Dakota shared joyfully that "yes (laughing) they make a lot of comments about my ideas or enthusiasm to try different things." Dakota like Cameron also utilized direct comments to understand the views of creativity from peers and administrators. Emery also shared that "yes…I've had some other teachers that will come to me and try to get ideas on how to make things different, how to create things." Emery also shared that with "limited conversations with the administration they view hand on activities as creative because not everyone gets to have that, so I would think yes." Although three of the four teachers shared that their administrators do see them as creative Avery said "probably not…because they don't get to see that side of me…because I am standoffish." Even though Avery feels as though administrators do not view creativity form interactions it is clear that Avery would need to hear clear statements in regards to creative ability and output to feel administrators and peers view Avery as creative.

Theme: Teachers view themselves as creative. All of the teachers said that they did view themselves as creative overall, but shared that the opportunity for them to use their creativity is not always present. Avery said that “sometimes I do…but it depends on the day… I am silly…and I elaborate on things." The idea of elaboration connects Avery's statement to the

TTCT. Elaboration is one of the constructs used to calculate the creativity level of an individual. Cameron feels creative because "in some ways…I don't have like artistic talent but I have the ability to you know to visualize what I want to do or see where I want to go it [creativity] is just finding the method to get there." The visualization that Cameron is including in her explanation of creativity and connecting problem-solving. Cameron relies on creativity to approach problems in the form of visualization and the success experienced reinforced the feeling creative. Dakota says "yes…I want to do more and I want to do something different from what has been done before. Just as Avery mentioned elaboration that is what Dakota is also using to identify as creative. Dakota wants to move tasks beyond what is currently or has been done and continue to develop them into something different. This need to move projects further is not only associated with elaboration but connects to the concept of originality, the need to be novel. Finally, Emery shared that "I do, personally I love doing creative things like making jewelry and you know doing crafts and different things like that, and I try to bring some of that aspect into the classroom." Emery's explanation is not as similar as the others because a traditional view of creativity combining leaning on Emery's artistic talent, but this statement is also connected to originality just as Dakota's was.

Display of Creativity and Role

This category of themes was identified by the researcher as to how teachers view their creative identify role in the classroom as well as how their creativity manifests in the classroom as student-focused and the types of instructional or organizational methods used.

Theme: Creativity leads to student-focused instruction in lesson planning. Study participants collectively agreed that their creative identity led to student-focused instruction. Participants credited creativity with promoting increased student engagement because of the

student-centered instructional methods used. Avery said that the creativity utilized was "definitely student-focused" because "if they [students] come up with some wild idea and it is not too farfetched and I don't think I'm going to get thrown under the bur for it we do it." Avery described clearly that student focus means student choice and that students lead the educational charge in the development of assignments and other related instructional tasks. Cameron said that "I would hope it [creativity] would be student-focused" because "…students chose the way they would like to present something." Again, a common idea that creativity leads to student choice and that when students have a choice the focus of teacher creativity manifests as student-focused instruction. Dakota concluded that currently in the program is "seeing a lot more sort of 50-50 right now and sometimes more student-led because they are getting the freedom to come up with their own projects." Dakota's statement also supports the idea that choice fosters the ability for teacher creativity to foster student-focused instruction. Emery said "I try to make it more student-focused", but sometimes "I feel like it is kind of forced from the teacher to make them be creative at times." Emery agrees that student-focus is the goal, but acknowledges the difficulty with students at times to have them take the lead in making choices that support a learning environment that is conducive to student-focused learning.

Theme: The teacher functions as a mentor and a motivator to promote and practice creativity. All four participants shared that the majority of the time their creative role as the agricultural teacher is to act as a mentor to motivate and push students to engage in creativity in the classroom when approaching various units of study and assignments. Avery said that the role is as “the guide…the mentor” because “if they are having a struggle, I’ll give them suggestions, so yes, I guess a mentor.” Cameron describes the role as “to help them [students] organize information in their mind or help them remember things." The task of helping students is

connected to a mentor because Cameron is working to assist students with the task of organizing information as well as how to approach tasks. This type of assistance is similar to modeling behaviors that are then mimicked. Mentors may model behavior for mentees to imitate. Dakota describes her role to promote creativity in that the role is to provide "…the factual information…and the tools to know what it is why." Mentors often provide their mentees with tools and information to assist them in future scenarios. Emery said that at times "it is kind of forced from the teacher to make them be creative", but "I would think that my role is to inspire students to use their own creativity to make things happen." The relationships that mentors build with mentees on a level can be inspirational.

Theme: The teacher's role is to use creativity to increase student engagement.

Because all of the participants view their focus as student-centered, they also agreed that their role is to also increase student engagement and much of that is found in a teacher's ability to adapt creatively and diversify instruction as mentioned in their collective definition of creativity. Emery said that "a lot of times I try to think with like inquiry-based ideas and try to give them something that we may or may not have a set right or wrong answer to, and so trying to get them to think on their own to problem solve." Emery is describing how creativity is used to develop students' ability to engage with course materials in the form of questions. Dakota says creativity is used in designing "a lesson to engage the students more or to get the student more interests in what we are learning…they want to learn more, so when they do it makes me feel like I am doing my job." Purposefully designing a lesson to engage students and to encourage students to explore topics and ask to learn more is supported by Dakota's creativity. Dakota also shared that "any lesson that you can give with multiple ways for students to receive it is going to be the most creative or adaptive lesson that you can give." This concept shared by Dakota indicates the need

to plan a lesson in a variety of ways to engage diverse learners. Cameron shared that "I think this is a critical part of our ability to teach because if you have to think of so many different ways to present things to kids to get them engaged." Cameron identifies creativity as a critical component of a skill set for an educator to develop a variety of instructional practices to ensure learners are being engaged.

Influences on Creativity

Participants were asked what or who helped to share their creativity. Participants share that their influences ranged from professional instructors, time and experience, as well as participating in various professional development opportunities.

Theme: Creativity is influenced by mentors in professor and administrative roles. Participants said they have had administrators that promoted creativity as well as professors that encouraged them to think nontraditionally. Avery says administration supports teacher creativity because “our principal has pushed this *Teach Like a Pirate* book and it's the whole idea of taking things out of the box." By administrators clearly supporting creativity by encouraging book studies or offering professional development opportunities conveys the important role creativity has in the classroom to the educators they work with as well as develops the creativity of their teachers. Dakota said, "one of my biggest mentors is my co-teacher." Dakota continued the list of mentors by including that "…surrounded by other ag teachers as far as mentorship and I've been getting a lot of help from those who have been in it for their whole lives." Dakota acknowledges that the interactions with various people influences creativity. Emery said, "on a personal level my mom is probably my biggest influence." Emery reminds that not all influences have a professional compacity, but that people in which relationships are developed with to influence creativity. This observation shared by Emery does not directly identify an influence from

administration or professors but allows the acknowledgment and role that casual or non-professional influences have on creative development.

Theme: Creativity is influenced by experience in and outside of the classroom. Some participants shared that their experiences with other agricultural teachers as well other teachers helped to shape their individual views of creativity as well as how they use creativity in the classroom. One participant also credits creativity to experiences not related to agriculture education. Both of Avery's parents were agricultural teachers and said that "maybe my dad, I remember him being silly as a teacher." Avery's memory recalling the behavior of a previous teacher shaped Avery's individual view and practice of creativity. Avery also shared "I've seen a lot of really cool things from other teachers and I think wow I wish I could do that…I beg borrow and steal a lot of creativeness." Avery shared the technique of using the methods and ideas of other teachers may decrease originality, but does support the construct of fluency in the support of appropriateness. Cameron has taught for 31 years and says that teaching experience shapes creativity "because no two days are the same (laughter) or not two classes are the same, so you have to constantly be thinking of new things you can do." Unlike Avery, Cameron does not rely on other teachers to support the development of fluency but rather personal experience from 31 years of teaching experience. Dakota shared that "I think it [creative identity] has just sort of been molded by people as you meet them." Dakota continued by saying "getting exposed to people doing different things, and traveling, and getting to see how different parts of the world do stuff" influenced her creativity. Dakota did not clearly state the same idea as Avery of using ideas and methods from other teachers but does support the importance of experiences. By having experiences Dakota can develop fluency and originality. Emery shared that "having more women in ag education than previous…there has been a lot more shared creativity and creative

ideas through different social media platforms." Emery suggests that gender may have a role in creativity and more specifically how creativity is influenced because of a change in gender concentration in the profession of agricultural education because of a variety of social interactions.

Theme: Creativity is influenced by professional development. One participant shared that it is important and credit creativity with participation in various professional development courses (Emery). Dakota said that when "I go to conferences and things" it sparks an interest to try various things. This exposure to research and techniques supports creativity development in fostering a feeling of creative identity. Just as Emery shared a personal influence, Emery also identified a professional influence as "some of the training I've attended not necessarily a set person, but some of the training with project-based learning and the Dupont Agri science inquiry-based." This is an encouraging statement for professional development, but Emery says it does not matter who is delivering the content just that the content is being delivered. Emery's stamen suggests the importance to not only continue to offer professional development but to also encourage agricultural teachers to actively seek out and participate in professional development.

Barriers to Creativity

This category of themes was identified by the researcher to identify barriers that either restrict or prevent a teacher's creativity. Barriers were not an initial piece, but did emerge during interviews in the form of follow-up questions, and was a clear part of the analysis.

Theme: Personal individual deficits form barriers to creativity. Teachers shared that there are individual characteristics or personality traits that they must overcome to be and feel more creative. Avery shared that the feeling of creativity depends on the level of comfort. "It is

probably my comfort zone. If I am more comfortable with the situation, I am probably more creative than if I am, um not as comfortable" (Avery). Avery continued to share that "I think that I have, um, some learning disabilities that in a group where I can't process things as quickly as maybe other in the group, I just kind of stand back, I think that is probably why." The vulnerability that Avery experience inhibits the manifestation of the overall identity of being creative. Avery had previously said that sometimes the identity of creativity is present, but further exploration of the response gleaned the idea that Avery's comfort level influence creativity and is a barrier that is difficult to overcome because of learning disabilities.

Theme: Components of the educational system act as barriers to creativity. Teachers shared that there are educational systemic barriers that make creativity difficult and those are time, resources, curriculum, and testing. Dakota said that often her creativity is dependent on "how much time do I have to dedicate." Dakota shared that if time is limited or not available then creativity is less utilized. Emery echoed Dakota's comment about time by sharing "a lot of times creativity may take longer for an activity." Time may not influence the lesson development as mentioned by Dakota, but the actual delivery of the lesson as explained by Emery. Dakota also said that "it is frustrating without the right resources it also hinders your ability to be more creative." Dakota acknowledges the important role that resources have within the support of creative lesson development. Resources could be money or time. In regards to curriculum Emery said that "the level of standards in line our introduction foundations class, is, um, there are a lot more standards to be covered and I think it limits the creativity for some of it versus in the upper division classes where they get to create and plan a little bit more, I think it opens it up for more." Emery shared that "I feel we've made a circle back around that we're having more standardized tests and more testing involved and a lot of that cuts into the creativity."

Discussion and Conclusions

After analyzing both the quantitative and qualitative data it can be concluded that each participant has a different creative skill set but, in the end, the level is not indicative of creative identity. The data can define creativity as problem-solving and adaptability and not as creative ability. This collective definition supports Sternberg's (2004) definition of creativity as both novel and appropriate. This also supports Kirton's (2003) conclusions that all people are creative because they are all problem solvers.

SI reveals that individuals see themselves through the eyes of others and that often the thought of others from a position of authority have a greater impact. When reviewing the themes that support the idea of the "Looking Glass" it is clear that teachers do view the type of feedback used is different from different categories either as students, administrators, or peers. It is interesting that a student can act in a way either by showing engagement or by approaching to request assistance, or sharing of ideas is enough for the teacher to infer that students view them as creative. Whereas for a teacher to feel either administrators or peers view them as creative, they must hear words of affirmation. Needing to hear the actual phrase "you're creative" reduces the need for the teacher to deduce from the action and simply assume what is intended by actions as with student. This phenomenon supports the SI notion that opinions from people of power influence identity development more so than those views from individuals with less power or authority. These views did not change based on the individual teacher creativity level. Those that scored high still required the words of affirmation just like the teachers that scored lower on the TTCT.

Teachers identified their role as a mentor and motivator to support student-focused instruction. Their role changed with what was expected of them, but their roles are not

influenced by their individual creativity level but rather the needs of the student. All participants agreed that the creative identity focused on the student to ensure the student was engaged and successful. Teachers acknowledged that there is a need to act as a motivator to promote student creativity and they also functioned as a mentor by supporting and asking for idea generation. Creativity strengths or level did not seem to have an impact on the roles the teachers saw themselves fulfilling.

The participants identified conferences, professional development opportunities such as CASE, administrative book studies, professors, and peer teachers all as influencers for creativity. Participants shared that they do credit their creativity to their experiences in their classrooms as well as they continue to hone their teaching strategies. Teachers regardless of years of teaching appeared to agree that learning from fellow agricultural teachers have been helpful in shaping their own creativity.

Whereas the SI does not directly identify that barriers play a role in identity development or identity use all but one participant shared barriers that prevent themselves from either feeling creative or practicing creativity. The teacher that did not share a barrier had the lowest creativity score but the longest tenure as an agricultural teacher. Participants shared that time and resources, as well as curriculum standards, tend to limit their ability to feel creative and also influence how students view them as creative. One teacher also shared that their own personality and learning disability held them back from possibly being more creative.

Recommendations

After reviewing the findings and conclusions as well as the existing literature it is recommended that identity development be integrated into existing teacher preparation programs as suggested by Hahl and Mikulec (2018). Identity shapes decisions and is constantly being

constructed or deconstructed based on reflection and experiences. Student teachers should be asked to define creativity and connect creativity to other teacher behaviors so that they can further support their multidimensional teacher identity. By being asked to contemplate creativity student teachers practice the task of identity development.

Teacher educators should work to include examples of creativity during methods or pedagogy courses to begin to normalize the term creativity. Because teachers require words of affirmation from authority figures it supports the need for teacher educators and professors to use words of affirmation and acknowledge creativity while clearly describing or identifying creative behavior. Participants did identify that past professors influenced their creativity, and this further supports the need to include creativity terms and descriptions during teacher preparation.

Shoulders (2018) and Shoulders and Myers (2011) recommended purposeful professional development specific to the specific components of agricultural teacher identity because it varies so much from a traditional educator. This call for future professional development to be designed with identity in mind is helpful as the participants in the study also recommended participating in professional development opportunities. These professional development opportunities are important in the continued development of identity because we know identity is not static (Trent, 2010). As teacher educators, we must include in our programs the culture of continuing education and becoming participants in professional developments designed specifically for agricultural teachers.

The researcher not only recommends purposeful professional development specific to agricultural teacher identity, but the encouragement of teachers participating within their communities of practice, or agricultural teacher peers. One participant mentioned social media as a platform to learn from agricultural teachers around the nation. It is recommended that teacher

educators develop or support both student and current teacher with engaging with other agricultural teachers in communities of practice either face to face or virtually.

It is also recommended that future research is completed in other areas of the country to begin to better enhance teacher preparation programs around the country. Because there is a limited connection with the TTCT scores and identity formation it is recommended that future studies only include interview grounded in SI. The data could also be enhanced by adding a focus group to integrate the mitigation of barriers to creativity and to form a more collective definition of creativity. Future studies would add to the value of the conversation regarding creative identity and allow for further development of professional development focused on creativity and identity.

References

Akkerman, S. F., & Meiger, P. C. (2011). A dialogical approach to conceptualizing teacher identity. *Teaching and Teacher Education 27*, 308-319. Retrieved from https://www.sciencedirect.com/science/article/pii/S0742051X10001502?via%3Dihub

Ary, D., Jacobs, L. C., Sorensen, C., & Walker, D. A. (2014). *Introduction to Research in Education* (9th ed.). Belmont, CA: Wadsworth.

ATLAS.ti8 (2018) Qualitative Analysis software.

Block, L.A., & Betts, P. (2014). Sustaining/containing agency in an alternative teacher education program. In L. Thomas (ED.), *Becoming teacher: Sites for teacher development in Canadian Teacher Education* (pp. 13-31). Retrieved from https://www.researchgate.net/profile/Julie_Mooney3/publication/328006982_Contemplative_Practice_to_Compassionate_Learning_Community_Developing_and_Sustaining_the_Teacher's_Inner_Life_as_a_Site_for_Faculty_Development/links/5bb2896092851ca9ed33b18a/Contemplative-Practice-to-Compassionate-Learning-Community-Developing-and-Sustaining-the-Teachers-Inner-Life-as-a-Site-for-Faculty-Development.pdf#page=13

Bryman, A. (2008) *Social Research Methods* (3 ed.). Oxford, UK: Oxford University Press.

Hahl, K. & Mikulec, E. (2018). Student reflection on teacher identity development in a year-long secondary teacher preparation program. In *Australian Journal of Teacher Education 43* (12). Retrieved from https://ro.edu.edu.au/ajte/vol43.iss12/4

Kirton, M. J. (2003). *Adaption-Innovation in the Context of Diversity and Change*. New York, NY: Taylor & Francis Group.

Lave, J. (1996). Teaching, as learning, in practice. *Mind, Culture, and Activity, 3*(3), 149-164.

Retrieved from http://www.mathcs.duq.edu/~packer/Courses/PSI3962/Lave%201996%20Teaching,%20as%20learning,%20in%20practice.pdf

Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. American Psychologist, 50, 741-749.

Oyserman, D., Elmore, K., & Smith, G. (2012). Self, self-concept, and identity. In M.R. Leary & J. P. Tangney (Eds.) *Handbook of self and identity* (pp. 69-104). New York, NY: the Guilford Press.

Petkus, E. (1996). The creative identity: Creative behavior from the symbolic interactionist perspective. *Journal of Creative Behavior* 30 (3). Retrieved from

Riquelme, H. (1994). Information processing theory and its explanation of the creative process. *Creativity and Innovation Management*, *3*(2), 85-90

Rossman, G. B. & Rallis, S. F. (2012). *Learning in the Field: An Introduction to Qualitative Research,* (3rd ed.). Thousand Oaks, CA: SAGE Publications.

Shoulders, C. W. (May, 2018). A description of the professional identities of Arkansas agricultural teachers. A research presentation at the American Association for Agricultural

Education held in Charleston, SC.

Shoulders, C. W., and Myers, B E. (2011). Considering professional identity to enhance agricultural teacher development. *Journal of Agricultural Education, 52*(4), 98-108. doi:10.5032?jae.2011.04098

Sternberg, R. J. (2004). *Handbook of creativity.* New York, NY: Cambridge University Press.

Torrance, E. P., (1965). *Rewarding Creative Behavior: experiments in classroom creativity.*

Englewood Cliffs, NJ: Prentice-Hall, Inc.

Torrance, E. P. (1993). Understanding creativity: Where to start. *Psychological Inquiry, 4*(3), 232-234. doi:10.1207/s15327965pli0403_17

Trent, J. (2010). Teacher education as identity construction: insights from action research. *Journal of Education for Teaching, 36*(2), 153-168. Retrieved from https://www.tandfonline.com/doi/pdf/10.1080/02607471003651672?needAccess=true

White, J. M., Klein, D. M. & Martin, T. F. (2015). *Family theories: An introduction* (4th ed). Thousand Oaks, CA: Sage.

CHAPTER 4

MANUSCRIPT #2

Agricultural teacher creative behaviors during instruction

Abstract

This study uses a case study approach to complete a qualitative study to confirm agricultural teacher creative behaviors. This study uses the Torrance Tests of Creative Thinking (TTCT) to identify the level of creativity of each participant. Each study participant is located in the South Eastern United States and represent individual cases. The researcher collected participant submitted video and analyzed each video identifying and tracking the following behavior codes: fluency, originality, storytelling, humor, movement, fantasy, colorfulness, and emotion. The researcher did find that participants who had strengths identified by the TTCT did also demonstrate those behaviors during instruction. The researcher concluded that storytelling, movement, fantasy, and colorfulness are the four main creative behaviors that were commonly found to be demonstrated during instructional time.

Introduction

Demonstrations are often efficient methods of identifying actions and behavior trends of individuals. Every day teachers are performing and planning demonstrations while delivering instruction and information to students. The researcher developed this study to identify practices and trends agricultural teachers use to deliver instruction to students. Teachers have been evaluated on student achievement and lesson planning as well as classroom management, but not on creative behavior. An individual's behavior is influenced by their identity and the level of creative behavior is relative to the individual's creativity level and the stage of development of their creative identity.

Research Problem

Because all people are problem solvers and are also creative (Kirton, 2003), creative identity exists and can be influenced by social interactions over time (Block &Betts, 2014). Agricultural teachers should be aware of their creativity level and develop their creative identity to support students develop skills for creative problem-solving. By identifying creative behaviors professional development and teacher preparation programs can support teachers in utilizing creative strategies. Priority area five of the American Association for Agricultural Education (Thoron, Myers, & Barrick, 2016), identifies a need for specialized professional development and training for agricultural teachers. By documenting creative behaviors and understanding how a teacher is creative a relationship can be examined and strategies developed for agricultural teacher education preparation programs and professional development. The researcher can use the findings from this study to develop materials and teacher professional development training to further build and foster creativity in the classroom by developing these behaviors in preservice, novice, and experienced teachers.

Purpose and Research Questions

This quantitative study includes the collection of data for the identification of creative behaviors of agricultural teachers in the South Eastern United States. Data was collected in the form of videos to identify creative practices. A case study design was used to provide enhancement for the researcher to view the phenomenon in a case by case nature because of the variety found within the agriculture education discipline to answer the following research questions:

1) What is the teacher's level of creativity?
2) How do teachers display creativity in the classroom during instruction?

3) What is the relationship between a teacher's creativity level and the classroom instruction they utilize?

Literature Review

Creativity is defined as producing a product that is both novel and appropriate (Sternberg, 2004). There are several lenses that can be used to develop an approach and understanding of creativity (Torrance, 1993) when it is defined as Sternberg (2004) has. Torrance (1993) identifies that creativity can be considered from the following viewpoints person, process, product, and the environment. The constructs used to develop the TTCT are rooted in the process of creativity. As an education phycologist Torrance was "concerned with the learning, thinking, teaching, problem-solving, creative, development, and other processes" (Torrance, 1993, p. 232). The act of creativity and creative thinking is the "process of sensing difficulties, problems, gaps in information, missing elements, something askew; making guesses and formulating a hypothesis about these deficiencies; evaluating and testing these guesses and hypotheses; possibly revising and retesting them; and, last communicating the results" (Torrance, 1993, p. 233). There are many creativity and creative thinking measures available for use. Some focus on motivation, the flexibility of thought, originality, and fluency. All of those attributes of creativity are found in the definition of creativity Sternberg supplies. Motivation and flexibility of thought are connected to the idea of production and may connect to the generations of ideas for a divergent thought and problem-solving. Originality is mirrored in the concept of novelty. In general, something is considered novel when it is unique and not typical. The remaining suggested component is fluency and is a measurable form of appropriate. Generally, things are appropriate with they make sense in the context they are being used.

When designing research, the task of instrument selection is imperative. The researcher must select the best instrument to best serve the needs of the purpose of the study. One tool to aid in the decision-making process is the collection and evaluation of validity evidence. Messick validity model includes the following categories of evidence: content, substantive, structural, generalizability, external, and consequential (Messick, 1995). The Messick model utilizing the aspects of construct validity will be utilized to assist the researcher in deciding between two measures that are widely utilized to measure similar aspects of creativity.

Description and Purpose of Torrance Tests of Creative Thinking

The Torrance Tests of Creative Thinking (TTCT) measure was developed for identifying and evaluating the creative potential of the respondent. This instrument can be used for participants that are in kindergarten through graduate school. The TTCT is used to identify gifted students by identifying the individual's creativity level as well as predicting achievement (Chase, 1985). The instrument is designed to be given in two parts a figural form and a verbal form. Torrance (2017) developed the TTCT to serve as a measure of creative thinking abilities and not a measure of creativity.

Test Specifications of Torrance Tests of Creative Thinking

The TTCT can be given respondents in an individual or group setting. It can also be given to a respondent orally if the respondent cannot write. Creativity researchers have shown that there are two ways creative thinking can manifest; therefore, the TTCT was designed to have both a verbal and nonverbal component (Sumners, 2017b). Both the figural and the verbal also have two forms available for use. The activities (items) in both forms are designed and approached as games to engage the participants (Chase, 1985). Both the figural and verbal TTCT

forms are norm-referenced. Scores are calculated for a standard and then transformed to a standard score which is then transformed to a national percentile score (Torrance, 2017).

The figural forms A and B consist of three activities that are each timed independently for a total time of 30 minutes (Torrance, 2017). The figural form requires that participants respond to the prompt by drawing and are scored on fluency, originality, elaboration, the abstractness of title, and resistance to premature closure. Not all activities are included in the calculation of all score categories. Fluency is identified as the gatekeeper score; therefore, all figures must be fluent to be included in the other areas as well as part of the total score (Cramond & Sumners, 2011). The figural also includes bonus scoring in the form of a checklist of creative strengths.

Methods

Research Design

The study was designed qualitatively to function as exploratory research. The findings are used to confirm the creative behaviors of agricultural educators. The creative behaviors identified during the study originated in the creative checklist construct used in the Torrance Tests of Creative Thinking (TTCT) to measure the creative level of an individual. The researcher selected this design to examine the relationships between creative thinking strengths and creative behaviors. This study uses quantitative data from a creativity measure that identifies a participant's creative level. The second set of data used to confirm the behavior was collected in the form of video data. Both strands are given equal priority and were collected sequentially. Meaning no data strand is more important the other and one data strand was completely collected before beginning collection of the next (Cramer, 2018). Data analysis was also conducted

separately and sequentially. The mixing of the data strands occurred during conclusions and discussion due to the nature of the researcher's interest in confirming creative behaviors.

Population and Sample

The process of identifying the population began with the researcher developing a professional development workshop that focused on creativity in the agricultural education classroom. The researcher used Sternberg's creativity definition as the focus of the workshop. The workshop introduced the creativity constructs measured by Torrance Tests of Creative Thinking (TTCT). Lesson and activity examples were discussed and practiced by participants. Participants also completed the TTCT during the three-hour workshop. By strategically developing a creativity workshop the researcher was able to identify a sample with an interest in creativity and therefore leading to a purposeful sample of agricultural teachers.

The population for this study was identified as Agricultural educators in the South Eastern United States that had an interest in creativity in the classroom and attended the researcher's workshop. All teachers in attendance of the workshops were invited to the study (N = 21). The sampling method utilized was convenience sampling because the study participants were the teachers in attendance. This sampling method allows the researcher to identify study participants that are easily accessible and available (Ary, et al., 2014). Four teachers (n = 4) returned the consent forms but only 3 teachers submitted video data (n = 3) for a total of nine videos used in the analysis.

Data Collection

Electronic media was used as data and collected as participants submitted videos. Video data is growing as an acceptable form of data specifically for social science researcher (JeWitt, 2012). A video is malleable and sharable which allows the researcher to view, review, and

analyze the data easily (JeWitt, 2012). Although video may appear as only a qualitative data strand the researcher will glean both qualitative and quantitative data from the analysis that will be used to answer research question two.

Participants were asked to film themselves in the classroom three times. The video protocol consisted of instructions and a statement for the teachers to share with their students. It is important to note that student images or voices were not the focus of this data collection and subsequent analyses during this study. The participants were asked to ensure their recording device only captured their image and limited student images. As part of any classroom student and teacher, interaction is inevitable, but an effort was made to decrease the likelihood of student interference. Participants also received a prompt in the video protocol to record a lesson where they felt their creativity was showcased.

Data Analysis

The video data was analyzed using Noldus Observer software. This software allows the researcher to code participant actions while teaching. The researcher developed the codes for this data set from the TTCT scoring rubric. The researcher viewed videos and documented when a creative behavior started and stopped. Video analysis was structured by adapting the stages identified by Bryman (2008). From these codes, behavior examples were identified to assist with the operationalization of creative behaviors. Identified creative behaviors were explained and supported by researcher observation gleaned from the video. The behaviors were documented to demonstrate the number of occurrences and duration of each individual behavior.

The TTCT uses fluency and originality to measure all examples of creativity; therefore, the TTCT scoring constructs reflect appropriateness and novel respectively. Fluency is defined by the TTCT scoring guide as the ability to fit within the rules of the defined problem or context.

For the purpose of this study, the researcher defined fluency as behavior that is part of instructional practice that fits within agricultural education. As with fluency, the TTCT scoring guide defines originality as any response that is not typical. The researcher also included the following codes: emotion, storytelling, movement, humor, colorfulness, and fantasy.

The TTCT scoring rubric and scoring guide were used as a description of the behavior the researcher identified. Emotion is explained by the TTCT scoring guide as figures that display feelings; therefore, the researcher identified emotional behaviors as those teacher behaviors that show and depict emotion. The TTCT scoring guide explains storytelling as responses that tell an entire story to the viewer; therefore, the researcher identified teacher behavior as storytelling when the behavior went beyond the surface level and involved a more in-depth explanation or connection with student experiences. Movement is one construct that is a bit more difficult because it is not a physical movement that occurs in our physical world such as walking, but is explained by the TTCT scoring guide as movement is depicted in the figure to indicate motion. Therefore, the researcher identified movement behaviors as those teacher behaviors that utilized movement in an explanation or instructional activity not merely moving around the classroom or using gestures when lecturing. The TTCT scoring guide identifies humor as age appropriate jovial response that evokes laughter; therefore, the researcher identified humorous behaviors as instructional techniques that were intended to be humorous. Colorfulness is described as responses that are rich with detail and stick in the mind for easy recall; therefore, the researcher identified participant behavior as colorful when the action was detailed and stood out as something easily remembered. The final code identified is fantasy and is defined by the TTCT scoring guide as a response that spark and uses the imagination. The researcher recognized

fantasy behavior as instructional practices that used the imagination as well as connected to fictional characters.

Results

Participant Descriptions

The researcher used both TTCT score reports and the video to describe participants. Constructs of creativity, identified and measured using the TTCT, were used to describe the participants' creativity level including strengths and weaknesses. The video data collected also contributed to describing the classrooms and laboratories that the participants used for instruction and classroom management.

Avery has been teaching agriculture for 24 years. Avery completed the TTCT and has a moderate creativity level. Avery falls into the 90th national percentile in fluency and in the 80th national percentile in originality. Both fluency and originality are the strengths of Avery's creativity. Elaboration or addition of details and is Avery's weakest area of creativity. Within the TTCT's creative checklist Avery's strengths are found in emotional expression, movement, the expressiveness of titles and humor. Avery did not submit any video data for this study although Avery did sign and return the participant consent form.

Cameron (Case Study One), has been teaching middle school agriculture for 31 years. Cameron completed the TTCT and was identified to have a low level of creativity. Cameron scored in the 97th national percentile in fluency. Cameron's largest area for growth, as identified by the TTCT, is elaboration. Within the TTCT's creative checklist Cameron's strengths are found in, the expressiveness of titles, extending boundaries, and colorfulness.

Cameron submitted three videos for a total of 86 minutes of recording time. Cameron selected two lessons from sixth grade and one lesson for seventh grade. The first sixth-grade

class video was filmed in a shop that had both a classroom with organized desks in rows and a work area with separate workbenches. This sixth-grade video was analyzed first and it included a lecture on agriculture safety as students completed their safety agreements. After the lecture the video cut and went to film the hands-on demonstration of how to uses a sander and then the students starting their woodworking projects by starting the sanding process.

The second sixth-grade video was analyzed next. This video was filmed in a traditional classroom with many examples of works posted on the walls as well as FFA chapter achievements. The ceiling also had examples of agriculture suspended. The student desks were organized in groups. The class topic was international agriculture. The format of this class included a lecture led by the instructor that included input and discussion from students. Student independent work followed the lecture. Students were asked to identify three countries and then identify three crops and three animals that are special to each country as well as three fact for each country.

The third and final video submitted by Cameron was of seventh-grade agriculture. This video also took place in the classroom and consisted of a lecture period including student discussion followed by a group project. The topic for this class was land management and environmental practices. The assignment was for the groups to develop a section of land that included a pond to become a town.

Dakota (Case Study Two), is a first-year teacher and has completed about six months of teaching at the time the study began. Dakota is currently teaching middle school agriculture. Dakota completed the TTCT and has a high level of creativity scoring in the 92nd national percentile. Dakota scored in the 90th national percentile in both fluency and originality. Dakota's creative weaknesses, as identified by the TTCT, are abstract of title and elaboration. Within the

TTCT's creative checklist Dakota's strengths are found in emotional expression, storytelling, movement, the expressiveness of titles, synthesis of lines, extending boundaries, and colorfulness.

Dakota submitted three videos for a total of 84 minutes of recorded time. Based on the video it is uncertain which grade levels Dakota selected to share but the topics were prevalent in the videos. Dakota's videos all took place in a traditional agriculture classroom with decorations and motivational posters displayed. There were not any visible FFA awards, but Dakota did have an FFA jacket on display. The students were seated in desks organized in rows. All three videos captured Dakota providing a lecture to the students. Dakota teaches on a block schedule so her videos naturally cut when it was time to break for restrooms and transition to another task.

The first two videos analyzed covered the topic of the upcoming fruit sale. Dakota used a PowerPoint that had images of the order forms that each student had at their desk. As Dakota went over the form, Dakota filled in the sections of the forms to model the behavior for students as well as provide the correct spelling. The lecture was interactive in that the students were filling out a form as Dakota did on the whiteboard. Dakota then set up examples of scenarios of the types of possible customers the student might interact with or should approach. It can be noted that Dakota's room is not equipped with a smart board, but did have the projection onto the white dry erase board and wrote on the slides that way and erased as the slide transitioned to the next slide. The final video of Dakota's that was analyzed was an FFA history lecture. Students had a notes sheet that they filled in as Dakota presented the information. There were two integrated videos into the PowerPoint that showcased the creed and the FFA jacket.

Emery (Case Study Three), is in the 18th year of teaching at the high school level. Emery completed the TTCT and has a high level of creativity scoring in the 92nd national percentile.

Dakota scored in the 99th national percentile in fluency, and in the 93rd national percentile in originality. Emery's creative weaknesses, as identified by the TTCT, is elaboration. Within the TTCT's creative checklist Emery's strengths are found in emotional expression, movement, and expressiveness of titles.

Emery submitted three videos with a total recording time of 24 minutes. The class that Emery recorded appeared to be an upper-level high school class enrolled in the food science pathway. The videos were set in both the lab and the traditional agriculture classroom. The classroom was decorated colorfully and had student FFA achievements posted. Students were seated in desks and desks were organized into rows. In the lab, students were working in groups spread around the area at work stations.

The first video analyzed had very little teacher instruction it was clear this was an upper-level course in the middle of the year because the students appeared to know the routine and did not ask many questions. They were preparing various recipes to share with the class. In video two the food science class takes place in the classroom where students were asked to complete a blind taste comparison. Emery asked the students to use their senses to compare and contrast the two food items. After a discussion, the students were then asked to generate ideas for food products that may also fall into the categories that have similar ingredients. The third and final video was of student work. During this third video, there is no teacher-led instruction.

Torrance Test of Creative Thinking Results

Table 4-1 includes the national percentile scores for each of the participants in the five constructs of creativity measured using the TTCT which are: fluency (F), originality (O), elaboration (E), abstract of titles (AT), and resistance to closure (C). Scores are also reported for the creativity checklist. The overall creativity index is the creativity level of the participant. The

creativity index scores are shown as a national percentile. For the purposes of this study, the researcher identified scores as high, moderate, and low based on score ranges. Scores that are identified as high are found in a range of 80-100. Moderate scores are in a range from 50-79, and sores are identified as low in the range of 0-49.

Table 4-1

Participant Torrance Test of Creative Thinking Scores

Participant Name	F	O	AT	E	C	Checklist	Score	Level
Avery	92	88	61	15	48	14	69	Moderate
Cameron	97	54	20	4	48	11	35	Low
Dakota	97	92	35	55	81	19	92	High
Emery	99	93	75	55	70	13	92	High

Table 4-2 contains the score from the TTCT creativity checklist that is used on the figural form of the test. The checklist works as a bonus system to further describe the participants' creative behavior. The checklist items selected for analysis are movement, emotion, storytelling, humor, fantasy, and colorfulness. Each construct can be score on a scale of zero to two. When the behavior appears more than twice a score of one is awarded. Behaviors that appear more than three times receive a score of two. All participants that submitted videos were identified to have both movement and emotion as strengths. Fantasy appeared to be the weakness of all participants with videos submitted.

Table 4-2

Participant Creativity Checklist Scores

Creativity Checklist	Avery	Cameron	Dakota	Emery
Movement	2	1	2	2
Emotion	2	1	2	2
Storytelling	1	1	2	1
Humor	2	0	1	1
Fantasy	1	0	1	1
Colorfulness	1	2	2	1

Creative Behavior Constructs Results and Findings

Table 4-3 contains the data that documents the number of occurrences for each creative behavior as performed by the teacher. The table indicates that all teachers exhibited one occurrence of Fluency and that was that all video data was fluent and the video did showcase an agricultural classroom during instruction. Table 4-3 also shows that storytelling has the most occurrences when compared to all other creative behaviors. The behavior that is demonstrated the least is originality because there is a lack of instructional behaviors to accurately determine what behavior is original. If originality is removed the behavior with the fewest occurrences is humor.

The table 4-3 also includes the duration for each behavior. The durations also identify how long the behaviors last. The durations observed indicated that the majority of instructional time is used for storytelling although fluency has the longest duration. It is important to remember that fluency is used as a gatekeeper and must be present for all other behaviors to be measured and present. Humor is measured to have the lowest duration after removing originality from the behavior constructs intended for measurement.

Table 4-3

Creative Behavior Occurrences and Durations by Participant

Creativity Behavior Construct	Cameron's Occurrences	Dakota's Occurrences	Emery's Occurrences	Cameron's Duration	Dakota's Duration	Emery's Duration
Fluency	1	1	1	86:16.0	84:60.0	24:51.0
Originality	0	0	0	00:00.0	00:00.0	00:00.0
Movement	40	51	5	07:07.4	05:01.5	00:35.7
Emotion	29	11	2	03:04.4	00:47.5	00:13.6
Storytelling	67	58	9	15:.56.8	16:43.5	01:41.8
Humor	9	15	0	00:24.0	00:48.0	00:00.0
Fantasy	23	45	1	04:40.4	13:31.3	00:08.0
Colorfulness	52	13	9	01:35.8	01:28.0	01:31.2

Note: time is reported in the form of mm:ss.0

Behavior Explanations and Examples

Fluency and Originality

Fluency and originality are grouped together by the researcher because both of these constructs represent the definition of creativity used by the researcher. Fluency is used to represent appropriate and originality represents novel. The TTCT uses fluency as a gatekeeper score meaning that if an answer is not fluent then it cannot be scored. All participants demonstrated fluency because all lessons or activities were appropriate for an agricultural education class. Fluency occurrences are low and duration is longer because for the behavior to be present the teacher must have been fluent since fluency is used as a gatekeeper score. The topics and activities were age appropriate and appeared to meet the standards for the courses that were being taught. As shown in table 4-2 no participant demonstrated originality. At this time

there is not enough previous research in agricultural teacher creative behavior to confidently report or measure this behavior.

Movement

Movement, as defined by the TTCT for scoring purposes, requires the figures to show some type of movement such as lines indicating a car or something is in motion. For the purposes of this study, the researcher found that movement was part of the instruction. Not that the teacher moved around the classroom but used movement to transfer meaning during instruction. For example, Cameron demonstrated the technique for putting away a cord for a hand sander. Dakota also used movement to demonstrate where on a sales form a student would record a customer's phone number or order quantity. Other movement included hand gestures to add emphasis or direct attention to certain items that were related to the instruction or class topic. Movement often occurred in short bursts and as a part of storytelling.

Storytelling

Storytelling appears in the TTCT checklist of creativity and for the purposes of scoring is recognized as a picture that is drawn tells a complete story. Meaning the drawing goes beyond what it actually is. In this study, the researcher identified storytelling as the teacher going beyond giving information but personalizing the information to tell a story. Dakota exhibited this behavior while encouraging students to participate in the fruit sale by telling of participating as a student. Dakota's story also included a sales technique as well as suggestions for potential customers. Cameron also used storytelling to share the importance of the safety agreement and the difference between a safety agreement and a safety test, which the seventh and eighth graders are required to take before working in the shop. Emery used storytelling to elaborate on the

problems that occur because food packaging may appear to have the same ingredients yet the tastes are different.

Emotion

For scoring purposes, the TTCT identifies drawings that show emotion that either physically depicts emotion like a smiling face or evoke the emotion of the viewer. For this analysis, the researcher identified emotion when the teacher would show emotion in an effort to add excitement to a topic to promote engagement. Emotion was also identified when teachers would use words to show emotion like "great" or "good." Lastly, emotion was identified by the researcher as to when a teacher made an effort to evoke the emotions of their students.

Emotion occurred on its own often when Dakota used words like "great" or "good." However, once emotion was seen as promoting excitement or engagement to evoke emotions from the students it occurred during storytelling. Cameron demonstrated emotion while sharing information about agriculture around the world. During this international agriculture lesson, Cameron showed pictures and shared stories or current events. Emery used emotion to emphasize food allergies and product ingredients. It is important to note that the behavior of emotion did not last the entirety of the storytelling behavior, but it was a recognizable component that was identified and measured.

Humor

The behavior of humor is dependent on the audience and individual scoring. Humor is often dependent on the age of the participant. For this study humor was identified both from the lens of the researcher as well as from the feedback from student laughter as captured in the video. Humor appeared either as sarcasm or a joke. All of the humor used and measured as part

of the instruction and not separate from and appeared to be used to keep the students focused or to regain focus.

Cameron used sarcasm as humor and it appeared to not be understood by the students. Dakota's humor was received by the students and it allowed for students to continue the conversation by asking questions or posing scenarios to their instructor. Emery did not exhibit humor in the videos provided but may have eventually in other classes or unit topics.

Colorfulness

When scoring the TTCT colorfulness is given points when a drawing is not in color but recalls memories or leaves a lasting impression. The image that is depicted is clear and you can see what the participant was attempting to share with you. The video data did not address the colors used in the classroom although it can be noted that all of the classrooms were colorful. For the purposes of this analysis, colorfulness was identified during periods of instruction where a mental picture could be created from the description the teacher was sharing. The majority of the time colorfulness appears as part of a storytelling behavior and not an independent creative behavior.

Dakota used colorfulness to add detail and elaboration to stories. Cameron added anecdotes to assist with further understanding and engagement. Cameron after introducing a tool added in when the student would use the tool next. Emery added colorfulness to the stories by being sure to include descriptors of the sour and the sweet food as well as examples of when ingredient lists become important as well as how some ingredient lists are not accurate.

Fantasy

The TTCT scoring guide identifies fantasy as mystical creatures or products of imagination like a talking dog or a fairy. Whereas for this study the researcher identify fantasy

and posing "what if" or "imagine" scenarios within the instruction to allow for students to practice or generate ideas on a presented topic. These fantasy discussions provide time for the student to think and apply what knowledge has just been presented. It is important to note that fantasy was typically part of storytelling and at times continued for the same length of time as the story. It is also important to note that fantasy time was not recorded when students used fantasy as a response to their instructor.

Emery asked students what if someone had a food allergy and the ingredient was not listed. Dakota staged scenarios to assist students with understanding how to complete order forms for the upcoming fundraiser. Emery also used what-if scenarios to describe the awards system associated with the fundraiser. Cameron used what-if scenarios to support tool safety as well as understanding the application of agricultural inventions and land management.

Case Study Discussions and Conclusions

The data received in a variety of topics that are specific to the instructor as well as a variety of age groups and academic levels. The videos presented by both Cameron and Dakota were both teaching in middle schools, but the topics covered were very different because of the timing of the school year. The videos submitted by Emery were from high school and appeared to be from an upper-level food science course. The total video time also varied. Teachers were asked to submit three 50-minute videos, but Cameron and Dakota were only able to film on average of 25 minutes of class instruction where Emery was only able to capture 24 minutes of class within her 3 video submissions. Because of all of the differences, the discussions and conclusions are reported by the case to restrict false conclusions.

Case One: Cameron

After scoring and reporting the findings for the TTCT Cameron received a low creativity level with a score in the 35th national percentile. Meaning Cameron is more creative than 35 percent of the general population that is over the age of 18. As discussed in the description Cameron's creative strength is fluency. When looking at Cameron's fluency for the video recordings was also strong. It can be concluded that Cameron understands and knows what is appropriate and fits a particular situation because of more than 30 years of teaching experience. Figure 4-1 illustrates the breakdown of Cameron's behavior occurrences for each of the eight creative behaviors the researcher measured. It is clear that the top three creative strengths that Cameron uses the most during instruction are storytelling, colorfulness, and movement. Humor is Cameron's least utilized behavior.

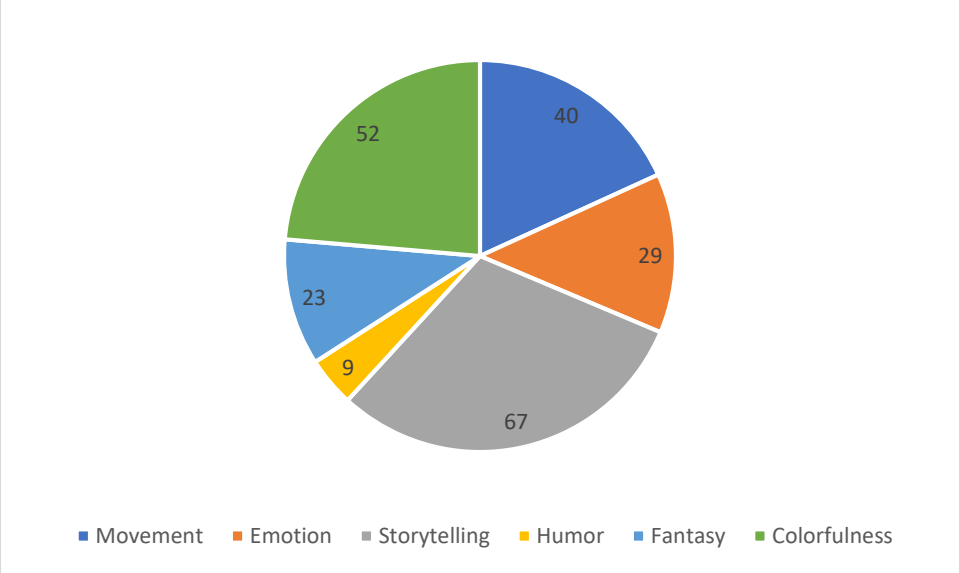

Figure 4-1. Cameron's Creative Behavior Occurrences

When comparing these creative behavior occurrences with Cameron's creativity checklist it is expected that Cameron would have fewer occurrences in storytelling, movement, humor, and fantasy. According to the checklist Cameron should have displayed colorfulness as her strength.

With an overall low creativity level of low, it would be expected to not see as many of these creative behaviors exhibited in her instruction. However, there are two forms of the TTCT and Cameron only completed the figural form and not the verbal form. The figural measure did not reflect her level of creative behavior. Perhaps the use of the verbal measure would better capture her creative thinking ability.

Case Two: Dakota

After scoring and reporting the findings for the TTCT Dakota received a high creativity level with a score in the 92nd percentile. Meaning Dakota is more creative than 92 percent of the general population that is over the age of 18. As discussed in the description Dakota's creative strengths are fluency and originality. When looking at Dakota's fluency for the video recordings was also strong. It can be concluded that Dakota understands and knows what is appropriate and fits a particular situation despite only being in the first year of teaching. The experience as a state FFA officer and in agriculture education as a student could help Dakota cover the deficit that could have been experienced in fluency. Unfortunately, Dakota did not have the behavior of originality identified despite the creativity level being high in originality. At this stage of creativity research in the context of agriculture education, the researcher does not have enough literature or behavior examples to accurately document and identify original behavior. Figure 4-2 illustrates the breakdown of Dakota's behavior occurrences for each of the eight creative behaviors the researcher measured. It is clear that the top three creative strengths that Dakota uses the most during instruction are storytelling, movement, and Fantasy. Emotion is Dakota's least utilized behavior.

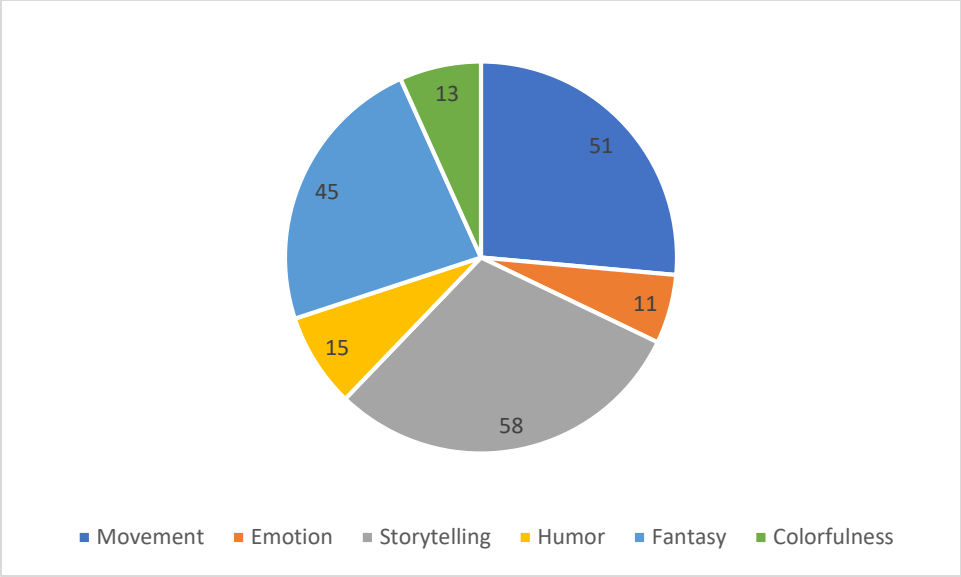

Figure 4-2. Dakota's Creative Behavior Occurrences

When comparing these creative behavior occurrences with Dakota's creativity checklist it is expected that Dakota would have more occurrences in storytelling, movement, but not fantasy. According to the checklist, Dakota should have displayed storytelling and movement as her strength, and Dakota did. The behavior identified confirmed storytelling as Dakota's creative strength with movement as a second. The researcher anticipated a low display of humor and that creative behavior was recognized as Dakota's third lowest score. The low occurrences of colorfulness do not match with the strengths identified by the TTCT. This discrepancy is explained by the topic of instruction. Colorful details were shared within the stories that were woven into her lecture but did not occur as frequently because the lecture topic of FFA history is fact heavy and had limited opportunity for Dakota to share an elaborative story. Fantasy was one of the top three creative behaviors that Dakota used. It is noted that with the increased use of fantasy in instruction the students would also mimic the behavior and share or propose imaginative situations as well to challenge the instructor or to demonstrate the engagement and

understanding of the material. With an overall high creativity level, it is expected to observe many of these creative behaviors during instruction.

Case Three: Emery

After scoring and reporting the findings for the TTCT Emery received a high creativity level with a score in the 92nd percentile. Meaning Emery is more creative than 92 percent of the general population that is over the age of 18. As discussed in her description Emery's creative strengths are fluency and originality and her largest creative deficit is in elaboration. When looking at Emery's fluency for the video recordings was weak when compared to the other participants, but when looking at her own submitted recording fluency was also a strength. It can be concluded that Emery understands and knows what is appropriate and fits a particular situation.

Unfortunately, Emery did not have the behavior of originality identified despite the creativity level being high in originality. At this stage of creativity research in the context of agriculture education, the researcher does not have enough literature or behavior examples to accurately document and identify original behavior. Figure 4-3 illustrates the breakdown of Emery's behavior occurrences for each of the eight creative behaviors the researcher measured. It is clear that the top three creative strengths that Emery uses the most during instruction are storytelling, colorfulness, and movement. Humor is Emery's weakest behavior followed closely by fantasy. The video that Emery submitted was very student-focused instruction and did not showcase Emery as an instructor. There were segments that Emery was leading the class, but for the majority of the submitted recording, the students were working in groups or independently on projects and course assignments. This difference in instruction type when compared to the other cases can be attributed to the level of the student, course focus, and time of year. Emery is a high

school teacher and shared video from a food science course. Emery has also already had these students for at least 18 weeks prior to recording the lessons.

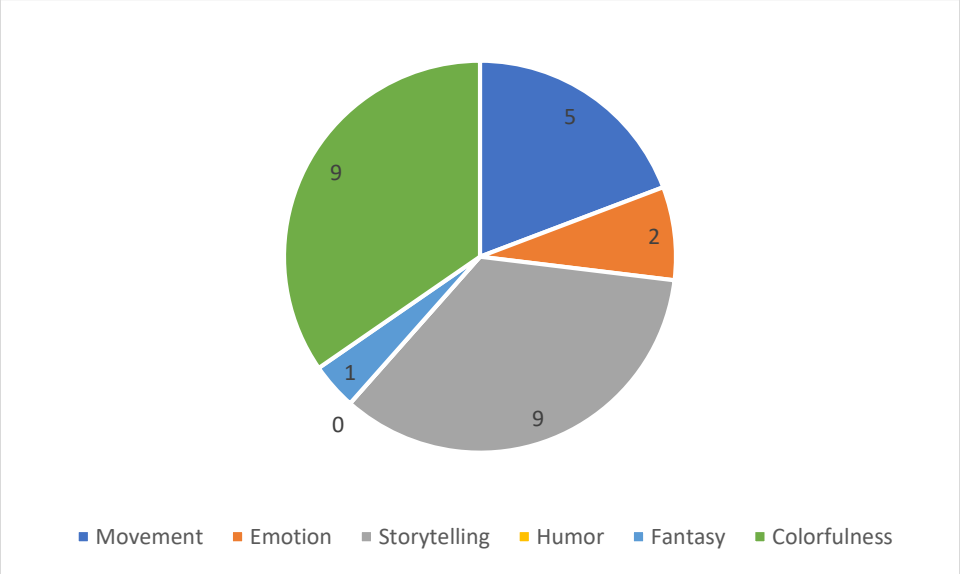

Figure 4-3. Emery's Creative Behavior Occurrences

When comparing these creative behavior occurrences with Emery's creativity checklist it is expected that Emery would have fewer occurrences in storytelling, humor, colorfulness, and fantasy. According to the checklist, Emery should have displayed emotion as a strength. With an overall high creativity level, it would be expected to see as many of these creative behaviors exhibited during instruction. As previously mentioned, there are some limitations to the data that can be gleaned from Emery's recordings because there is less time and the instruction was almost all student-focused. It is concluded that with different instructional delivery that includes more teacher input and participation would include higher rates of observable teacher creative behavior.

Overall Study Conclusions

Although it is difficult for the researcher to compare and contrast the data from the three case studies there are some general observations and conclusions. A common behavior that was

identified as the most prevalent creative behavior was storytelling. All three cases demonstrated storytelling the most. The second most recorded creative behavior was movement. It is clear that these teachers utilize movement with communicating knowledge to their students. The third most prevalent creative behavior is between fantasy and colorfulness. Two of the three teachers exhibited behavior more frequently in either of these two behavior categories. It is concluded that the teachers regardless of their creativity level rely on storytelling, movement, fantasy, and colorfulness during student instruction. At this time the researcher is unable to draw conclusions about originality, humor, or emotion other than they are part of instruction, but may need to be reported and recorded differently.

Recommendations

The National research agenda for the American Association for Agricultural educators identifies a need for professional development to be specifically designed for agricultural educators (Shoulders & Myers, 2011). Shoulders (2018) also agrees that there is a need for professional development me to be developed specifically for agricultural educators because they identify differently than traditional educators.

The general conclusion for this study identified four creative behaviors that these teachers in the South Eastern United States use the most during instruction. It is recommended that professional development is developed specifically for instructional methods to include the use and practice of storytelling, movement, fantasy, and colorfulness. The other three creative behaviors that were demonstrated the least should also be included in professional development although these behaviors may not be as prevalent in instruction may appear in other times or roles the agricultural teacher may uses as classroom management or program recruitment and development.

It is important to remember that these findings and conclusions are not generalizable but only explain and relate to the teachers that represent these three cases. Because of the lack of generalizability, it is recommended that before developing professional development for the behaviors with lower occurrences more studies are conducted to determine originality, humor, and emotion. The results clearly indicated a need to have continued research into the originality construct. In the future, the originality construct should be removed from the creative behavior analysis checklist for video analysis until originality can clearly be defined. Because the limited data set could have influenced the results, it is recommended to collect more video data over time which may lead to clearer more applicable results for professional development. This would also add to the body of literature and research to identify creative thinking ability demonstrated as teacher behavior.

It is recommended for future replications of this study the population is limited to only either middle school or high school agricultural teachers. The age and needs of the students, as well as the content being taught, appeared to differentiate too much between the middle school and high school teachers in this study. The inclusion of more strict video guidelines will also help with the uniformity of data and allow for more in-depth analysis as well as a comparison among samples.

Future research should also include other methods of data collection into the research design. Interviews should be conducted along with the video submission to allow the researcher to more fully understand what is happening in the video. An additional data strand to include the lesson plan for the videos being used for analysis would also prove helpful. By adding lesson plans the findings would continue to shape more focused professional development as well as teacher preparation programs.

References

Bryman, A. (2008) *Social Research Methods* (3 ed.). Oxford, UK: Oxford University Press.

Block, L.A., & Betts, P. (2014). Sustaining/containing agency in an alternative teacher education program. In L. Thomas (ED.), *Becoming teacher: Sites for teacher development in Canadian Teacher Education* (pp. 13-31). Retrieved from https://www.researchgate .net/profile/Julie_Mooney3/publication/328006982_Contemplative_Practice_to_Compas sionate_Learning_Community_Developing_and_Sustaining_the_Teacher's_Inner_Life_a s_a_Site_for_Faculty_Development/links/5bb2896092851ca9ed33b18a/Contemplative-Practice-to-Compassionate-Learning-Community-Developing-and-Sustaining-the-Teachers-Inner-Life-as-a-Site-for-Faculty-Development.pdf#page=13

Chase, C.I. (1985). Test review of Torrance Tests of Creative Thinking. In Mitchell, J.V. (Ed.), *The Ninth Mental Measurements Yearbook*. Retrieved from http://marketplace.unl.edu/buros/

Creamer, E. G. (2018). *An Introduction to Fully integrated Mixed Methods Research*. Thousand Oaks, CA: SAGE Publications.

Cramond, B. & Sumners, S. F. (2011). Scoring the Torrance Tests of Creative Thinking. Presented at Torrance Tests of Creative Thinking, Figural Workshop. Athens, GA; UGA Torrance Center for Creativity and Talent Development.

Jewitt, C. (2012). An introduction to using video for research. *National Centre for Research Methods Working Paper 3*(12). Retrieved from http://eprints.ncrm.ac.uk/2259/4/NCRM_workingpaper_0312.pdf

Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. American

Psychologist, 50, 741-749.

Noldus (2018). Observer XT. Software

Sumners, S. E. (2017). E. Paul Torrance: His life, Accomplishments, and Legacy. Presented at Torrance Tests of Creative Thinking, Figural Workshop. Athens, GA; UGA Torrance Center for Creativity and Talent Development.

Shoulders, C. W. (May, 2018). A description of the professional identities of Arkansas agricultural teachers. A research presentation at the American Association for Agricultural Education held in Charleston, SC.

Shoulders, C. W., and Myers, B E. (2011). Considering professional identity to enhance agricultural teacher development. *Journal of Agricultural Education*, *52*(4), 98-108. doi:10.5032?jae.2011.04098

Sternberg, R. J. (2004). *Handbook of creativity*. New York, NY: Cambridge University Press.

Torrance, E. P. (1993). Understanding creativity: Where to start. *Psychological Inquiry, 4*(3), 232-234. doi:10.1207/s15327965pli0403_17

Torrance, E. P. (2016) *Torrance Tests of Creative Thinking Directions Manual*. Bensenville, IL; Scholastic Testing Service, Inc.

Torrance, E. P. (2017) *Torrance Tests of Creative Thinking Norms-Technical Manual*. Bensenville, IL; Scholastic Testing Service, Inc.

MANUSCRIPT #3

Agricultural teacher creativity identity and instructional behaviors conclusions and recommendations

Abstract

Everyone has a collection of identities that guide who an individual is and the actions or goals and individual sets. Just as everyone has an identity, they also are all creative; therefore, everyone also has a creative identity. This study defines creativity from the perspective of agricultural teachers as well as identifies the influences on creativity and creative identity. The concept from symbolic interaction (SI) theory of the "looking glass" is also explored. The researcher presents the findings and discusses the connections between creativity level and certain identity influencers. This study not only identifies the creativity level of individuals and the process of identity development but it confirms the creative behaviors that agricultural teachers use during instructional methods. The findings of this study lead to recommendations for both future agricultural teacher professional development and curriculum items to be integrated into teacher preparation programs.

Introduction

The quest for understanding both how the human brain works and how humans develop knowledge has been a task many scientists have undertaken. One characteristic separating humans from other animals is our intellect. The task to define learning is difficult but not impossible. As an applied sociologist, it is noted that learning and behavior are both involved as we gain new knowledge. The research often focuses on measuring is learning or how learning occurs. Instead of focusing on the learners (students), research concentrated on the experienced teacher provides insights specific to teacher behavior that will impact student achievement in a

meaningful way. Encouraging the education programs that nurture desired practices in teachers should positively impact student achievement.

Because the learning environment is social (Lave, 1996) the development of identity is also social and follows the assumptions that are found in symbolic interaction (SI) theory. These main assumptions of SI lend the theory very well with identity formation of agricultural teachers during teacher preparation programs. The basics of identity development are rooted in experience and that aligns with the third SI assumption that meaning is either developed, sustained, or dismantled as people interact with one another.

Need for the Study and Research Problem

This study used both quantitative and qualitative data in measuring creativity level, creative identity and creative behaviors. This study supports the American Association for Agricultural Education National Research Agenda, by supporting research priority area five: Efficient and Effective Agricultural Education Programs (Thoron, Myers, and Barrick, 2016). This research area specifically fits with this manuscript because it asks for continued research in professional identity.

This study contributed to the literature on agriculture education teacher preparation and professional development opportunities as well as contributed to the literature specifically on creativity and career and technical education. This study also added to the growing knowledge and literature in creativity as it applies to the identity development of teachers.

This research study addresses priorities outlined in the *National Research Agenda" American Association for Agricultural Education's Research Priority Areas for 2016-2020 (*Roberts, Harder, & Brashears, 2016). This specific study identified teacher creativity as a starting point for a greater examination into creativity, therefore, this study aligns most

specifically with "Research Priority 5: Efficient and Effective Agricultural Education Programs" (Thoron, Myers, & Barrick, 2016, p.41) by supporting the development of skills needed by agricultural education practitioners. Creativity, as it applies to the agricultural teacher, has not been examined in depth which places this study as innovative with the continued potential to develop professional development that allows for teachers to hone their skills in the classroom by understanding creative behavior.

Purpose Statement

This qualitative study includes the collection of data for a deeper understanding of the formation of an agricultural teacher's creative identity and creative behavior. A sequential mixed method design was used with equal priority between all data strands. In this study quantitative data was used to measure the level of an individual's creativity and creative behavior. Qualitative data was collected to identify creative practices as well as explore a teacher's creative identity. A qualitative design was used to provide enhancement for the researcher to view the phenomenon to develop a deeper understanding of the following research questions:

Research Questions

1) What is the teacher’s level of creativity?
2) How do teachers describe what creativity means to them as well as their own creative identity?
3) How do teachers develop their creative self-concept from their interactions in a learning environment and creativity level?
4) How do teachers display creativity in the classroom during instruction?
5) What is the relationship between a teacher’s creativity level and the classroom instruction they utilize?

Literature Review

This research study relies on creativity, the Torrance Tests of Creative Thinking, and symbolic interaction (SI) theory for the development of the design, interviews, and data analysis. The researcher utilized the constructs found in the TTCT to design study to confirm the creative behaviors of agricultural educators. The assumption of the SI theory shaped the development of interview questions as well as inform the analysis, discussion, and recommendations for teacher identity.

Creativity

There are several lenses that can be used to develop an approach and understanding of creativity (Torrance, 1993). Torrance (1993) identifies that creativity can be considered from the following viewpoints person, process, product, and the environment. The constructs used to develop the TTCT are rooted in the process of creativity. As an education phycologist Torrance was "concerned with the learning, thinking, teaching, problem-solving, creative, development, and other processes" (Torrance, 1993, p. 232). The act of creativity and creative thinking is the "process of sensing difficulties, problems, gaps in information, missing elements, something askew; making guesses and formulating a hypothesis about these deficiencies; evaluating and testing these guesses and hypotheses; possibly revising and retesting them; and, last communicating the results" (Torrance, 1993, p. 233). At the base of all of these are human needs and the need to correct incompleteness is satisfied when creative behavior is used (Torrance, 1993).

The use of creativity is simply something done to relieve a tension to solve problems around us so that something is not missing or out of place (Torrance, 1993). As solutions are being developed is the point where divergent thinking enters. Divergent thinking is searching for

all possible solutions. This search for all possible solutions and finding an answer with trial and error is supported by Torrance's (1993) inclusion of hypothesis testing for solutions.

Torrance Test of Creative Thinking

As previously discussed, the TTCT is a measure used to identify the creativity level of an individual and not necessarily theory. By understanding the scoring and operationalized definitions of the constructs of the TTCT the researcher can develop assumptions about creativity and creative behavior. Each construct or behavior that is measured is defined and described in detail in the certification manual that is part of the required certification course to become a TTCT practitioner.

The TTCT does rely on the participant responses to be fluent which supports the appositeness required by Sternberg's, (2004) definition of creativity. The TTCT also scores individuals on originality, abstractness titles, elaboration, and resistance to premature closure. These score categories are the five constructs the instrument measures to identify an individual's creativity level. Torrance developed the TTCT not to reward individuals with high levels of creativity but in an effort to recognize an area of need for an individual and know exactly where that individual might need development (Sumners, 2017b).

The TTCT does not only measure those main constructs but also includes a creative checklist of possible specific creative behaviors that may add to the overall creativity score of an individual. The creative behavior checklist for the figural form include the following: emotional expressiveness, storytelling articulateness, movement or action, expressiveness of titles, synthesis of incomplete figures, synthesis of lines or circles, unusual visualization, internal visualization, extending or breaking boundaries, humor, richness of imagery, colorfulness of imagery, and fantasy.

Symbolic Interaction

In the social science discipline what is known as symbolic interaction (SI) theory was developed form the work of C. H Cooley in 1902 and G. H. Mead in 1934 (Krutilla & Benson, 1990). Krutilla and Benson (1990) noted that it was Blumer in 1972 who actually began to use the term "symbolic interaction." Blumer (1972) argues that SI rests on three assumptions as cited in Krutilla and Benson (1990),

> 1) human beings initiate activity with physical objects, other human beings, categories of human beings, institutions, and abstract concepts; 2) meaning is entirely derived from the social interaction one as with others; 3) meaning are created, modified, stabilized or dismantled as people interact with one another and their common environment (p. 9).

These main assumptions of SI lend the theory very well with identity formation of agricultural teachers during teacher preparation programs. The basics of identity development are rooted in experience and that aligns with the third SI assumption that meaning is either developed, sustained, or dismantled as people interact with one another. By interacting with others, the second assumption is fortified and can be found in identity development because "people become keenly attuned to how they think others see them" (Krutilla & Benson, 1990, p. 9). This awareness is especially impactful when the awareness of others perceptions are coming from people who are viewed as important (Krutilla & Benson, 1990). This idea of seeing yourself as others see you is known as "The Looking Glass Self."

Symbolic interaction (SI) theory assumes that identity is formed from social interactions (White, Klein, & Martin, 2015). Because learning occurs and is situated in social situations (Lave, 1996) it allows for the classroom and teacher interactions to facilitate the shaping of

identity. SI uses the process of self-reflection as individuals use the looking glass approach to see how others see them as individuals and from that identity is formed (White, et al., 2015).

Methodology

Research Design

To examine the phenomenon of creativity and answer the research questions the researcher used a qualitative research design. The researcher utilized a case study approach. A case study permitted the researcher to "focus on a single unit to produce an in-depth description that is rich and holistic" (Ary, Jacobs, Sorensen, & Walker, 2014, p. 485). For the purpose of this study, the units that were identified as the cases are agricultural education teachers in the South Eastern United States. These teachers represented either secondary or middle school agricultural education programs. Because the education field varies from state to state due to curriculum, training, and boards of education the case boundaries naturally exist allowing this phenomenon to be examined within agricultural teachers in their individual classrooms located in the South Eastern United States.

Although this was a qualitative study both qualitative and quantitative data were collected. Data were collected sequentially. Priority was given to the qualitative data strands because the quantitative data was used to add a level of description to the study. Data that was collected sequentially occurred at different points of time and the data strands are separate (Creamer, 2018). Qualitative data were collected electronically in video format as well as from semi-structured phone interviews. The quantitative data were collected using the Torrance Tests of Creativity Thinking (TTCT) figural form.

Data analysis techniques will depend upon the type and source of the data. Data strands will be either analyzed side by side or merged (Creswell, 2014). The side by side analysis will

occur sequentially and with equal priority. The quantitative data collected from the TTCT was analyzed first followed by interview data that was then followed by the analysis of video data. The meta-inference emerged from merging all analysis as the researcher reviewed the data strands from all sources (Creamer, 2018). The meta-inference lead to answering the fifth and final research question that is examined the relationship of creativity level, identity, and behavior in an effort to produce best practices for teacher preparation programs and agricultural teacher professional development opportunities.

Population and Sample

The process of identifying the population began with the researcher developing a professional development workshop that focused on creativity in the agricultural education classroom. The researcher used Sternberg's creativity definition as the focus of the workshop. The workshop introduced the creativity constructs measured by Torrance Tests of Creative Thinking (TTCT). Lesson and activity examples were discussed and practiced by participants. Participants also completed the TTCT during the three-hour workshop. By strategically developing a creativity workshop the researcher was able to identify a sample with an interest in creativity and therefore leading to a purposeful sample of agricultural teachers that were also convenient.

The population for this study was identified as Agricultural educators in the South Eastern United States that had an interest in creativity in the classroom as well as attended the researcher’s creativity workshop in their respective states. All teachers in attendance of the workshops were invited to the study (N = 21). The sampling method utilized was convivence sampling because the study participants were the teachers in attendance of the workshop. This sampling method allows the researcher to identify study participants that are easily accessible

and available (Ary, et al., 2014). Four teachers (n = 4) returned the consent forms and completed phone interviews. The researcher anticipated the four participants to each submit three videos which allowed for 12 videos (N = 12) for analysis. Three of the four teachers submitted three videos each resulting in nine videos (n = 9) for creative behavior analysis. All four teachers also completed the TTCT figural form.

Data Collection

There are many creativity and creative thinking measures available for use. Some focus on motivation, the flexibility of thought, originality, and fluency. All of those attributes of creativity are found in Sternberg's (2004) definition of creativity as an act that is both novel and appropriate. Motivation and flexibility of thought are connected to the idea of production and may connect to the generations of ideas for a divergent thought and problem-solving. Originality is mirrored in the concept of novelty. In general, something is considered novel when it is unique and not typical. The remaining suggested component is fluency and is a measurable form of appropriate. Generally, things are appropriate with they make sense in the context they are being used. Creativity as a large item in itself is difficult to construct a measure for that is useful and valid.

The quantitative data strand for this study was collected independently and sequentially from all study participants. Each participant completed a figural form A of the Torrance Tests of Creative Thinking (TTCT). The instrument is divided into three sections and is timed by the researcher. Participants were given 10 minutes to complete each of the sections with a total time of 30 minutes to complete the entire instrument. This figural creativity test was scored by the researcher and its analysis was used to answer research question one. The researcher is trained and has been identified as a reliable scorer for the TTCT figural form. This data strand will be

collected first as a participant enters the study as part of a creativity workshop. The workshop was part of a teacher professional development opportunity during a conference. The timing for this collection is important to ensure an accurate score. The subsequent interactions between the research and participant will also be influenced while interpreting scores and providing feedback.

The semi-structured interviews were scheduled with each participant individually and at a time and that was convenient for both the participant and researcher. Each interview was audio recorded and lasted for 60 minutes. The recordings were transcribed verbatim and provided to the participant for member checking. The researcher used member checking to ensure the transcript captured the conversation correctly and represented the participant accurately (Rossman & Rallis, 2012). The researcher used Atlas.ti8 to code and identify themes that emerge from the interviews.

Data Analysis

The participant interviews were coded and the researcher identified themes in stages and adapted from the model suggested by Bryman (2008). During the first stage, the researcher observed the data as a whole by reading over interview transcripts and notes. From this review, the researcher identified the theme categorized and began to identify and define possible codes. The second stage included the researcher uploading the transcript data into Atlas.ti8. Once the text was uploaded into the software the researcher began to highlight passages of importance and identifying keywords and phrases. Stage three included the majority of the coding of key phrases shared by the participants. This stage also included the grouping of similar codes to limit repetition and the identification of any connections. The final stage is where the researcher interpreted the meanings of the codes and constructed themes that supported the previously identified categories identified by the existing literature.

The video data was analyzed using Noldus Observer software. This software allows the researcher to code the participant submitted videos with identified codes developed by the researcher from the TTCT scoring rubric. The researcher viewed videos and documented when a creative behavior started and stopped. From these codes, behavior examples were identified to assist with the operationalization of creative behaviors. These themes were explained and supported by video description and researcher observation. The behaviors were documented to demonstrate the number of occurrences and duration of individual behaviors. The researcher can use the findings from this study to develop materials and teacher professional development training to further build and foster creativity in the classroom by developing these behaviors in preservice and experienced teachers.

The TTCT uses fluency and originality to measure all examples of creativity; therefore, the TTCT scoring constructs reflect appropriate and novel respectively. Fluency is defined by the TTCT scoring guide as the ability to fit within the rules of the prompt. For the purposed of this study, the researcher defined fluency as behavior that is part of instructional practice that fits within agricultural education. As with fluency, the TTCT operationalizes originality as any response that is not typical. The researcher also included the following codes: emotion, storytelling, movement, humor, colorfulness, and fantasy.

The TTCT scoring rubric and scoring guide were used as a description of the behavior the researcher identified. Emotion is explained as figures that display feelings; therefore, the researcher identified emotional behaviors as those teacher behaviors that show and depict emotion. Storytelling behavior is described as responses that tell an entire story to the viewer; therefore, the researcher identified teacher behavior as storytelling when the behavior went beyond the surface level and involved a more in-depth explanation or connection with student

experiences. Movement is one construct that is a bit more difficult because it is not the physical movement that occurs in our physical world such as walking, but is defined and recognized as a movement that is depicted in the figure to indicate motion. Therefore, the researcher identified movement behaviors as those teacher behaviors that utilized movement in an explanation or instructional activity not merely moving around the classroom or using gestures when lecturing. The TTCT scoring guide identifies humor as age appropriate jovial response that evokes laughter; therefore, the researcher identified humorous behaviors as instructional techniques that were intended to be humorous. Colorfulness is described as responses that are rich with detail and stick in the mind for easy recall; therefore, the researcher identified participant behavior as colorful when the action was detailed and stood out as something easily remembered. The final code identified is fantasy and is recognized as a response that sparks and uses the imagination. The researcher recognized fantasy behavior as instructional practices that used the imagination as well as connected to fictional characters.

Results and Findings

Participant Descriptions

The researcher used both quantitative and qualitative data strands to develop participant descriptions. Constructs of creativity, identified and measured using the TTCT, were used to describe the participants' creativity level including strengths and weaknesses. During the interview, participants were asked for their years of experience and what led them to be agricultural educators. The video data collected also contributed to describing the classrooms and laboratories that the participants used for instruction and classroom management.

Avery has been teaching agriculture for 24 years. Avery entered into the field of agricultural education by accident. Avery has a bachelor's degree in agricultural sciences, and

both parents were agricultural educators. Avery wanted a job in the field of agriculture and fell into an open teaching position where the administration felt confident, Avery could be successful in the position. Avery's former agricultural teachers came together to offer guidance and support. Avery now feels comfortable in her career. However, Avery did note that if another opportunity came along that sounded interesting, there would possibly be a career change. Avery completed the TTCT and has a moderate creativity level. Avery falls into the 90th national percentile in fluency and in the 80th national percentile in originality. Both fluency and originality are the strengths of Avery's creativity. Elaboration or addition of details and is Avery's weakest area of creativity. Within the TTCT's creative checklist Avery's strengths are found in emotional expression, movement, the expressiveness of titles, and humor. Avery did not submit any video data for this study although a consent form was signed and returned to the researcher. Avery did complete a phone interview.

Cameron has been teaching middle school agriculture for 31 years. Cameron credits the experience in agricultural education and FFA during middle and high school as what led to becoming an agricultural educator. Cameron completed the TTCT and was identified to have a low level of creativity. Cameron scored in the 97th national percentile in fluency. Cameron's largest area for growth, as identified by the TTCT, is elaboration. Within the TTCT's creative checklist Cameron's strengths are found in, the expressiveness of titles, extending boundaries, and colorfulness. Cameron's interview responses were very concise and to the point and very clearly conveyed love and dedication to agriculture education.

Cameron submitted three videos for a total of 86 minutes of recording time. Cameron selected two lessons from sixth grade and one lesson for seventh grade. The first sixth-grade class video was filmed in a shop that had both a classroom with organized desks in rows and a

work area with separate workbenches. This sixth-grade video was analyzed first and it included a lecture on agriculture safety as students completed their safety agreements. After the lecture the video cut and went to film the hands-on demonstration of how to uses a sander and then the students starting their woodworking projects by starting the sanding process.

The second sixth-grade video was analyzed next. This video was filmed in a traditional classroom with many examples of works posted on the walls as well as FFA chapter achievements. The ceiling also had examples of agriculture suspended. The student desks were organized in groups. The class topic was international agriculture. The format of this class included a lecture led by the instructor that included input and discussion from students. Student independent work followed the lecture. Students were asked to identify three countries and then identify three crops and three animals that are special to each country as well as three fact for each country.

The third and final video submitted by Cameron was of seventh-grade agriculture. This video also took place in the classroom and consisted of a lecture period including student discussion followed by a group project. The topic for this class was land management and environmental practices. The assignment was for the groups to develop a section of land that included a pond to become a town.

Dakota is an excited first-year teacher that has completed about six months of teaching middle school agriculture at the time the study began. Dakota was enrolled in agriculture education courses in high school and was a State FFA officer. Dakota did not originally think of a future working in a classroom, but after spending a year facilitating leadership workshops for FFA members during time as a state officer, Dakota decided to become an agricultural educator. Dakota completed the TTCT and has a high level of creativity scoring in the 92nd national

percentile. Dakota scored above the 90th national percentile in both fluency and originality. Dakota's creative weaknesses, as identified by the TTCT, are abstract of title and elaboration. Within the TTCT's creative checklist Dakota's strengths are found in emotional expression, storytelling, movement, the expressiveness of titles, synthesis of lines, extending boundaries, and colorfulness. Dakota self-selected to enter the study by attending a workshop on creativity that was offered as part of a leadership conference. During the interview, Dakota shared that time is spent talking with the art teacher at school about creativity and what it means to be creative. Dakota shared the frustration that participation in paint night fundraisers is low because people feel that they are not creative enough to participate.

Dakota submitted three videos for a total of 84 minutes of recorded time. Based on the video it is uncertain which grade levels Dakota selected to share but the topics were prevalent in the videos. Dakota's videos all took place in a traditional agriculture classroom with decorations and motivational posters displayed. There were not any visible FFA awards, but Dakota did have an FFA jacket on display. The students were seated in desks organized in rows. All three videos captured Dakota providing a lecture to the students. Dakota teaches on a block schedule so her videos naturally cut when it was time to break for restrooms and transition to another task.

The first two videos analyzed covered the topic of the upcoming fruit sale. Dakota used a PowerPoint that had images of the order forms that each student had at their desk. As Dakota went over the form, Dakota filled in the sections of the forms to model the behavior for students as well as provide the correct spelling. The lecture was interactive in that the students were filling out a form as Dakota did on the whiteboard. Dakota then set up examples of scenarios of the types of possible customers the student might interact with or should approach. It can be noted that Dakota's room is not equipped with a smart board, but did have the projection onto the

white dry erase board and wrote on the slides that way and erased as the presentation transitioned to the next slide. The final video of Dakota's that was analyzed was an FFA history lecture. Students had a notes sheet that they filled in as Dakota presented the information. There were two integrated videos into the PowerPoint that showcased the creed and the FFA jacket.

Emery is in the 18th year of teaching. Emery credits experiences in 4-H, prior to enrolment in agricultural courses, combined with experiences in agricultural courses with leading to become an agricultural educator. Emery completed the TTCT and has a high level of creativity scoring in the 92nd national percentile. Emery scored in the 99th national percentile in fluency, and in the 93rd national percentile in originality. Emery's creative weaknesses, as identified by the TTCT, is elaboration. Within the TTCT's creative checklist Emery's strengths are found in emotional expression, movement, and expressiveness of titles.

Emery submitted three videos with a total recording time of 24 minutes. The class that Emery recorded appeared to be an upper-level high school class enrolled in the food science pathway. The videos were set in both the lab and the traditional agriculture classroom. The classroom was decorated colorfully and had student FFA achievements posted. Students were seated in desks and desks were organized into rows. In the lab, students were working in groups spread around the area at work stations.

The first video analyzed had very little teacher instruction it was clear this was an upper-level course in the middle of the year because the students appeared to know the routine and did not ask many questions. They were preparing various recipes to share with the class. In video two the food science class takes place in the classroom where students were asked to complete a blind taste comparison. Emery asked the students to use their senses to compare and contrast the two food items. After a discussion, the students were then asked to generate ideas for food

products that may also fall into the categories that have similar ingredients. The third and final video was of student work. During this third video, there is no teacher-led instruction.

Torrance Test of Creative Thinking Results

Table 5-1 includes the national percentile scores for each of the participants in the five constructs of creativity measured using the TTCT which are: fluency (F), originality (O), elaboration (E), abstract of titles (AT), and resistance to closure (C). Scores are also reported for the creativity checklist. The overall creativity index is the creativity level of the participant. The creativity index scores are shown as a national percentile. For the purposes of this study, the researcher identified scores as high, moderate, and low based on score ranges. Scores that are identified as high are found in a range of 80-100. Moderate scores are in a range from 50-79, and sores are identified as low in the range of 0-49.

Table 5-4
Participant Torrance Test of Creative Thinking Scores

Participant Name	F	O	AT	E	C	Checklist	Score	Level
Avery	92	88	61	15	48	14	69	Moderate
Cameron	97	54	20	4	48	11	35	Low
Dakota	97	92	35	55	81	19	92	High
Emery	99	93	75	55	70	13	92	High

Table 5-2 contains the score from the TTCT creativity checklist that is used on the figural form of the test. The checklist works as a bonus system to further describe the participants' creative behavior. The checklist items selected for analysis are movement, emotion, storytelling, humor, fantasy, and colorfulness. Each construct can be score on a scale of zero to two. When the behavior appears more than twice a score of one is awarded. Behaviors that appear more than three times receive a score of two. All participants that submitted videos were identified to have

both movement and emotion as strengths. Fantasy appeared to be the weakness of all participants with videos submitted.

Table 5-5
Participant Torrance Tests of Creative Thinking Creativity Checklist Scores

Creativity Checklist	Avery	Cameron	Dakota	Emery
Movement	2	1	2	2
Emotion	2	1	2	2
Storytelling	1	1	2	1
Humor	2	0	1	1
Fantasy	1	0	1	1
Colorfulness	1	2	2	1

Creative Identity Emergent Themes

Creativity Defined

SI assumes that individuals collectively define terms by using social interactions and ques. This assumption reinforces that participants in the study formed a definition of creativity. The interview data revealed the following collective definition of creativity in the context of the agricultural classroom.

Theme: Creativity is defined as problem-solving, adaptability and is just teaching. Teachers identified and described creativity as problem-solving. Participants recognized that creativity is recognized as problem-solving for the teacher because of the need to determine which teaching methods and lesson structure can best meet the needs of the students. Participants also agreed that creativity in the form of problem-solving is exhibited by students as students work to complete various assignments. Just as important as problem-solving was the ability of an agricultural teacher to adapt to class dynamics or daily tasks take require creativity.

Dakota shared that typically creativity is discussed in an "artistic way," but continued to share that "creativity is more about adapting to your situations. The situations develop from working with a diverse group of learners that have different needs. Dakota explained connected

that the problem being solved is how to engage a variety of students and the solution is made possible by creativity enabling the skill of adaptability. Emery shared that "creativity is a person being able to create things and express yourself in different ways." Emery's use of expressing oneself in different ways is similar to the adaptability described by Dakota when needing to utilize creativity to develop lesson plans and class activities that can engage a diverse classroom.

One agricultural teacher explained creativity as "madness" (Avery). Avery continued to explain that creativity is elaborating on concepts during instruction or the ability "to take something and turn it into something else, seeing things outside of the box more or less." Cameron shared that "creativity has to do with solving problems and findings solutions to things that present themselves in your classroom." Dakota equated creativity to the ability to come "up with new and innovative ideas to come to a solution whether that is what art supplies or whether that's with people skills and communication or just simply problem-solving." Emery defined "creativity as thinking outside the box."

Just as important as problem-solving is the ability of an agricultural teacher to adapt to class dynamics or daily tasks require creativity. Dakota shared that typically creativity is discussed in an "artistic way," but continued to share that "creativity is more about adapting to your situations. This statement made by Dakota demonstrates the form that creativity takes in the classroom is adaptability, so creativity is used to add variety and flexibility into classroom and instructional methods. Emery shared that "creativity is a person being able to create things and express yourself in different ways."

As teachers thought about what creativity is and how to define it Avery simply stated that "I think I see it just like teaching." Emery shared that the "idea of creativity is so that it is not the same boring thing all of the time." Cameron added that sometimes "creativity may just be

confused with working a little harder on something to make it happen." Avery also shared that "I think that [creativity] is kind of what we do." These ideas presented by these teachers supports that creativity is a part of the daily skills needed to be a teacher.

The "Looking Glass Self"

This category of themes was identified by the researcher as to how teachers view their creative identity from the point of view of either students, administrators, or peers. This category also includes the teachers' view of themselves as creative or not. The themes are organized into three categories the viewpoint from the student looking glass, the administrative and peer looking glass, and finally their individual view of their own creativity.

These three themes emerged from teacher statements made in response to being asked first if a student or administrator viewed them as creative. Once a response was given then a follow-up question asking the participant to explain how they knew this or to give of example of something that supports what they feel they see in the looking glass. Participants shared stores of past interaction between themselves and a student as well as described interactions with peers or administrators. Several times participants reflected back to their own individual experiences from their past as a student enrolled in an agricultural education course to understand their interaction as a teacher with a student.

Theme: Teachers know their students view them as creative because of action.

Teachers reported that their students behave a certain way or take action because they recognize the creativity of their instructor. Avery said, "do I dare say yes? Because I am always silly, they never know what to expect." Avery continues with "they [students] come in and they want to share ideas with me." Dakota said that "I would hope so." Dakota continued by sharing a story of a student coming to her for help with a project which led Dakota to share "I thought you know if

I were a student who would I ask and I am like well I'd ask my ag teacher, mostly because if they don't have what you need they can often time figure out a way to get them something similar." Dakota finished the story with "we got him what he needed and it made me feel good about it, so, yeah." From the interaction described by Dakota combined with the reflection of personal past experience as a student action is seen as an indicator of a student viewing their teacher as creative.

Emery said that the upperclassmen feel Emery is creative whereas the freshman or first-year students may not. "I think more upperclassmen probably do because that is where we tend to get to have more fun hands-on activity…my freshmen right now, probably not as much" (Emery). Emery explained this based on the type of engagement and the lesson structure utilized during instruction. Emery's comments suggested that advanced classes work more independently; therefore, utilizing more creativity and variety in instruction. The activity level of the student suggests engagement which then allows Emery to feel the independently engaged upperclassmen view Emery as creative.

Theme: Teachers know their administrators and peers view them as creative because of words of affirmation. For teachers to recognize that peers and administrators view them as creative they must hear directly from them or infer from conversations. One teacher shared that "probably so, I've heard them say things" (Cameron). Cameron is clearly able to understand how an administrator view Cameron as creative because of statements that clearly included creativity. Dakota shared joyfully that "yes (laughing) they make a lot of comments about my ideas or enthusiasm to try different things." Dakota like Cameron also utilized direct comments to understand the views of creativity from peers and administrators. Emery also shared that "yes…I've had some other teachers that will come to me and try to get ideas on how

to make things different, how to create things." Emery also shared that with "limited conversations with the administration they view hand on activities as creative because not everyone gets to have that, so I would think yes." Although three of the four teachers shared that their administrators do see them as creative Avery said "probably not…because they don't get to see that side of me…because I am standoffish." Even though Avery feels as though administrators do not view creativity form interactions it is clear that Avery would need to hear clear statements in regards to creative ability and output to feel administrators and peers view Avery as creative.

Theme: Teachers view themselves as creative. All of the teachers said that they did view themselves as creative overall, but shared that the opportunity for them to use their creativity is not always present. Avery said that "sometimes I do…but it depends on the day… I am silly…and I elaborate on things." The idea of elaboration connects Avery's statement to the TTCT. Elaboration is one of the constructs used to calculate the creativity level of an individual. Cameron feels creative because "in some ways…I don't have like artistic talent but I have the ability to you know to visualize what I want to do or see where I want to go it [creativity] is just finding the method to get there." The visualization that Cameron is including in her explanation of creativity and connecting problem-solving. Cameron relies on creativity to approach problems in the form of visualization and the success experienced reinforced the feeling creative. Dakota says "yes…I want to do more and I want to do something different from what has been done before. Just as Avery mentioned elaboration that is what Dakota is also using to identify as creative. Dakota wants to move tasks beyond what is currently or has been done and continue to develop them into something different. This need to move projects further is not only associated with elaboration but connects to the concept of originality, the need to be novel. Finally, Emery

shared that "I do, personally I love doing creative things like making jewelry and you know doing crafts and different things like that, and I try to bring some of that aspect into the classroom." Emery's explanation is not as similar as the others because a traditional view of creativity combining leaning on Emery's artistic talent, but this statement is also connected to originality just as Dakota's was.

Display of Creativity and Role

This category of themes was identified by the researcher as to how teachers view their creative identify role in the classroom as well as how their creativity manifests in the classroom as student-focused and the types of instructional or organizational methods used.

Theme: Creativity leads to student-focused instruction in lesson planning. Study participants collectively agreed that their creative identity led to student-focused instruction. Participants credited creativity with promoting increased student engagement because of the student-centered instructional methods used. Avery said that the creativity utilized was "definitely student-focused" because "if they [students] come up with some wild idea and it is not too farfetched and I don't think I'm going to get thrown under the bur for it we do it." Avery described clearly that student focus means student choice and that students lead the educational charge in the development of assignments and other related instructional tasks. Cameron said that "I would hope it [creativity] would be student-focused" because "…students chose the way they would like to present something." Again, a common idea that creativity leads to student choice and that when students have a choice the focus of teacher creativity manifests as student-focused instruction. Dakota concluded that currently in the program is "seeing a lot more sort of 50-50 right now and sometimes more student-led because they are getting the freedom to come up with their own projects." Dakota's statement also supports the idea that choice fosters the

ability for teacher creativity to foster student-focused instruction. Emery said "I try to make it more student-focused", but sometimes "I feel like it is kind of forced from the teacher to make them be creative at times." Emery agrees that student-focus is the goal, but acknowledges the difficulty with students at times to have them take the lead in making choices that support a learning environment that is conducive to student-focused learning.

Theme: The teacher functions as a mentor and a motivator to promote and practice creativity. All four participants shared that the majority of the time their creative role as the agricultural teacher is to act as a mentor to motivate and push students to engage in creativity in the classroom when approaching various units of study and assignments. Avery said that the role is as “the guide…the mentor” because “if they are having a struggle, I’ll give them suggestions, so yes, I guess a mentor.” Cameron describes the role as “to help them [students] organize information in their mind or help them remember things." The task of helping students is connected to a mentor because Cameron is working to assist students with the task of organizing information as well as how to approach tasks. This type of assistance is similar to modeling behaviors that are then mimicked. Mentors may model behavior for mentees to imitate. Dakota describes her role to promote creativity in that the role is to provide "…the factual information…and the tools to know what it is why." Mentors often provide their mentees with tools and information to assist them in future scenarios. Emery said that at times "it is kind of forced from the teacher to make them be creative", but "I would think that my role is to inspire students to use their own creativity to make things happen." The relationships that mentors build with mentees on a level can be inspirational.

Theme: The teacher’s role is to use creativity to increase student engagement. Because all of the participants view their focus as student-centered, they also agreed that their

role is to also increase student engagement and much of that is found in a teacher's ability to adapt creatively and diversify instruction as mentioned in their collective definition of creativity. Emery said that "a lot of times I try to think with like inquiry-based ideas and try to give them something that we may or may not have a set right or wrong answer to, and so trying to get them to think on their own to problem solve." Emery is describing how creativity is used to develop students' ability to engage with course materials in the form of questions. Dakota says creativity is used in designing "a lesson to engage the students more or to get the student more interests in what we are learning…they want to learn more, so when they do it makes me feel like I am doing my job." Purposefully designing a lesson to engage students and to encourage students to explore topics and ask to learn more is supported by Dakota's creativity. Dakota also shared that "any lesson that you can give with multiple ways for students to receive it is going to be the most creative or adaptive lesson that you can give." This concept shared by Dakota indicates the need to plan a lesson in a variety of ways to engage diverse learners. Cameron shared that "I think this is a critical part of our ability to teach because if you have to think of so many different ways to present things to kids to get them engaged." Cameron identifies creativity as a critical component of a skill set for an educator to develop a variety of instructional practices to ensure learners are being engaged.

Influences on Creativity

Participants were asked what or who helped to share their creativity. Participants share that their influences ranged from professional instructors, time and experience, as well as participating in various professional development opportunities.

Theme: Creativity is influenced by mentors in professor and administrative roles. Participants said they have had administrators that promoted creativity as well as professors that

encouraged them to think nontraditionally. Avery says administration supports teacher creativity because “our principal has pushed this *Teach Like a Pirate* book and it's the whole idea of taking things out of the box." By administrators clearly supporting creativity by encouraging book studies or offering professional development opportunities conveys the important role creativity has in the classroom to the educators they work with as well as develops the creativity of their teachers. Dakota said, "one of my biggest mentors is my co-teacher." Dakota continued the list of mentors by including that "…surrounded by other ag teachers as far as mentorship and I've been getting a lot of help from those who have been in it for their whole lives." Dakota acknowledges that the interactions with various people influences creativity. Emery said, "on a personal level my mom is probably my biggest influence." Emery reminds that not all influences have a professional compacity, but that people in which relationships are developed with to influence creativity. This observation shared by Emery does not directly identify an influence from administration or professors but allows the acknowledgment and role that casual or non-professional influences have on creative development.

Theme: Creativity is influenced by experience in and outside of the classroom. Some participants shared that their experiences with other agricultural teachers as well other teachers helped to shape their individual views of creativity as well as how they use creativity in the classroom. One participant also credits creativity to experiences not related to agriculture education. Both of Avery's parents were agricultural teachers and said that "maybe my dad, I remember him being silly as a teacher." Avery's memory recalling the behavior of a previous teacher shaped Avery's individual view and practice of creativity. Avery also shared "I've seen a lot of really cool things from other teachers and I think wow I wish I could do that…I beg borrow and steal a lot of creativeness." Avery shared the technique of using the methods and

ideas of other teachers may decrease originality, but does support the construct of fluency in the support of appropriateness. Cameron has taught for 31 years and says that teaching experience shapes creativity "because no two days are the same (laughter) or not two classes are the same, so you have to constantly be thinking of new things you can do." Unlike Avery, Cameron does not rely on other teachers to support the development of fluency but rather personal experience from 31 years of teaching experience. Dakota shared that "I think it [creative identity] has just sort of been molded by people as you meet them." Dakota continued by saying "getting exposed to people doing different things, and traveling, and getting to see how different parts of the world do stuff" influenced her creativity. Dakota did not clearly state the same idea as Avery of using ideas and methods from other teachers but does support the importance of experiences. By having experiences Dakota can develop fluency and originality. Emery shared that "having more women in ag education than previous…there has been a lot more shared creativity and creative ideas through different social media platforms." Emery suggests that gender may have a role in creativity and more specifically how creativity is influenced because of a change in gender concentration in the profession of agricultural education because of a variety of social interactions.

Theme: Creativity is influenced by professional development. One participant shared that it is important and credit creativity with participation in various professional development courses (Emery). Dakota said that when "I go to conferences and things" it sparks an interest to try various things. This exposure to research and techniques supports creativity development in fostering a feeling of creative identity. Just as Emery shared a personal influence, Emery also identified a professional influence as "some of the training I've attended not necessarily a set person, but some of the training with project-based learning and the Dupont Agri science

inquiry-based." This is an encouraging statement for professional development, but Emery says it does not matter who is delivering the content just that the content is being delivered. Emery's stamen suggests the importance to not only continue to offer professional development but to also encourage agricultural teachers to actively seek out and participate in professional development.

Barriers to Creativity

This category of themes was identified by the researcher to identify barriers that either restrict or prevent a teacher's creativity. Barriers were not an initial piece, but did emerge during interviews in the form of follow-up questions, and was a clear part of the analysis.

Theme: Personal individual deficits form barriers to creativity. Teachers shared that there are individual characteristics or personality traits that they must overcome to be and feel more creative. Avery shared that the feeling of creativity depends on the level of comfort. "It is probably my comfort zone. If I am more comfortable with the situation, I am probably more creative than if I am, um not as comfortable" (Avery). Avery continued to share that "I think that I have, um, some learning disabilities that in a group where I can't process things as quickly as maybe other in the group, I just kind of stand back, I think that is probably why." The vulnerability that Avery experience inhibits the manifestation of the overall identity of being creative. Avery had previously said that sometimes the identity of creativity is present, but further exploration of the response gleaned the idea that Avery's comfort level influence creativity and is a barrier that is difficult to overcome because of learning disabilities.

Theme: Components of the educational system act as barriers to creativity. Teachers shared that there are educational systemic barriers that make creativity difficult and those are time, resources, curriculum, and testing. Dakota said that often her creativity is dependent on

"how much time do I have to dedicate." Dakota shared that if time is limited or not available then creativity is less utilized. Emery echoed Dakota's comment about time by sharing "a lot of times creativity may take longer for an activity." Time may not influence the lesson development as mentioned by Dakota, but the actual delivery of the lesson as explained by Emery. Dakota also said that "it is frustrating without the right resources it also hinders your ability to be more creative." Dakota acknowledges the important role that resources have within the support of creative lesson development. Resources could be money or time. In regards to curriculum Emery said that "the level of standards in line our introduction foundations class, is, um, there are a lot more standards to be covered and I think it limits the creativity for some of it versus in the upper division classes where they get to create and plan a little bit more, I think it opens it up for more." Emery shared that "I feel we've made a circle back around that we're having more standardized tests and more testing involved and a lot of that cuts into the creativity."

Creative Behavior

The creative behaviors are displayed in table 5-3 and reported as both behavior occurrences and durations for each participant. The data is not reported for the purposes of this study by video but rather a total by case. Each case included three videos submitted by participants. Table 5-3 contains the data that documents the number of occurrences for each creative behavior as performed by the teacher. The table indicates that all teachers exhibited one occurrence of Fluency and that was that all video data was fluent and the video did showcase an agricultural classroom during instruction. Table 5-3 also shows that storytelling has the most occurrences when compared to all other creative behaviors. The behavior that is demonstrated the least is originality because there is a lack of instructional behaviors to accurately determine

what behavior is original. If originality is removed the behavior with the fewest occurrences is humor.

The table 5-3 also includes the duration for each behavior. The durations also identify how long the behaviors last. The durations observed indicated that the majority of instructional time is used for storytelling although fluency has the longest duration. It is important to remember that fluency is used as a gatekeeper and must be present for all other behaviors to be measured and present. Humor is measured to have the lowest duration after removing originality from the behavior constructs intended for measurement.

Table 5-6

Creative Behavior Occurrences and Durations by Participant

Creativity Behavior Construct	Cameron's Occurrences	Dakota's Occurrences	Emery's Occurrences	Cameron's Duration	Dakota's Duration	Emery's Duration
Fluency	1	1	1	86:16.0	84:60.0	24:51.0
Originality	0	0	0	00:00.0	00:00.0	00:00.0
Movement	40	51	5	07:07.4	05:01.5	00:35.7
Emotion	29	11	2	03:04.4	00:47.5	00:13.6
Storytelling	67	58	9	15:.56.8	16:43.5	01:41.8
Humor	9	15	0	00:24.0	00:48.0	00:00.0
Fantasy	23	45	1	04:40.4	13:31.3	00:08.0
Colorfulness	52	13	9	01:35.8	01:28.0	01:31.2

Note: time is reported in the format of mm:ss.0

Behavior Explanations and Examples

Fluency and Originality

Fluency and originality are grouped together by the researcher because both of these constructs represent the definition of creativity used by the researcher. Fluency is used to represent appropriate and originality represents novel. The TTCT uses fluency as a gatekeeper score meaning that if an answer is not fluent then it cannot be scored. All participants demonstrated fluency because all lessons or activities were appropriate for an agricultural

education class. Fluency occurrences are low and duration is longer because for the behavior to be present the teacher must have been fluent since fluency is used as a gatekeeper score. The topics and activities were age appropriate and appeared to meet the standards for the courses that were being taught. As shown in table 4-2 no participant demonstrated originality. At this time there is not enough previous research in agricultural teacher creative behavior to confidently report or measure this behavior.

Movement

Movement, as defined by the TTCT for scoring purposes, requires the figures to show some type of movement such as lines indicating a car or something is in motion. For the purposes of this study, the researcher found that movement was part of the instruction. Not that the teacher moved around the classroom but used movement to transfer meaning during instruction. For example, Cameron demonstrated the technique for putting away a cord for a hand sander. Dakota also used movement to demonstrate where on a sales form a student would record a customer's phone number or order quantity. Other movement included hand gestures to add emphasis or direct attention to certain items that were related to the instruction or class topic. Movement often occurred in short bursts and as a part of storytelling.

Storytelling

Storytelling appears in the TTCT checklist of creativity and for the purposes of scoring is recognized as a picture that is drawn tells a complete story. Meaning the drawing goes beyond what it actually is. In this study, the researcher identified storytelling as the teacher going beyond giving information but personalizing the information to tell a story. Dakota exhibited this behavior while encouraging students to participate in the fruit sale by telling of participating as a student. Dakota’s story also included a sales technique as well as suggestions for potential

customers. Cameron also used storytelling to share the importance of the safety agreement and the difference between a safety agreement and a safety test, which the seventh and eighth graders are required to take before working in the shop. Emery used storytelling to elaborate on the problems that occur because food packaging may appear to have the same ingredients yet the tastes are different.

Emotion

For scoring purposes, the TTCT identifies drawings that show emotion that either physically depicts emotion like a smiling face or evoke the emotion of the viewer. For this analysis, the researcher identified emotion when the teacher would show emotion in an effort to add excitement to a topic to promote engagement. Emotion was also identified when teachers would use words to show emotion like "great" or "good." Lastly, emotion was identified by the researcher as to when a teacher made an effort to evoke the emotions of their students.

Emotion occurred on its own often when Dakota used words like "great" or "good." However, once emotion was seen as promoting excitement or engagement to evoke emotions from the students it occurred during storytelling. Cameron demonstrated emotion while sharing information about agriculture around the world. During this international agriculture lesson, Cameron showed pictures and shared stories or current events. Emery used emotion to emphasize food allergies and product ingredients. It is important to note that the behavior of emotion did not last the entirety of the storytelling behavior, but it was a recognizable component that was identified and measured.

Humor

The behavior of humor is dependent on the audience and individual scoring. Humor is often dependent on the age of the participant. For this study humor was identified both from the

lens of the researcher as well as from the feedback from student laughter as captured in the video. Humor appeared either as sarcasm or a joke. All of the humor used and measured as part of the instruction and not separate from and appeared to be used to keep the students focused or to regain focus.

Cameron used sarcasm as humor and it appeared to not be understood by the students. Dakota's humor was received by the students and it allowed for students to continue the conversation by asking questions or posing scenarios to their instructor. Emery did not exhibit humor in the videos provided but may have eventually in other classes or unit topics.

Colorfulness

When scoring the TTCT colorfulness is given points when a drawing is not in color but recalls memories or leaves a lasting impression. The image that is depicted is clear and you can see what the participant was attempting to share with you. The video data did not address the colors used in the classroom although it can be noted that all of the classrooms were colorful. For the purposes of this analysis, colorfulness was identified during periods of instruction where a mental picture could be created from the description the teacher was sharing. The majority of the time colorfulness appears as part of a storytelling behavior and not an independent creative behavior.

Dakota used colorfulness to add detail and elaboration to stories. Cameron added anecdotes to assist with further understanding and engagement. Cameron after introducing a tool added in when the student would use the tool next. Emery added colorfulness to the stories by being sure to include descriptors of the sour and the sweet food as well as examples of when ingredient lists become important as well as how some ingredient lists are not accurate.

Fantasy

The TTCT scoring guide identifies fantasy as mystical creatures or products of imagination like a talking dog or a fairy. Whereas for this study the researcher identify fantasy and posing "what if" or "imagine" scenarios within the instruction to allow for students to practice or generate ideas on a presented topic. These fantasy discussions provide time for the student to think and apply what knowledge has just been presented. It is important to note that fantasy was typically part of storytelling and at times continued for the same length of time as the story. It is also important to note that fantasy time was not recorded when students used fantasy as a response to their instructor.

Emery asked students what if someone had a food allergy and the ingredient was not listed. Dakota staged scenarios to assist students with understanding how to complete order forms for the upcoming fundraiser. Emery also used what-if scenarios to describe the awards system associated with the fundraiser. Cameron used what-if scenarios to support tool safety as well as understanding the application of agricultural inventions and land management.

Discussion and Conclusion of Research Questions

Research Question #1

The first research question was to identify the teacher's creativity level and required the use of quantitative data collected from the TTCT to identify the teacher creativity level. The levels and creativity descriptions are shown in Table 5-1. Two of the participants were identified as highly creative mostly as the result of their fluency and originality scores. These two participants also scored the highest on elaboration and resistance to closure as compared to the other participants. One participant was identified as moderately creative. This participant's strengths were identified as fluency and originality as well but appeared to need support with the

development of elaboration. The fourth participant scored at a low level of creativity but demonstrated strength in fluency just as the other three participants.

These results identify this group of agricultural teachers as having a high ability to determine ideas that are appropriate for a given situation. These scores also demonstrate a need for further development of all constructs of creativity with the exception of fluency and originality. It is concluded that agricultural teachers general can identify creative solutions based on both fluency and originality, but require skill development for elaboration, the abstractness of titles, and resistance to closure.

Research Question #2

The second research question asked, how do teachers describe what creativity means to them as well as their own creative identity? The qualitative analysis from the teacher interviews satisfied this question. The following themes were identified to answer the question how do teachers describe what creativity means to them: 1) creativity defined as problem-solving for both the teacher and the student; 2) creativity defined as variety and adaptability; 3) creativity is just teaching and not boring. By developing these themes, a general definition of creativity that represents this group of agricultural teachers is that; creativity is simply teaching to not be boring while adapting to situations as well as practicing problem-solving for both the teacher and the student.

The second part of this research question focuses on how teachers described their identity. Despite creativity scores, all teachers felt they were creative and the theme that teachers view themselves as creative emerged from the data. Because these agricultural teachers view themselves are creative it is concluded that teacher identities are multidimensional as suggested

by (Akkerman & Meijer, 2011) and include creativity. Therefore, this specific part of the identity can be developed as well. Teachers felt creative despite what their actual creative level was.

Research Question #3

As Lave (1996) implies learning is situated in social interactions. Bandura (1971) supports this with the idea that we learn from our social interactions. The third research question asks, how do teachers develop their creative self-concept from their interactions in a social learning environment and creativity level? This is supported by SI by using the "looking glass" principle to determine how others view us. The following themes emerged from the qualitative data: 1) teachers know their students view them as creative because of action; 2) teachers know their administrators and peers view them as creative because of words of affirmation.

These themes support the idea that the opinions of those who have power or seem important mean more (Krutilla & Benson, 1990). This does not suggest that the researcher thinks the teachers think students are less important just that it takes less justification to know that a student views them as creative and is often inferred from student actions; whereas, for a teacher to know or feel creative because of an administrator or peer they must hear words of affirmation. Their supervisors and peers must say things like "you're creative" or "that is a creative idea." Although the research question anticipated a relationship between creativity level and creative identity the researcher did not find a relationship. The formation of the creative identity of these teachers was facilitated based on their experiences and interactions with students, administrators, and peers.

Research Question #4

The fourth research question comes from the video analysis with the TTCT identifying the eight creative behaviors. The fourth research question was, how do teachers display creativity

in the classroom during instruction? While the video data is difficult to generalize, because of the time and instructional difference, four behaviors were identified as the most used creative behaviors for an agricultural teacher. All three teachers demonstrated that storytelling is the most prominent creative behavior used in an agricultural classroom closely followed by movement. Given the type of hands-on curriculum found in agricultural classrooms, these two creative behaviors fit well in methods of instruction. The other two creative behaviors were not strengths for all three teachers but were for at least two of the teachers. These behaviors are fantasy and colorfulness. The researcher concluded that agricultural teachers utilize a variety of creative behaviors. However, the ones that occur most frequently are storytelling, movement, fantasy, and colorfulness.

Research Question #5

The final research questioned asked the researcher to examine the relationship between a teacher's creativity level and the type of classroom instruction they utilize. At this time the researcher cannot identify a significant relationship between creative ability and creative behavior displayed during instruction. The researcher anticipated Cameron to exhibit few creativity behaviors because her creativity level was identified as low, however, Cameron's creative behavior was as frequent as an agricultural teacher identified as highly creative that also taught middle school. The TTCT is designed to measure both verbal and figural creativity. This study only used the figural form. The researcher has concluded that Cameron might score a higher level of creativity if the verbal form of The TTCT was used to measure creativity level.

Recommendations

This study was designed for the purposes of gaining more insight and adding to the literature on the role that creativity plays in agricultural education both in the form of creative

identity and creative instructional behaviors. The recommendations from this study support the call from the research priority area five of the *American Association for Agricultural Education National Research Agenda 2016-2018* (Thoron, Myers, Barrick, 2016). This research priority area focuses on research that supports the development of efficient and effective agricultural education programs (Thoron et Al., 2016). Table 5-4 includes the recommendations as presented for this study for teacher preparation programs and professional development.

Table 5-7
Study Recommendations

Focus of Recommendation	Recommendation
Teacher Preparation	The inclusion of creativity and creative behavior. The inclusion of identity development. Use of creativity terms (words of affirmation). Student video analysis for creative behavior.
Professional Development	Continued identity development. To include social media and the generation and sharing of creative ideas by teachers and not by instructional faculty

Teacher Preparation Programs

The teachers reported that creativity is just teaching; therefore, the researcher recommends the inclusion of creativity and creative behaviors into the teacher preparation programs. Thoron et Al (2016) identify the need for teacher preparation to include personal and employability skill, and the data shared from the teachers support creativity as being one of those skills needed for employment.

The researcher recommends identity development be included in teacher preparation programs. Identity is used to set goals and identify paths to achieve those goals as well as make day to day decision on what role to fulfill or behavior to exhibit (Hahl & Mickulec, 2018). By including identity development early in the teacher's career time can be given for the identity to fully form. Teacher preparation programs and instructors should use creativity terms since instructors can appear to students as authority figures. Emery mentioned having a professor during teacher preparation that encouraged creativity and teaching outside of the box. Avery mentioned the use of a book called *Teach Like a Pirate*. Integration of creative texts into teacher preparation can facilitate and promote creative thoughts and instructional behaviors.

Teacher preparation programs can also benefit from student video analysis and reflection on creative behavior. Most programs as part of student teaching require video and reflections, such as like with EdTPA. By using observer software student teachers can identify their own behavior trends and then reflect on their use of creative behaviors as well as note how students may interact differently depending on the teacher's creative behavior. This is supported because Dakota had a high occurrence of fantasy during her videos and the students began to mimic and utilize fantasy as well to communicate an understanding of the topic being covered by the instructor. This reflection is part of identity development as self-awareness and experiences shape creative identity throughout time (Trent, 2010).

Agricultural teacher Professional Development

Previous research identified the need for specialized professional development for agricultural teachers (Shoulders & Myers, 2011). The findings from this study support the needs and continued to develop a creative identity that is part of the overarching agricultural teacher identity. Because identity is not static professional development should routinely be offered to

teachers that include reflection and discussion of identity. Emery credited some of her creative ability due to her participation in professional development.

Dakota and Avery also shared that they gained creativity by working with or observing other agricultural teachers. This social learning through experiences is supported by Bandura (1971). With this need for sharing of experiences and learning from fellow agricultural teachers, the researcher recommends that professional development include social media and the generation and sharing of creative ideas by teachers and not by instructional faculty.

Future Research

The researcher recommends future replication of this study to continue to add to the existing literature regarding creativity in the context of agriculture education as well as creative identity and behavior. Future research should begin to identify the relationship between creative behaviors and student achievement. It is recommended that future research also include the use of Kirton's Adaption-Innovation (KAI) theory and instrument to identify possible relationships between creative behavior and problem-solving style.

It is also recommended that future research is completed in other areas of the country to better inform teacher preparation programs. Because there is a limited connection with the TTCT scores and identity formation it is recommended that future studies only include interview grounded in SI. The data could also be enhanced by adding a focus group to integrate the mitigation of barriers to creativity and to form a more collective definition of creativity. Future studies would add to the value of the conversation regarding creative identity and allow for further development of professional development and teacher preparation focused on creativity and identity.

Although not an anticipated finding for this particular research study there is a future need to explore the relationship between gender and creativity among agricultural teachers. Emery suggested that the creative behavior seen in the profession may have benefited from the increase in female agricultural teachers. Emery also mentioned the role that social media has in sharing of creative idea between agricultural teachers, so future research can add to the understanding of how to best use social media to support the development of creative behaviors and creative identity. An additional finding that was not anticipated is the barrier shared by Avery that personality and learning disability may at times prevent her from feeling or behaving creatively. Future research examining the relationships between creativity and personality traits as well as learning disabilities is needed to further understand how to best develop agricultural teachers' creative identities and behaviors.

It is recommended for future replications of this study the population is limited to only middle school agricultural teacher or only high school agricultural teachers. The age and needs of the students, as well as the content being taught, appeared to vary too different between the middle school and high school teachers in this study. The inclusion of more strict video guidelines will also help with the uniformity of data and allow for more in-depth analysis as well as a comparison among samples. With time and travel permitting it is recommended by the researcher that videos are collected by the researcher to ensure more similarity and consistency in video quality, content, and duration.

Future research should also include other methods of data collection into the research design. Interviews should be conducted along with the video submission to allow the researcher to more fully understand what is happening in the video. The addition of an instructor reflection following each video submission can add depth to the understanding of how reflection and

experiences impact creative behavior and identity. An additional data strand to include the lesson or unit plan for the instruction captured on video to analysis for possible nonverbal creative behaviors. By adding lesson plans the findings would continue to shape more focused professional development as well as teacher preparation programs.

Finally, it is recommended that researchers engaged in such a study report back to the participants to review the findings and allow the instructor to reflect. The reflection should include creativity level as identified by the TTCT, the development of their creative identity, and the analysis of their creative behavior. It is recommended that a final interview and separate study be conducted to identify possible impacts of findings such as this. Findings from these exit interviews can lead to the development of tailored professional development that specifically meets the needs of agricultural teachers.

References

Akkerman, S. F., & Meiger, P. C. (2011). A dialogical approach to conceptualizing teacher identity. *Teaching and Teacher Education 27*, 308-319. Retrieved from https://www.sciencedirect.com/science/article/pii/S0742051X10001502?via%3Dihub

Ary, D., Jacobs, L. C., Sorensen, C., & Walker, D. A. (2014). *Introduction to Research in Education* (9th ed.). Belmont, CA: Wadsworth.

ATLAS.ti8 (2018) Qualitative Analysis software.

Bandura, A. (1971). *Social Learning Theory*. General Learning Corporation. Retrieved from https://www.dl.icdst.org/pdfs/files1/91fcebcd73499a3a43173cca1a1ea1ef.pdf

Block, L.A., & Betts, P. (2014). Sustaining/containing agency in an alternative teacher education program. In L. Thomas (ED.), *Becoming teacher: Sites for teacher development in Canadian Teacher Education* (pp. 13-31). Retrieved from https://www.researchgate.net/profile/Julie_Mooney3/publication/328006982_Contemplative_Practice_to_Compassionate_Learning_Community_Developing_and_Sustaining_the_Teacher's_Inner_Life_as_a_Site_for_Faculty_Development/links/5bb2896092851ca9ed33b18a/Contemplative-Practice-to-Compassionate-Learning-Community-Developing-and-Sustaining-the-Teachers-Inner-Life-as-a-Site-for-Faculty-Development.pdf#page=13

Bryman, A. (2008) *Social Research Methods* (3 ed.). Oxford, UK: Oxford University Press.

Creamer, E. G. (2018). *An Introduction to Fully integrated Mixed Methods Research*. Thousand Oaks, CA: SAGE Publications.

Creswell, J. W. (2014). *Research Design* (4th ed.). Thousand Oaks, CA: SAGE Publications.

Hahl, K. & Mikulec, E. (2018). Student reflection on teacher identity development in a year-long secondary teacher preparation program. In *Australian Journal of Teacher Education 43*

(12). Retrieved from https://ro.edu.edu.au/ajte/vol43.iss12/4
Retrieved from http://www.mathcs.duq.edu/~packer/Courses/PSI3962/Lave%201996%20Teaching,%20as%20learning,%20in%20practice.pdf

Kirton, M. J. (2003). *Adaption-Innovation in the Context of Diversity and Change*. New York, NY: Taylor & Francis Group.

Krutilla, J. O, Benson, D. E. (February, 1990). The reflected-self identity of learning disabled adolescents: Perceptions of "I Am" using symbolic interaction theory. Paper presented at the *International Conference of the Learning Disabilities Association* in Anaheim, CA.

Lave, J. (1996). Teaching, as learning, in practice. *Mind, Culture, and Activity, 3*(3), 149-164. Retrieved from http://www.mathcs.duq.edu/~packer/Courses/PSI3962/Lave%201996%20Teaching,%20as%20learning,%20in%20practice.pdf

Noldus (2018). Observer XT. Software

Roberts, T. G., Harder, A., & Brashears, M. T. (Eds). (2016). *American Association for Agricultural Education national research agenda: 2016-2020.* Gainesville, FL: Department of Agricultural Education and Communication.

Rossman, G. B. & Rallis, S. F. (2012). *Learning in the Field: An Introduction to Qualitative Research,* (3rd ed.). Thousand Oaks, CA: SAGE Publications.

Shoulders, C. W., and Myers, B E. (2011). Considering professional identity to enhance agricultural teacher development. *Journal of Agricultural Education*, *52*(4), 98-108. doi:10.5032?jae.2011.04098

Sternberg, R. J. (2004). *Handbook of creativity.* New York, NY: Cambridge University Press.

Sumners, S. E. (2017). E. Paul Torrance: His life, Accomplishments, and Legacy. Presented at Torrance Tests of Creative Thinking, Figural Workshop. Athens, GA; UGA Torrance

Center for Creativity and Talent Development.

Thoron, Myers, & Barrick, (2016). Research priority 5: Efficient and effective agricultural education programs. In T.G. Roberts, A. Harder, & M. T. Brashears (Eds.) *American Association for Agricultural Education national research agenda: 2016-2020* (pp. 41-48). Gainesville, FL: Department of Agricultural Education and Communication.

Torrance, E. P. (1993). Understanding creativity: Where to start. *Psychological Inquiry, 4*(3), 232-234. doi:10.1207/s15327965pli0403_17

Trent, J. (2010). Teacher education as identity construction: insights from action research. *Journal of Education for Teaching, 36*(2), 153-168. Retrieved from https://www.tandfonline.com/doi/pdf/10.1080/02607471003651672?needAccess=true

White, J. M., Klein, D. M. & Martin, T. F. (2015). *Family theories: An introduction* (4th ed). Thousand Oaks, CA: Sage.

APPENDIX A: Western Institutional Review Board Letter of Exemption

October 23, 2018

Rick D. Rudd, PhD
Virginia Tech
214 Litton-Reaves (0343)
175 West Campus Drive
Blacksburg, VA 24061

Dear Dr. Rudd:

SUBJECT: REGULATORY OPINION—IRB EXEMPTION
Protocol Title: Teacher Creative Identity
Investigator: Rick D. Rudd, PhD

This letter is in response to your request to Western Institutional Review Board (WIRB) for an exemption determination for the above-referenced research project. WIRB's IRB Affairs Department reviewed the exemption criteria under 45 CFR §46.101(b)(2):

> (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
> (i) Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

We believe that the research fits the above exemption criteria. The data will be collected in a way so that the subjects can be identified, directly or through identifiers linked to the participants. However, any disclosure of the human subjects' responses outside the research will not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation. You have also confirmed that the results of this study will not be submitted to the Food and Drug Administration (FDA) for marketing approval.

This exemption determination can apply to multiple sites, but it does not apply to any institution that has an institutional policy of requiring an entity other than WIRB (such as an internal IRB) to make exemption determinations. WIRB cannot provide an exemption that overrides the jurisdiction of a local IRB or other institutional mechanism for determining exemptions. You are responsible for ensuring that each site to which this exemption applies can and will accept WIRB's exemption decision.

Western Institutional Review Board®
1019 39th Avenue SE Suite 120 | Puyallup, WA 98374-2115
Office: (360) 252-2500 | Fax: (360) 252-2498 | www.wirb.com

Please note that any future changes to the project may affect its exempt status, and you may want to contact WIRB about the effect these changes may have on the exemption status before implementing them. WIRB does not impose an expiration date on its IRB exemption determinations.

If you have any questions, or if we can be of further assistance, please contact Alisha Rodenbach, JD, at 360-252-2427, or e-mail regulatoryaffairs@wirb.com.

ANRY:dao
B2-Exemption-Rudd (10-23-2018)
cc: Patricia Lane Woodward, VA Tech
WIRB VA Tech
WIRB Accounting
WIRB Work Order #1-1120521-1

APPENDIX B: Agricultural teacher Recruitment Email

Teacher Creative Identity
Recruitment Email

Email to be sent for recruiting participation in the study.

Hello,

You are receiving this email because you have recently participated in a creativity in the classroom workshop or been identified as a creative teacher.

I would like to invite you to participate in a study that examines agricultural teacher creative identity. If you agree to participate then you will be asked to report your creativity score if you have completed the Torrance Test of Creative Thinking (TTCT). If you have not completed the TTCT then you will be asked to complete the instrument. The TTCT will take approximately 45 minutes. After the research team receives your score you may be asked to continue to participate in the study by submitting teaching videos and a personal interview that will last no longer than 60 minutes.

I have attached the informed consent for you to sign if you agree to participate in the study. If you have any questions, do not hesitate to send your questions as a reply to this email. Please return a signed consent form to me at plw@vt.edu.

Thank you,

Lane Woodward
plw@vt.edu

APPENDIX C: Consent Form

Informed Consent for Participants

Title of Project: Teacher Creative Identity

Investigator(s): Lane Woodward — plw@vt.edu/(478)394-0616
Name — E-mail / Phone number
Rick Rudd — rrudd@vt.edu/(540)231-6836
Name — E-mail / Phone number

I. Purpose of Research
The objective of this project is to examine teacher creativity identity. All agricultural teachers in Florida and Virginia are may participate in the study. The findings will provide insights for others who are involved in teacher identity, development and education.

II. Procedures
First participants will complete a creativity instrument if they have not already completed the instrument. The inventory will take 45 minutes to complete. Once the inventory is completed or the score is submitted participants will be contacted by Lane Woodward (plw@vt.edu) to proceed to the video and interview processes. All videos will be recorded and submitted by the participant. The interviews will be scheduled at the participant's convince and will not exceed 60 minutes.

III. Risks
This study involves no more than minimal risks for participants. The researchers work to minimize potential risks by taking measures to maintain confidentiality. Participants may also choose to skip any questions they are not comfortable answering.

IV. Benefits
There are no direct benefits to you for your participation. The indirect benefits may come from better understanding your creativity level and creative behaviors. No promise or guarantee of benefits has been made to encourage you to participate.

V. Extent of Anonymity and Confidentiality
Protecting your identity is a top priority of this study. By participating in this study, your information will be kept strictly confidential. Any information that potentially could identify you or others will be coded to ensure confidentiality. At no time will the researcher release identifiable results of the study to anyone other than individuals working on the project without your written consent. However, the Western Institutional Review Board (WIRB) may view the study's data for auditing purposes. The IRB is responsible for the oversight of the protection of human subjects involved in research.

VI. Compensation
Participants will not receive any form of compensation for their time during the study.

VII. Freedom to Withdraw
You are free to withdraw from this study at any time without penalty. You are free not to answer any questions that you choose or respond to what is being asked of you without penalty.

VIII. Questions or Concerns
Should you have any questions about this study, you may contact one of the research investigators whose contact information is included at the beginning of this document. Should you have any questions or concerns about the study's conduct or your rights as a research subject, or need to report a research-related injury or event, you may contact WIRB at help@wirb.com or (800) 562-4789.

IX. Participant's Consent
I have read the Consent Form and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent:

_____ Date_____
Subject signature

_____
Subject printed name

APPENDIX D: Torrance Test of Creative Thinking Description

Name of Test and Subtest	Description	Creative Factors
Activity 1: Picture Construction	The person constructs a picture using a pear shape as a stimulus on the page. The shape must be a part of the completed picture	• Originality • Abstractness of titles • Elaboration • Checklist of Creative Strengths
Activity 2: Incomplete Figures	The activity has 10 incomplete figures and the person must turn them into a picture and provide a label for each picture or object	• Fluency • Originality • Abstractness of Titles • Elaboration • Resistance to premature closure • Checklist of Creative Strengths
Activity 3: Lines or Circles (repeated figures)	The activity consists of 3 pages of either lines or circles. The person is to make objects or pictures by using the line or circles. Pictures or objects must also be given a name.	• Fluency • Originality • Elaboration • Checklist of Creative Strengths

Retrieved and adapted from https://innovators-guide.ch/wp-content/uploads/2012/12/torrance-creativity-test.pdf with courtesy of : © The Alberta Teachers' Association

APPENDIX E: Interview Protocol and Questions

Interview Script – Teacher Creative Identity

For the purpose of this study, this interview will be audio recorded. Is it alright with you, if we use a recording device for the interview?

My name is _____, and I am part of the research team working on this project. I would like to begin by thanking you for speaking with me today. The purpose of this interview is to collect information on agricultural teachers' creative identity. Creative identity refers to how you see yourself as creative or as an individual who uses creative problem solving to arrive at novel and appropriate solutions

Today, I would like to ask you a few questions regarding your experiences as an agricultural teacher and perceptions of creativity.

We will start by talking about your role as a participant in this study and obtaining informed consent. Then, I will ask questions from my interview guide. My role as an interviewer is to ask questions related to specific topic areas of interests, request additional details on specific responses, and keep track of time. This interview is designed to last approximately one hour in length.

First, will you please read and review the consent form. If you have any related questions, please feel free to ask them throughout. **(Allow time to read)**

Are there any additional questions?

(Participant reads consent form, collect signed consent forms. Resume interview [~5 minutes]).

Keep in mind during the interview that there are no right or wrong answers. Please share your thoughts and experiences throughout the interview. If at any time you wish to not respond to a question, please let me know. We will proceed forward to the next question.

As mentioned in the consent form, all participants have been assigned a pseudonym. To begin, we will test the recording device. Please state your name.

(Allow the interviewee to read their name to both test for volume and 'record' voice recognition)

I will begin recording now.

Thank you. Now that you have read and signed the consent document. Could you please provide verbal consent to participate in the study as well as be audio recorded?

Participant Interview (60 minutes)

We will start with more general questions about your teaching history. As the interview continues, we will focus in on your experiences and perceptions of creativity and your individual creative identity.

1. How long have you been an Agricultural teacher, and what led you to this career path?
2. How do you define creativity?
    a. What influenced this? Did you have any creative mentors?
3. Can you think of an example of creative teaching in your classroom?
    a. Creative-Problem solving?
    b. Student or Teacher focused?
4. What is your creativity role in the classroom?
5. Do students view you as creative?
    a. Examples of why or why not?
6. Do administrators, peers, and coworkers view you as creative?
    a. Examples of why or why not?
7. Do you view yourself as creative?
    a. Examples of why or why not?
8. Describe your creativity in the classroom.
9. Who or what influenced your creativity?
10. **Wrap-Up (Remaining Time):** We have reached the end of our preplanned questions. Is there anything else you would like to share about creativity or your creative identity in regards to our discussion today or anything else you would like to share?

At this time, I am going to stop recording.

Again, thank you for your participation in this interview. I will transcribe this session verbatim. You will receive the interview transcription to review and provide any feedback regarding its accuracy. We will then interpret the findings to learn more about teacher identity. We may need

to contact you during the data analysis process. We will only do so if we need to clarify a response. If at any time during this process you have any questions or additional comments, please feel free to contact myself or another investigator as listed on the consent form.

APPENDIX F: Video Protocol

Instructions for Video Submission

Thank you for your continued participation in this study. You have been selected to submit 3 videos. The research team will not provide video equipment. If you do not have access to video equipment please notify Lane Woodward (plw@vt.edu).

It is your preference as to which class or lesson you would like to record. It is important that you work to avoid the capturing of student images in your videos. Your teaching is not being evaluated, but the researcher will be using your video to identify the creative behaviors of agricultural teachers. You may want to record lessons and classes that you feel allow for the most creativity from you as the instructor. We ask that videos are submitted by the following deadlines: **November 9th**, **November 30th** and **December 14th**.

Videos should be submitted electronically to the research team via a password protected google drive folder. The research team will work with you to set up and use the google drive folder and only you and the research team will have access to your password protected folder.

If you have any questions regarding the video recording or submission please contact the research team by emailing Lane Woodward at plw@vt.edu.

Again, thank you for your continued participation.

APPENDIX G: Study Timeline

Task	September 2018	October 2018	November 2018	December 2018	January 2019	February 2019	March 2019	April 2019
Research proposal presented to committee.								
Complete IRB Documents, Submit, and edit as needed.								
Invite Participants to Study and obtain consent forms.								
Conduct interviews, Complete Transcriptions, and member checking.								
Collect video from participants.								
Interview analysis.								
Video analysis.								
Present findings.								

APPENDIX H: TTCT Complete Scores

	Column Labels			
TTCT Constructs	**Avery**	**Cameron**	**Dakota**	**Emery**
Sum of Fluency Act 2	10	9	9	10
Sum of Fluency Act 3	20	25	24	28
Sum of Fluency Total	30	34	33	38
Sum of Fluency NP	92	97	97	99
Sum of Fluency SS	128	138	138	147
Sum of Originality Act 1	1	1	0	0
Sum of Originality Act 2	5	8	8	2
Sum of Originality Act 3	15	5	14	21
Sum of Originality Total	21	14	22	23
Sum of Originality NP	88	54	90	93
Sum of Originality SS	124	102	126	130
Sum of Abstract of Titles Act 1	2	2	1	2
Sum of Abstract of Titles Act 2	10	5	8	12
Sum of Abstract of Titles Total	12	7	9	14
Sum of Abstract of Titles NP	61	20	35	75
Sum of Abstract of Titles SS	106	83	92	114
Sum of Elaboration Act 1	3	2	4	4
Sum of Elaboration Act 2	2	2	3	3
Sum of Elaboration Act 3	2	1	3	3
Sum of Elaboration Total	7	5	10	10
Sum of Elaboration NP	15	4	55	55
Sum of Elaboration SS	79	65	103	103
Sum of Closure Act 2	14	14	17	16
Sum of Closure Total	14	14	17	16
Sum of Closure NP	48	48	81	70
Sum of Closure SS	99	99	118	111
Sum of Emotional Expression	2	1	2	2
Sum of Storytelling	1	1	2	1
Sum of Movement	2	1	2	2
Sum of Expressiveness of Titles	2	2	2	2
Sum of Synthesis of Incomplete Figures	0	0	0	0
Sum of Synthesis of Lines	0	1	2	0
Sum of Unusual Visualization	1	1	1	1
Sum of Internal Visualization	1	0	1	0
Sum of Extending/Breaking Boundaries	1	2	2	1
Sum of Humor	2	0	1	1
Sum of Richness	0	0	1	1
Sum of Colorfulness	1	2	2	1
Sum of Fantasy	1	0	1	1
Sum of check list Total	14	11	19	13

Sum of Creativity Index	121	108	134	134
Sum of Creativity NP	69	35	92	92
	Moderate	Low	High	High

APPENDIX I: Complete Creativity Behavior Analysis

Behavior	Cameron		Dakota		Emery	
	occurrences	Duration	occurrences	Duration	occurrences	Duration
Movement	40	07:07.4	51	05:01.5	5	00:36.7
Emotion	29	03:04.4	11	00:47.5	2	00:13.6
Storytelling	67	15:56.8	58	16:43.5	9	01:41.8
Humor	9	00:24.0	15	00:48.0	0	00:00.0
Fantasy	23	04:40.4	45	13:31.3	1	00:08.0
Colorfulness	52	01:35.8	13	01:28.0	9	01:31.2
Fluency	1	86:16.1	1	84:51.0	1	24:51.0
Originality	0	00:00.0	0	00:00.0	0	00:00.0