

THE INFLUENCE OF 4-H INSTRUCTOR BELIEFS ON THE TEACHING OF ANIMAL
FOOD PRODUCTION TO YOUTH POPULATIONS

by

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Abstract

Agricultural literacy education initiatives are more essential than ever to tackle emergent local, national, and global challenges related to agriculture and food production (Trexler, 2000). Current societal issues, both in and beyond agriculture, require individuals to develop a complex understanding of the agri-food system and the skills necessary to engage in critical conversations (Trexler, 2000). Despite the need for agriculturally literate youth, recent studies indicate that their knowledge of the agriculture industry is limited and underdeveloped (Hess & Trexler, 2011a; Kovar & Ball, 2013). The purpose of this study is to explore how the personal beliefs of 4-H instructors influence their teaching of animal food production to 4-H youth populations in the non-formal teaching setting within a specific southwestern state. The conceptual framework used to guide this study was derived from the work of Martin and Enns (2017) on agricultural ideologies. Martin and Enns (2017) highlight two specific ideologies within the agriculture industry that can be used to identify general beliefs about agriculture- agrarian populist and neo-agrarian. The theoretical framework that guided this study was derived from the work of Jones and Carter (2007) who developed the sociocultural model of embedded belief systems to explain how the belief systems of science teachers impacted their teaching of the subject. The previous agriculture ideologies from Martin and Enns (2017) can be used in conjunction with the sociocultural model of embedded belief systems to explain how the personal beliefs of 4-H instructors influences their teaching of animal food production to youth populations. I used in-depth, semi-structured participant interviews as the data source for my study. Interviews were chosen to allow participants to communicate their own lived experiences and to elicit the internal construct of beliefs (Moustakas, 1994). Five main themes emerged from the data that served as the basis for my findings including: (1) agricultural beliefs of 4-H instructors largely align with

agrarian populist ideology, (2) lack of 4-H curriculum to teach animal food production, (3) beliefs of 4-H instructors served as a central driver in how content was taught and assessed, (4) context of the community impacted 4-H instructors strategies for teaching animal food production, and (5) animal food production ultimately taught as raising animals for fair projects. These five themes were closely related and interact with each other, ultimately guiding instructional decisions of 4-H instructors in the study. The underlying essence of the phenomenon was the fear and anxiety present in all aspects of teaching animal food production and the perceived consequences of how the content was being taught on the agricultural literacy of youth. Fear was driven by factors related to beliefs whether it was the participants own beliefs or other individuals' beliefs that impacted instruction

Introduction

Agricultural literacy education initiatives are more essential than ever to tackle emergent local, national, and global challenges related to agriculture and food production (Trexler, 2000). Agricultural literacy is the understanding and knowledge necessary for individuals to effectively synthesize, analyze, and communicate information regarding agriculture (Frick et al., 1991; Meischen & Trexler, 2003). Current societal issues, both in and beyond agriculture, require individuals to develop a complex understanding of the agri-food system and the skills necessary to engage in critical conversations (Trexler, 2000). By the year 2100, it is estimated that the population will increase by more than 50%, and the agriculture resources available may not be enough to sustain the population (Bongaarts, 2016). This illustrated problem, in addition to increased urbanization and burgeoning agriculture regulations and policies (Kovar & Ball, 2013), will require the further education of individuals so they can make informed decisions (Trexler, 2000). Specifically, youth populations are a target audience for agricultural literacy education because of their current and future influence on agriculturally related issues (Frick, 1990).

Despite the need for agriculturally literate youth, recent studies indicate that their knowledge of the agriculture industry is limited and underdeveloped (Hess & Trexler, 2011a; Kovar & Ball, 2013). In a study focused on agricultural literacy in urban youth, elementary students were interviewed to evaluate their understanding of the agri-food system. Researchers found that the elementary students could name common food items; however, they were unable to identify the origins of the items, food processing was not well understood, and students' previous and current agricultural experiences did not influence their understanding about where food comes from or the food production process (Hess & Trexler, 2011b). Additional studies have examined the agricultural literacy of high school students and found that the student

participants were not agriculturally literate or did not fully understand specific content areas within agriculture (Frick, et al., 1991; Pense, et al., 2004; Pense, et al., 2006).

Within the formal education setting, instructors typically focus on the nutritional and health sectors of the agri-food system and less about agriculture production concepts (Trexler, 2000). There are formal school-based agricultural education specific programs nationwide, but these programs are only available in 83 schools within the specific southwestern state (National Association of Agriculture Educators, 2019). Agriculture is usually framed through a farming lens during early elementary school years and then quickly transitions into nutrition and health information during middle and high school within general formal education, outside of school-based agricultural education programs only available in select school districts. However, elementary and middle school instructors voiced that there is a need for students to be able to understand how food is produced to enable them to make well-reasoned decisions regarding their health and the environment (Trexler, 2000). These findings illustrate the need for agricultural literacy specifically within youth populations, which can occur outside of the formal classroom through Cooperative Extension programming, specifically within 4-H youth programs (Frick et al., 1995).

For programs like 4-H to be effective in their efforts to educate youth populations about agriculture, it is also important for the instructors of these students to possess content knowledge (Van Driel & Berry, 2012) in agriculture and specifically in the agri-food system. Instructors also need the necessary pedagogical knowledge and pedagogical content knowledge (PCK) to teach the content (Loughran et al., 2004). The freedom that 4-H curriculum provides allows instructors' beliefs to have a greater influence on the content that is being taught as well as the pedagogical strategies that are being employed to teach the content. Belief systems act as a

driving force when forming teachers' PCK because PCK as a knowledge base influences teaching decisions related to student understanding, which can greatly affect transferability of content learned by students (Rice & Kitchel, 2017). The variance of the 4-H curriculum from program to program, combined with instructors' beliefs and differences in PCK, begs the following question- how do the personal beliefs of 4-H instructors influence their teaching of animal food production?

Purpose of the Study and Central Research Question

The importance of agricultural literacy is growing exponentially along with agricultural issues. Kovar and Ball (2013) further define agricultural literacy as the, "understanding of the food and fiber system that includes its history and current economic, social, and environmental significance to all Americans" (p. 167). Using this definition, animal food production falls into the agricultural literacy category. As agricultural issues regarding animal food production become more prominent, it will be imperative that individuals understand the agri-food system to make informed decisions about these issues (Trexler, 2000), further necessitating exploration into non-formal agricultural education entities like 4-H and the knowledge and beliefs of instructors within 4-H that directly influence the dissemination of this information to youth.

The purpose of this study is to explore how the personal beliefs of 4-H instructors influence their teaching of animal food production to 4-H youth populations in the non-formal teaching setting within a specific southwestern state. This study aligns with the American Association for Agricultural Education National Research Agenda priority area five- efficient and effective agricultural education programs (Roberts et al., 2016). The following central research question guided the study: How do the personal beliefs of 4-H instructors influence their teaching of animal food production to 4-H youth populations in the non-formal teaching setting?

This study will examine instructors' personal beliefs using a phenomenological approach and unpack the impact these beliefs have on instruction, specifically within the context of animal food production.

Review of the Literature

Conceptual Framework

The conceptual framework used to guide this study was derived from the work of Martin and Enns (2017) on agricultural ideologies. Martin and Enns (2017) highlight two specific ideologies within the agriculture industry that can be used to identify general beliefs about agriculture- agrarian populist and neo-agrarian. Neo-agrarian ideologies generally consist of values associated with environmentalism, social justice, small scale production, and organic agriculture while agrarian populist ideologies generally encompass values associated with tradition, science, efficiency, and values represented in rural communities. These ideologies can be placed on a continuum where most individuals directly involved in the agriculture field tend to gravitate towards one of the two ideologies. Individuals that are not heavily involved in agriculture do not gravitate towards one ideology or the other, even though they may have opinions about popular issues that can be voiced through consumer actions that align with one specific ideology. It is also possible for an individual to have split opinions on which ideology they gravitate towards (Martin & Enns, 2017).

Agrarian populists focus on conventional farm production as well as traditional agriculture and scientific progress. This can often lead to the belief that working in relation to a farm will lead to a life of high morality and ethics. Other values that coincide with agrarian populist include efficiency, individualism, responsibility, and patriotism (Martin & Enns, 2017).

Neo-agrarians focus on alternative methods of agriculture and tend to include smaller scale operations. This ideology aligns with non-conventional values and more contemporary movements. Balance between the environment and people is considered important within the neo-agrarian ideology (Martin & Enns, 2017). These differences in ideologies often lead to opposing viewpoints of current agricultural practices.

In a recent study focused on how college students discuss their agriculture values with others in relation to their own values, three themes emerged: acknowledgment of different agricultural values, deeply rooted agricultural values, and conflicts arising from differing agricultural values (Martin & Enns, 2017). Student participants from both ideological perspectives discussed how individuals should be open to different agricultural values and then evolved from talking about their own values to how their values differed from other individuals along the continuum. Student participants preferred individuals who were not extreme in their views regarding agriculture and qualitative comments revealed that most student participants viewed individuals around them as having deeply rooted beliefs. It was also highlighted that deeply rooted agricultural values may lead to conflict between individuals (Martin & Enns, 2017).

The ideologies presented by Martin and Enns (2017) can be applied to the specific context of agri-food production, with a focus on animal agriculture. Instructors of animal food production within the non-formal education setting of 4-H are directly involved in the agriculture industry and subsequently are likely to gravitate toward one of these two ideologies. This can influence the content they choose to teach and the method and strategies they utilize to teach that content. The potential impact of agriculture ideologies may be magnified by individual instructor

autonomy through the freedom of 4-H curriculum and delivery methods in the southwestern state that is the focus of this study.

Instructor Beliefs

The influence of personal beliefs on the way instructors teach material has been studied in the formal agricultural education setting within school-based agricultural education programs (Rice & Kitchel, 2017). Instructors' personal beliefs about a subject, as well as the teaching and learning of a subject, can greatly impact what instructors are willing to teach and the methods that are used when teaching (Earnest, 1989). In a recent study by Rice and Kitchel (2018) that explored the PCK of agriculture teachers within plant sciences, it was discovered that integrated belief systems had the greatest influence in shaping the PCK of agriculture teachers. More specifically, participants' beliefs about the purpose of agriculture education, teaching and learning in agriculture education, as well as their beliefs about plant science education all played a fundamental role in the development of instructors' PCK (Rice & Kitchel, 2018).

There have been additional studies that explored teacher beliefs within a specific agricultural subject, such as sustainable agriculture (Muma et al., 2010); however, there are limited studies that focus on the non-formal teaching setting rather than traditional classroom settings. Due to the lack of enforced curriculum or guiding content standards within non-formal teaching settings like 4-H, instructors' personal beliefs may play a larger role in instructional decisions. However, there is a paucity of research exploring the impact of instructor beliefs on the teaching of animal food production within non-formal education, further substantiating the need for this study.

4-H Curriculum in Animal Food Production

The 4-H curriculum that is available to instructors is composed of a variety of text available for purchase on the national 4-H website (4-H Youth Curriculum in STEM, Healthy Living and Civic Engagement, 2020). There is not a specific text for animal food production as whole; however, there are separate texts for beef, swine, lamb, and goat projects that students can be involved in through local 4-H youth programs. These livestock projects refer to the students' county fair projects where they raise animals for food consumption to show and sell at local county fairs (4-H Youth Curriculum in STEM, Healthy Living and Civic Engagement, 2020). This limited curriculum focused on animal food production provided by 4-H presents an increased level of freedom for individual instructors to choose which text/resources they utilize for instruction, if any, and the ideological lens in which instructors choose to present the text. Embedded within county fair livestock projects are various concepts that instructors can focus on within the context of animal food production including animal nutrition and feeding, identifying quality livestock, and biosecurity measures; however, the depth in which these concepts are explored, if at all, is left up to the individual instructor. Additionally, the local community in which 4-H instructors reside can also influence the curriculum focus and pedagogical strategies utilized (4-H Programs - STEM, Health, Agriculture & Civic Engagement, 2020). Ultimately, a clear picture of what specific content is being taught to 4-H students in the southwestern state of focus and the pedagogical methods employed to teach that content remains largely unknown.

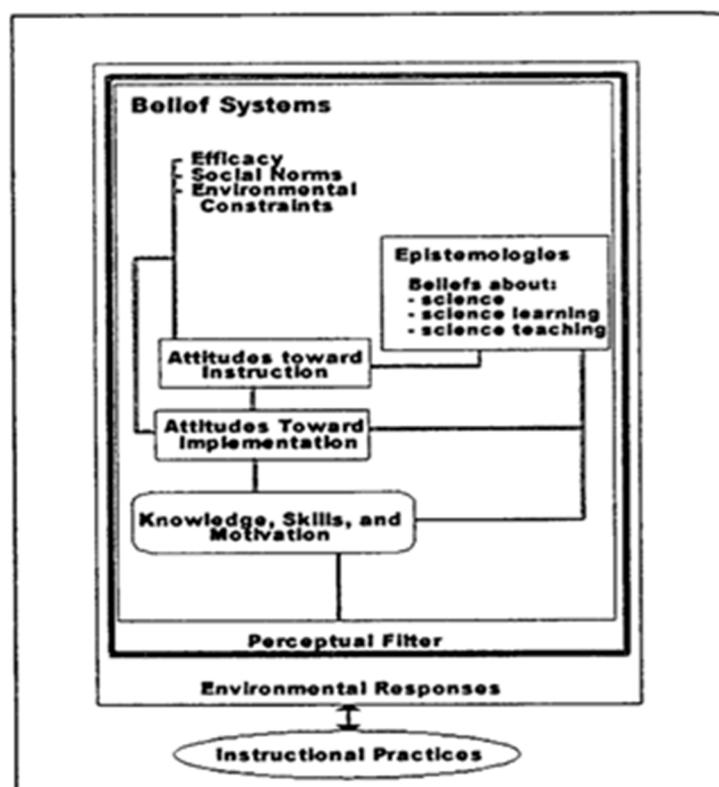
Theoretical Framework

The theoretical framework that guided this study was derived from the work of Jones and Carter (2007) who developed the sociocultural model of embedded belief systems to explain how the belief systems of science teachers impacted their teaching of the subject, see figure 1. The

previous agriculture ideologies from Martin and Enns (2017) can be used in conjunction with the sociocultural model of embedded belief systems to explain how the personal beliefs of 4-H instructors influences their teaching of animal food production to youth populations.

Figure 1.

The Sociocultural Model of Embedded Belief Systems (Jones & Carter, 2007)



The sociocultural model of embedded belief systems is a blended model derived from various theoretical models in social psychology (Jones & Carter, 2007). The belief systems of instructors, paired with their epistemologies (which includes their beliefs about science, science learning, and science teaching), impacts instructors' attitudes toward instruction and implementation. While the original model focused exclusively on science, the model can be adapted to an agricultural context, as agriculture is an applied science (Huffman & Evenson,

2006). Instructors' epistemologies also directly impact their knowledge, skills, and motivations. The knowledge, skills, and motivations of instructors make up the perceptual filter through which instructors decide which instructional practices to use when teaching their students. The environmental responses to these instructional decisions influence instructional practice and these practices impact the environmental responses that instructors receive. Therefore, the multi-directional arrow exists between the environmental responses and instructional practices (Jones & Carter, 2007).

Instructor beliefs are derived from personal experiences and norms and are largely based on an individual's background and how they were raised, as highlighted in the work from Martin and Enns (2017). The idea that beliefs are derived from experiences and norms based on individual backgrounds also holds true when considering the epistemologies of individuals, which are also developed from past experiences. Epistemologies refer to instructor beliefs about animal food production as well as the teaching and learning of the subject. Instructor beliefs about instruction, efficacy, social norms, and environmental constraints influences each other and ultimately influence instructional practices for teaching animal food production. Since agricultural beliefs are quite diverse, instructors' attitudes about teaching animal food production can vary greatly depending on where they lie on the Martin and Enns (2017) agricultural ideology continuum. The instructor attitudes towards the concepts associated with animal food production in turn effect the implementation of the subject. The implementation refers to the methods or strategies that are used when teaching about a subject which goes on to impact the knowledge, skills, and motivation of instructors.

Instructors with deeply rooted agricultural values may not be as motivated to learn material about animal food production that is linked with opposing agricultural beliefs. Any of

the factors within the perceptual filter can impact any other factor, even though it is not shown with multi-directional arrows (Jones & Carter, 2007). For example, an instructor that raised production animals throughout their life and has extensive knowledge of the subject uses this knowledge to form their beliefs about animal food production. The perceptual filter represents instructors' decisions on what and how they will teach animal food production to their students based on the previously discussed factors. This decision will result in an environmental response, which is how the students respond to what the instructor has taught. At this point, the instructor can change the instructional practice that they have put in place. The new instructional practice will trigger an environmental response and these two factors directly impact each other, as indicated with the multi-directional arrows (Jones & Carter, 2007).

Relating this sociocultural model of embedded belief systems to animal food production provides a more specific meaning to the framework. The epistemologies of instructors are highly influenced by the agricultural ideology that they gravitate toward due to the clear contrast between the two ideologies. Agrarian populist and neo-agrarian ideologies contain opposing beliefs about animal food production which creates vastly different attitudes towards the instruction, learning, and teaching of animal food production. Because these factors make up the perceptual filter through which instructors make decisions about how they present content, the difference between how instructors with different ideological beliefs present information about animal food production may be exceptionally different.

Methods

I used a phenomenological approach to investigate how the beliefs of 4-H instructors impacted their teaching of animal food production. Phenomenology enables researchers to articulate a common meaning between multiple individuals that share a lived experience

(Moustakas, 1994). This methodological approach allowed participants to articulate their lived experience in teaching animal food production and the compilation of responses created a common interpretation of collective experiences, resulting in the essence of the phenomenon (Moustakas, 1994). Phenomenology was chosen as the research design for this study due to the exploration of personal beliefs of 4-H instructors, which is an individual and internal construct, and its potential influence on their teaching of animal food production to youth populations within the non-formal teaching setting.

Epistemology and Positionality

This study was approached through the lens of social constructivism. Social constructivism can be defined as a theoretical perspective in which individuals create realities through the actions of individuals and through collective actions (Bryant & Charmaz, 2007). Utilizing a social constructivist lens, I sought to understand the phenomenon of the impact of beliefs on teaching. I relied on participant experiences expressed through interviews in constructing my understanding and analyzed their collective responses to identify patterns of meaning (Moustakas, 1994). Constructivism is commonly used within phenomenological approaches, making it an appropriate fit for my study (Creswell, 2013).

Within qualitative studies it is important to reveal any potential bias to aid in trustworthiness of the data and interpretations. My interest within the area of animal food production, as well as the teaching of the subject, stems from experiences during my youth, high school, and undergraduate education. I grew up on a small farm where we raised cattle, sheep, and hogs. At the age of nine, I began raising livestock for county fair projects with a focus on sheep and swine. These experiences shaped my view of commercial animal food production.

Additionally, I was a member of my high school livestock judging team and later participated on a collegiate livestock judging team. During this time, I traveled the Midwest learning about animal production as a food source, visiting multiple production facilities. My undergraduate education exposed me to various issues within the agricultural field such as feeding growing populations, managing land for food production, and increasing the efficiency of production animals. I recognize that the issues I had the privilege to learn about were not presented to many students. This sparked my interest in educating youth, as well as adults, about animal food production. During this time, I also served as a volunteer within 4-H, teaching lessons in swine and sheep project clubs.

While my prior experiences aid in my understanding of animal food production and 4-H, it is also important that I recognize my inherent bias as it has the potential to impact the questions asked and my interpretation of the responses received. To mitigate this, I remained mindful of my positionality and its potential influence throughout the research process as recommended by Bourke (2014). I attempted to bracket my experiences as it relates to the research question throughout the data collection and analysis process (Creswell, 2013).

Participants

After reaching out via email to all instructors statewide teaching animal food production within 4-H youth programming, 20 participants ultimately agreed to participate. The instructors must have taught for at least one year and must have taught more than one lesson specifically within animal food production. It was important that instructors taught animal food production more than a single time to better ensure that their instructional decisions were purposeful versus reactionary. 4-H is a non-profit organization and is largely supported by volunteers that often teach lessons (Smith, 1993). Therefore, instructors interviewed included paid employees and

volunteers with the 4-H system due to the varying numbers of paid employees that directly teach animal food production to 4-H youth within each county. All instructors were located and taught within the same southwestern state to ensure that the direction and curriculum for the instructors was consistent to the overall 4-H mission in the southwestern state. For this study, I utilized any participant that met the above criteria due to the small population of instructors that engage in this unique education sector. Characteristics of participants are further described in Table 1 and all participant names were changed to pseudonyms to protect their identities. Participants incentive to participate was to contribute to a greater body of knowledge and understanding in their field of work.

Table 1.

Overview of Participant Characteristics

Pseudonym	Years Teaching in 4-H	Volunteer or Paid Employee	Urban or Rural Area
Emily Johnson	16-20 years	Paid	Urban
Hannah Smith	1-5 years	Paid	Rural
James Williams	6-10 years	Volunteer	Rural
Alyssa Brown	6-10 years	Volunteer	Urban
Anthony Jones	21-25 years	Paid/Volunteer	Rural
Mackenzie Miller	1-5 years	Volunteer	Urban
Alice Davis	1-5 years	Volunteer	Urban
Audrey Wilson	1-3 years	Paid	Rural
Olivia Anderson	6-10 years	Volunteer	Urban
John Lee	1-5 years	Paid	Urban
Brandon Martin	5-10 years	Volunteer	Urban
Savannah Harris	16-20 years	Volunteer	Urban
Isaiah Clark	21-25 years	Paid	Rural
Ethan Thompson	15-20 years	Volunteer	Rural
Blake Walker	1-5 years	Paid	Rural
Sadie Wright	1-5 years	Paid	Urban
Natalie Green	5-10 years	Volunteer	Urban
Lexie Adams	1-5 years	Volunteer	Rural
Lillian Nelson	6-10 years	Volunteer	Rural
Daniel Hall	1-5 years	Paid	Rural

Data Sources and Collection

I used in-depth, semi-structured participant interviews as the data source for my study. Interviews were chosen to allow participants to communicate their own lived experiences and to elicit the internal construct of beliefs (Moustakas, 1994). Interviews lasted between 45-60 minutes and were not conducted in relation to the instructors' teaching schedules. Interviews were not conducted in alignment with a specific lesson because the aim of my study was to inquire into the impact of beliefs on the instructors' summative teaching experiences rather than the experiences of a single lesson. Interview questions included exploration into the specific ideologies in which participants align, the specific content being taught, the strategies and methods utilized in teaching that content, and the impact of beliefs on the teaching and learning process. For example, a question from the interview protocol included: what is the purpose of 4-H education within the scope of animal food production? Another example question from the interview protocol was: How would you describe your agricultural identity and values? Interviews were conducted and recorded using Zoom video conferencing software to extend the scope of the study to all potential 4-H instructors and volunteers in a large southwestern state. Interviews were conducted from January to April 2020 to avoid conflicts with spring county fair season and were transcribed verbatim.

Data Analysis

Nvivo 12 served as the data management software for my study. Data were analyzed by horizontalizing the transcribed interviews and coding the meaning and meaning units (Moustakas, 1994). The mean and meaning units were then clustered into categories and subsequent themes to develop descriptions of the lived experience. From the description of the experience, the essence of the phenomenon was constructed (Moustakas, 1994). Moustakas

(1994) further identifies strategies for phenomenological analysis that I utilized in my study which included: considering statements of significance for the experience, recording all of the relevant statements, purging of repetitive and overlapping statements, listing of nonrepetitive and nonoverlapping statements, clustering meaning units into themes, determining meaning units and themes into descriptions of the experience, reflection of description, and producing a description of the essence of the experience. I utilized deductive analysis techniques using the Jones and Carter (2007) framework and the ideologies literature from Martin and Enns (2017). I also conducted inductive analysis to include emergent items from the data that were not captured by the frameworks (Creswell, 2013). Using inductive and deductive analysis, 26 categories emerged with over 450 codes within these categories.

Trustworthiness

To maintain the credibility of my study, I engaged in member checking of my findings, rigor, rich and thick description in the form of participant quotes, and the bracketing of my personal experiences (Creswell, 2013; Tracy, 2010). Member checking allows researchers to have participant input on the interpretation of the data which ensures that miscommunications have not occurred during interviews or the data analysis process (Carlson, 2010). I engaged in member checking by discussing the emerging findings with the participants during analysis of the data. Rigor refers to the rich complexity of data (Tracy, 2010). Rigor was supported by abundant data to support significant claims, the use of significant data, context remaining appropriate to a study, and the use of appropriate procedures in interviewing practices (Tracy, 2010). The rigor of this study is also evident by the thick and rich description of participant quotes and the use of memoing throughout the research process (Tracy, 2010). Finally, I

bracketed my personal experiences to focus on the true essence of the lived phenomenon from my participants, as is recommended in phenomenological research design (Moustakas, 1994).

Findings

Five main themes emerged from the data that served as the basis for my findings including: (1) agricultural beliefs of 4-H instructors largely align with agrarian populist ideology, (2) lack of 4-H curriculum to teach animal food production, (3) beliefs of 4-H instructors served as a central driver in how content was taught and assessed, (4) context of the community impacted 4-H instructors strategies for teaching animal food production, and (5) animal food production ultimately taught as raising animals for fair projects. These five themes were closely related and interact with each other, ultimately guiding instructional decisions of 4-H instructors in the study. The underlying essence of the phenomenon was the fear and anxiety present in all aspects of teaching animal food production and the perceived consequences of how the content was being taught on the agricultural literacy of youth. Fear was driven by factors related to beliefs whether it was the participants own beliefs or other individuals' beliefs that impacted instruction. Interactions between all the factors impacted the teaching of animal food production to youth in non-formal teaching settings.

Agricultural Beliefs of 4-H Instructors Largely Align with Agrarian Populist Ideology

When instructors were asked how they would describe their personal agricultural identities and values, sixteen instructors indicated that their past experiences, including involvement with 4-H, led them to develop more traditional and conventional values associated with the agrarian populist ideology, see Table 2. One key tenant of the agrarian populist ideology is the focus on responsibility and hard work in a traditional agriculture setting. When asked about

his agricultural values, James said, “agricultural values are probably pretty ingrained in a lot of people that raise animals from day to day and a lot of them really boil down to work.” Other participants made statements about growing up on farms or ranches in more conventional and traditional production settings, being involved in 4-H as youth themselves, currently farming on a family farm, and receiving extensive formal education in animal agriculture. Martin and Enns (2017) also identify patriotism to be a tenant of agrarian populist beliefs; however, participants did not explicitly talk about patriotism or their country potentially due to the close association with politics and the current political climate.

Another tenant of agrarian populist belief is the reliance on science and efficiency to guide modern agriculture practices. Anthony illustrated his views on scientific practices in animal food production, “I think that we continue to embrace technology... I think that it is strategic and smart to stay up to date and recognize those things and incorporate those things where they make sense.” This combination of personal experiences and response to the current scientific advances in animal food production shaped 4-H instructors agriculture ideologies. There were also instructors that expressed agrarian populist beliefs farther from the center of the continuum as illustrated by Audrey:

I'm a big fan of large-scale production, agriculture because... these are the these are producers that are producing the most product to feed not only the United States, but the world in the most efficient and economical way...I've been in slaughter plants and I think that they're absolutely proficient and very professional at what they do.

Despite most 4-H instructors possessing beliefs aligning with the agrarian populist ideology, it is important to note that there were a small number of instructors that aligned more

with the neo-agrarian ideology. These instructors described their preference for small-scale, local animal production as well as support for more natural production practices. This was illustrated by Olivia who said, “small scale agriculture is really going to be the way to go for the future.” Makenzie also voiced her support of small-scale production by saying, “I would support that [small-scale production] over kind of the big systems as much as possible.” However, instructors with neo-agrarian beliefs were still the minority when comparing belief systems of participants.

Neutral beliefs were also expressed during the interviews when instructors did not have a strong belief that aligned with either of the ideologies. An example of a neutral belief from Sadie was, “I think all agriculture, whether it’s in the backyard or large acreage farms, are important.” Those with neo-agrarian beliefs were located more towards the center of the continuum and more likely to hold some neutral beliefs. Alyssa said, “I think I like my product close to home so even if I go to a meat counter, I’m finding myself looking at where that fish was farmed or where it was caught.” This illustrates how instructors can be located at different parts of the ideological continuum based on their beliefs about a specific subject or agricultural issue and how some instructors may hold stronger beliefs than others within the same identified ideology.

Two instructors that held largely agrarian populist beliefs also had a belief that went beyond the agrarian populist ideology, specifically in the area of scientific developments commonly used in large scale agriculture production, see Table 2. James indicated that he was involved in traditional agriculture and held more conventional values; however, he also stated, “I don’t know if I’m the biggest fan of genetically modified organisms.” Some instructors also expressed slight changes in their beliefs over time which reflects movement on the ideology continuum; however, none of the participants completely crossed into the opposing ideology

during their careers. Daniel illustrated this by stating, “I mean, personally, I have strong beliefs... And yet your opinion does change about a few things over time.” Instructors whose beliefs did change over time credited the change to age and experience.

Table 2.

Identified Ideologies of Participants

Pseudonym	Identified Ideologies	Perception of Urban or Rural Area
Emily Johnson	Agrarian Populist*	Rural
Hannah Smith	Agrarian Populist	Rural
James Williams	Agrarian Populist*	Rural
Alyssa Brown	Neo-Agrarian	Urban
Anthony Jones	Agrarian Populist	Rural
Mackenzie Miller	Neo-Agrarian	Rural
Alice Davis	Agrarian Populist	Urban
Audrey Wilson	Agrarian Populist	Rural
Olivia Anderson	Neo-Agrarian	Urban
John Lee	Agrarian Populist	Rural
Brandon Martin	Agrarian Populist	Urban
Savannah Harris	Agrarian Populist	Rural
Isaiah Clark	Agrarian Populist	Rural
Ethan Thompson	Agrarian Populist	Rural
Blake Walker	Agrarian Populist	Rural
Sadie Wright	Agrarian Populist	Rural
Natalie Green	Agrarian Populist	Rural
Lexie Adams	Agrarian Populist	Rural
Lillian Nelson	Neo-Agrarian	Rural
Daniel Hall	Agrarian Populist	Rural

*Instructor held at least one belief beyond identified ideology

Regardless of the specific agriculture ideology that aligned with the instructors’ beliefs, all twenty participants identified agricultural literacy of the general population to be low. This indicates that instructors’ ideological beliefs did not have a direct impact on their perception of agricultural literacy, as all the instructors deemed it to be lacking in the general public and youth populations. Instructors expressed concern and fear for the future due to the perceived lack of agricultural literacy in the public. Olivia said, “I think it's horrifying to me in this country, in this

day and age, that people don't know where their food comes from. I think that the literacy is very low, actually.” Other instructors blamed the agricultural industry directly for the lack of agricultural literacy of the general public. Brandon explained, “the first thing that comes to my mind in agriculture literacy is that we do a terrible job of reaching outside of our comfort zone and it's frustrating to me.” The idea that it is the responsibility of the agricultural industry and the individuals who work within it to educate the public was further illustrated by this comment from Ethan. He said, “now would be a perfect time that our agricultural communities need to educate the population.” Daniel also stated that individuals within the agricultural industry play a role in educating the general public, “I think agriculturalist can share the information that we're raising quality products, and the process of how we do things and then I think...it could change people's minds for the better.” Regardless of instructors’ beliefs about who should be responsible for agricultural education, all the instructors agreed that agricultural literacy needs to be increased within the general population, which included youth in 4-H programs.

Lack of 4-H Curriculum to Teach Animal Food Production

While most 4-H instructors recognized that there is a selection of text available to purchase from the 4-H website, they also indicated that there is not a specific curriculum that they are required to follow or provided to guide instruction. Savannah stated, “I don't have a curriculum. I have never used one. I have never asked for one. I've never downloaded one.” The selection of text offered by 4-H seemed to be underutilized because of the perception that the text contained elementary content. Alice elaborated on her perception of the available text, “you can go to the 4-H website and you can pull curriculum from there, but I've actually bought it and I've looked through it and I'm like, this is very basic and it's very juvenile.” This led to inconsistent curriculum for animal food production being taught across the state within 4-H programs. The

curriculum that is available through the 4-H website can be categorized as resources versus curriculum.

Instructors indicated that much of the resources and curriculum they did use was derived from various internet resources, other university Extension systems, or based on prior experience working with youth who were successful showing livestock. Daniel said, “Honestly, I think more often than not, people are relying on experiences from others rather than going back to curriculum. I think learning, especially with these types of projects, goes more into who do you know?” Instructors commonly used previous 4-H youth in their programs that were deemed successful or exemplary examples as a teaching tool and many had former 4-H youth serve as guest lecturers in addition to others from the community that possessed experience with the content or skill being taught. Daniel continued, “I am a county agent and I've never recommended go look at the project book on how to raise your rabbits...instead it's let me find someone who's raised rabbits competitively and we'll get you to them.” The choice of curriculum and resources utilized were largely influenced by the experiences of instructors, including the background and identity of instructors and guest speakers, as well as their personal knowledge and skill related to the content.

While the background and experiences of instructors may have been different, there were some commonalities. The four major content areas that most instructors deemed important for youth to understand in the context of animal food production included animal nutrition, biosecurity, quality assurance, and form and function in show animals. The most widely used curriculum resource to meet these content areas was quality assurance curriculum and certification. Brandon said, “The number one concept that we worry about is the care that aspect of it, every kid has to go through a quality assurance class. And just ensuring that...they

understand that they're supposed to care for this animal.” Quality assurance is a prepackaged curriculum that students can complete online to educate them on how to responsibly take care of a fair project. It aims to teach youth how to improve the care and management of their animal, avoid violative drug residues, decrease the cost of raising their animal, and grow awareness of food safety (Quality Assurance and Food Safety for [State] Youth Livestock Producers, 2020). Many counties within the southwestern state require youth who show a fair animal to complete the quality assurance training before participating at the county fair, which could be one factor in its widespread use amongst 4-H instructors.

Instructors said that they felt quality assurance was important because it taught youth to take care of their animals with the best animal husbandry practices available. This belief often led to the instructor thought process that small projects produced better products than large scale production operations. Lillian illustrated this concept, “It’s all important and it’s all good. But I think sometimes small-scale stuff, you know, it’s more hands-on. It can be better quality.” Some instructors voiced that they feared some large-scale production operations treat livestock poorly. Lillian expressed her hesitation with commercial production, “It scares me on a commercial scale when you hear the way things are done and taken care of.” Other instructors feared the negative perceptions from the public on animal food production. Daniel said, “It’s crucial that agriculturalists put out information that’s positive about our industry just as aggressively as people that put out the negative aspects about our industry because we’re getting attacked left and right.” These apprehensions influenced some instructors to select content with the purpose of combatting a negative public perception of commercial animal agriculture food production.

Beliefs of 4-H Instructors served as a Central Driver in How Content was Taught and Assessed

Regardless of the content instructors decided to teach, most commonly instructors used experiential learning as their primary teaching strategy. Hannah said, “It's kind of the motto of 4-H, that hands-on experiential learning. But that's [experiential learning] really important, especially for the kids that are involved in our 4-H program.” Hands-on instruction was perceived to be the best way for youth to learn and for instructors to communicate the content. Brandon elaborated further on his decision to teach using hands-on approaches, “That's how I learn the best and that's how I'm able to keep things in my brain to recall them is just to do it.” Hands-on teaching strategies were perceived by all instructors to increase student motivation and participation and were regarded as the best way for students to learn new content.

While hands-on activities seemed to best engage students, instructors also voiced that student motivation was largely intrinsic due to 4-H being an extracurricular activity in which youth voluntarily participate. Anthony said, “I think we're very, very fortunate in 4-H and FFA programs that those students have chosen to be there.” When talking about their preferred teaching strategy, many instructors voiced that hands-on teaching was the only way that it was possible to teach the material that they wanted to include in their curriculum and that it was the easiest way to communicate the material to the youth. James said, “That's the only way you can do it. I mean, you must have hands-on. You can only explain to people so much. No, they have to go out and do it.” Hands-on instruction was considered the easiest and most effective way for instructors to teach the content to youth.

Instructors also said that it is important to consider the wide age range (9-18 years old) of students they are teaching within the same instructional session, which contributed to the use of hands-on teaching strategies as it was seen as applicable to all age and experience levels. Daniel explained:

I focus on making sure that it's understandable to the age group that I'm talking to...I think my number one priority is making sure that it's not going to go over the kids' heads...I think the thing to do is if you make a more intelligent or advanced point, you need to follow that up with relating it to something that everyone in the audience can understand.

Hands-on teaching allowed instructors to make the content understandable to everyone at the same meeting and for complex ideas to be taught at multiple levels to ensure understanding across a variety of age ranges and experience levels.

The evaluation of the hands-on teaching method varied amongst instructors across the state. Some instructors utilized pre- and post-tests to assess the students' knowledge; however, the format for these tests varied by instructor. Some utilized questionnaires, others asked verbal comprehension questions, and some did not assess. Sadie described their method of assessment, "We do a participatory evaluation where we hand out stickers and we ask questions on a poster. They put their stickers on where they are at the beginning. At the end we do a written evaluation." The variance in assessment strategies led to a lack of consistency or clear statewide picture of student knowledge gained as a result of instruction. Some instructors voiced that in their individual programs there was not a need to provide student assessments or that they were unsure how to implement assessments, so they opted not to. Audrey said, "I haven't done this, but we could do kind of a pretest post test." Due to the lack of consistency and implementation of assessment practices, it is difficult to improve curriculum and delivery without student data to support what needs to be added or changed.

The Context of the Community Impacted 4-H Instructor Strategies for Teaching Animal Food Production

4-H is a nationwide organization and has a local program within each county in the southwestern state. Due to the local nature of 4-H, instructors stated that the community members knew what was best for their community and had a direct influence on what content was taught and how it was delivered. Ethan elaborated on the influence of the community on 4-H instruction:

The community I live in... I'm very fortunate where I live. They kind of let me do what needs to be done. And [the community] has their own set of community standards. They want our kids to learn how to work, learn how to how to maintain things, learn animal production. They want to learn the welding and all those different things. So, where I live, we have our own set of basic standards and we are measured. Our community measures us based on how successful those kids are in completing those tasks and getting them into the workforce and get them to go to school and do those things. The community I'm living, I'm very, very blessed here to have kind of free range of what I think kids need to learn in agriculture. And I like that. I probably wouldn't want to do it anywhere else.

Many of the instructors felt supported by their communities and indicated that they lived in rural communities and that the people who lived there were primarily homogenous in background and prior knowledge of animal agriculture.

The community expectations as well as the environmental constraints impacted where in the curriculum instructors would start teaching based on prior knowledge and the context of the rural or urban community. Rural communities with more conventional and traditional agricultural practices expected youth to learn about animal production and how to work within the industry in the local community. Urban and suburban communities required instructors to

begin instruction at a more basic level. Anthony further described the influence of his community and how it impacted the content taught, “we have mostly suburban audiences so trying to reach an audience that is not directly involved in food animal production...as a teacher, you have to realize that you have to start from a different stance, starting point.” The local community greatly influenced where instructors began instruction and if the instructor needed to change the depth or sequence of the content. However, the community did not appear to impact the content topics instructors deemed important to teach. For example, if youth already possessed prior knowledge of how livestock are processed then the instructor elaborated on the why behind the process. Conversely, if youth did not have prior knowledge of how livestock are processed, then the instructor would first teach about how livestock were processed before delving into the why. Prior knowledge was generally based on what youth were taught by their parents, peers, and within their communities, which illustrates the tie between prior knowledge and the communities influence on instructors’ decisions about teaching content illustrated in the Jones and Carter (2007) framework.

Animal Food Production Ultimately Taught as Raising Animals for Fair Projects

Every instructor within the southwestern state used show animals to teach animal food production to youth. As illustrated in the Jones and Carter (2007) framework, instructors’ beliefs about a subject, as well as the teaching and learning of a subject, all impacted decisions made by the instructor when teaching. The beliefs of each instructor combined with their community context impacted their decisions and ultimately led to teaching animal food production through the context of county fair projects. When teaching animal food production through fair projects, instructors can assess what students learned by the successful completion of the youth’s fair project. When instructors were asked how they assess the youths learning, Anthony said, “It’s

pretty simple. I mean, that steer is completed at the end and meets certain quality standards. And we know that they've taken proper care of that animal.” These non-formal assessments provide a more concrete form of assessment when compared to the earlier mentioned assessment practices, or lack thereof, used within non-formal teaching settings.

While showing as the main purpose does include animal food production concepts, it also leaves out some aspects of commercial food production that are essential to the agricultural literacy education of youth. When talking about the content that he taught, Brandon described that youth were taught about how to properly care for their animal and “from there, it just dives more into showing.” Instructors voiced that the four main content areas that they deemed important to teach youth were: animal nutrition, biosecurity, quality assurance, and how to structurally evaluate show animals. Teaching these concepts through the lens of show animals involved the following applications: how to feed show animals, how to keep them safe from viruses and germs, how to treat them in the most humane way possible, and how to select animals based on what looks the best in the show ring. These are all valuable perspectives that teach youth responsibility and compassion for animals; however, these concepts do not largely cross over to commercial food production. James elaborated on this concept:

I think we've probably focused more on the show side than the animal food production side. Obviously, there's some traits that cross over and you should be targeting what's going to land on the dinner table in the show ring but unfortunately, that doesn't necessarily match up most of the time. So, we target to educate kids more about the livestock on the hoof in the show ring than what's going to come out on their plate.

James statement clearly illustrates the gap between educating youth about fair projects and commercial animal food production.

Youth were taught how to raise an animal for a fair purpose, but they are not always taught more in-depth concepts related to animal food production. When asked what concepts he focused on when teaching, James said, “All of the show ring things that people need to know, not necessarily the cuts of animals and what quality of meat they might be getting.” James clearly illustrated the gap between teaching youth how to raise show animals and teaching youth about animal food production. An example of the gap between the two subject areas can be illustrated with the following example: youth are taught how to feed an animal, so it meets weight expectations for showing, but are not taught ideal weights for livestock to be processed in processing facilities. Another example is youth are taught how to select an animal to be successful in a show ring, but they are not taught why those traits are important in commercial settings. These are only a few of the discrepancies that were surfaced between producing animals for the county fair and commercial production operations and can lead to a lack of transferability from fair projects to production operations. In turn, the lack of transferability to commercial production operations can lead to a lack of agricultural literacy among youth in animal food production.

James was the only instructor that surfaced an overt connection between commercial food production and showing animals at the fair. Youth can learn valuable skills from raising and showing animals; however, the knowledge that youth gain from showing animals does not include various aspects of animal food production knowledge beyond the show ring, which was primarily focused on animal husbandry practices. Instructors indicated that youth success in the show ring was their primary assessment of knowledge gained. While youth may be successful in

the show ring, this may not be an accurate representation of the content youth have learned or if it has increased their overall knowledge of animal food production needed to meet agriculture literacy initiatives instructors deemed important.

Summary of the Essence of the Phenomenon- Anxiety of Misconceptions, Current Climate and Public Issues with Animal Agriculture and its Impact on Instruction

Overall, the instructors in this study expressed an underlying fear of public perceptions and misconceptions related to animal agriculture, largely influenced by the current climate and agriculture skepticism of the general public. The word fear was used to identify this feeling by various instructors in the study; however, anxiety may be the more accurate term. Fear is usually triggered by a specific stimulus and does not last for long periods of time while anxiety, a type of sustained fear, is not typically related to a direct physical threat and commonly persist over large periods of time (Hartley & Phelps, 2012). Instructors' anxiety was based on others' beliefs that did not align with their personal agricultural ideology, including fear of misconceptions from consumers and youth, and creating misconceptions and fear within the general population. This anxiety was most prevalent when instructors discussed personal beliefs about large- and small-scale production, personal beliefs about agricultural literacy, and personal beliefs about plant-based production in animal science context. Olivia indicated her anxiety concerning commercial production operations, "I think I personally don't believe in the way the processed in large facilities. I think it's it can be very cruel, and the animals are scared." This indicated that Olivia has felt anxiety about large processing facilities over an extended period of time, which directly impacted her instruction.

Martin and Enns (2017) found that individuals with opposing deeply rooted beliefs may lead to conflict (2017). Anxiety was expressed from instructors with beliefs that aligned with

both agricultural belief systems. Those with neo-agrarian beliefs voiced their anxiety for the treatment of animals while those with agrarian populist beliefs voiced anxiety of the way commercial production is portrayed. Hannah said, “I think that this is a great example of how the media has created this demonized large-scale producer in people's minds.” Brandon voiced that it was the conflict within the agriculture industry that was the root of the issue:

From a young age my dad always tried to instill in me. It's like all ag is good when it's not attacking each other. But today we're seeing, you know, the cattle producers are angry with plant-based meat and then plant based meat is angry with the cattle producers. They don't think they should be around.... At the end of the day, it all has the place. And as long as people are getting fed, I don't think it matters.

The perceived lack of agricultural literacy and misconceptions from the public, and more specifically the youth they teach, led many instructors to express a need to personally defend animal agriculture. Emily stated, “I feel like I sometimes have to get defensive about [animal production] over time because I do find that...people can say anything and it's true, and it's up to a farmer or a kid to defend themselves.” This defense is the result of anxiety driven by perceived consumer misinformation. What is considered misinformation by instructors may be different depending on the individual's beliefs systems and their response to animal production practices. For example, some instructors may think that mistreatment of animals is misinformation that is popular among consumers, while other instructors think that it is accurate information. Defense as a result of fear can be triggered by different factors depending on the instructor's beliefs and response to production practices. These differences indicate that the anxiety of each instructor is triggered by different stimuli depending on their belief system which ultimately impacted their

instruction. Instructors anxiety may also be a reason that instructors expressed a personal responsibility to increase the agricultural literacy of youth.

Discussion, Implications, and Recommendations

All the 4-H instructors aligned with one of the two agricultural ideologies highlighted by Martin & Enns (2017), and sixteen of the twenty instructors' beliefs aligned specifically with the agrarian populist ideology. Instructors with similar experiences in their background and perceptions of a subject, which make up the perceptual filter of Jones and Carter's (2007) sociocultural model of embedded belief systems, will likely develop similar content areas to teach and have similar attitudes towards instruction and implementation. While the predominate agrarian populist ideology of instructors created similarities in the content areas taught to 4-H youth in the southwestern state, it also created a lack of diversity about what instructors believed to be important to teach. Instructors beliefs are often based on experience rather than theory, and their instructional practices are critical referents when studying their beliefs and knowledge bases (Mansour, 2008). The lack of diversity within agriculture ideologies of instructors in this study indicates that youth may not be receiving information that instructors holding different beliefs would deem essential.

To ensure that the content being taught in 4-H youth programs encapsulates what would largely be considered essential information, there needs to be a diverse group of individuals present to determine the content that is important to teach in the context of animal food production to increase agricultural literacy. Moreover, instructors should be educated on agricultural ideologies and how their beliefs impact teaching. The goal of this training would be for instructors to be more mindful of how their beliefs impact their teaching when planning lessons and delivering content. Additionally, groups that are developing 4-H guiding standards

and/or curriculum should consist of individuals with diverse beliefs and backgrounds to ensure that the curriculum contains the most pertinent information from a variety of perspectives.

While 4-H does have some developed curriculum available for purchase (4-H Youth Curriculum in STEM, Healthy Living and Civic Engagement, 2020), the content of the curriculum is perceived to be outdated or elementary by many instructors statewide. This led many instructors to seek outside sources and rely heavily on personal experiences to develop their own curriculum. The only consistently used curriculum package was quality assurance and certification (Quality Assurance and Food Safety for [State] Youth Livestock Producers, 2020). Quality assurance is one of the most easily available curriculums for instructors and every instructor interviewed claimed that quality assurance was a topic heavily taught within their 4-H program. Even though quality assurance is required by most counties, this indicates that other prepackaged curriculums that are easily available to instructors, and deemed to be quality resources, may be utilized.

While the specific driving beliefs of some instructors did vary across the Martin and Enns (2017) agriculture ideology continuum, all the instructors taught similar content (nutrition, biosecurity, quality assurance, and the ability to identify quality livestock) and used the same primary strategy of hands-on learning to teach the content. Instructors' personal beliefs about a subject greatly impact what instructors are willing to teach and the methods they use when teaching (Earnest, 1989), and integrated belief systems have the greatest impact in shaping PCK of teachers (Rice & Kitchel, 2018). Hands-on learning was used by instructors because it was deemed the most effective and efficient way to teach youth of all ages.

Individuals can learn in a variety of different ways (Darling-Hammond & Bransford, 2017), and youth that are not kinesthetic and visual learners may have a more difficult time

learning from the hands-on instruction that was most prominent among 4-H instructors teaching animal food production. Again, this leads to a need for additional curriculum to guide 4-H instructors. A pre-planned curriculum that highlights various ways to teach content could assist instructors in planning lessons designed to cater to youth with a variety of learning preferences, potentially increasing the amount and quality of information that 4-H youth retain. A recent study focused on 4-H instruction revealed that the use of a structured curriculum increased student achievement outcomes on exams when compared with youth who were not taught using the structured curriculum (Ewers et al., 2020). While the instructors all taught similar content when teaching animal food production to youth, more specific curriculum can guide instructors not just on the what but the how, in the form of varied pedagogical strategies.

Instructors desire to teach using hands-on teaching strategies also stemmed from the anxiety of creating misconceptions about animal food production, which ties to the essence of the phenomenon. Hands-on instruction is more difficult to refute as it relies on concrete skill development versus discussion of more nuanced concepts. Future curriculum could include educating youth on both sides of complex issues with detailed instruction about how to present the content. Enhanced agricultural literacy may impact the reaction of individuals to modern production agriculture practices, decreasing the likelihood of individuals reacting negatively to material related to the agriculture industry (Specht et al., 2014). Despite the need for agriculturally literate youth surfaced by all instructors, recent studies indicate youth knowledge of the agriculture industry remains limited and underdeveloped (Kovar & Ball, 2013; Hess & Trexler, 2011).

Educating youth about both sides of complex issues can also be influenced by local communities where instruction takes place, further illustrating the need for instructor guidance

on presenting difficult or controversial concepts to youth. The context of the community impacted the pedagogical strategies that instructors used when teaching animal food production to 4-H youth, an environmental factor outlined in the Jones and Carter (2007) framework. There was much diversity present across 4-H programs in terms of the communities that they are located in, some rural communities and others suburban/urban. The prior knowledge that youth brought to the lessons was impacted by the context of the communities they lived in, which in turn impacted decisions made by the instructor (Jones & Carter, 2007). Specifically, instructors in this study largely utilized youth that were perceived as successful within the community to help teach the content by serving as guest speakers and exemplary examples. The wide age range in youth involved in 4-H also presented a challenge for instructors when teaching.

Many of the non-paid or volunteer 4-H instructors that teach animal food production to youth do not possess a background in teaching. Providing state-wide training on basic teaching strategies may help these volunteer instructors feel that they have more options when planning lessons. Paid 4-H instructors that teach animal food production to youth commonly have a teaching background; however, they may still benefit from a training to familiarize them with guiding curriculum and provide them with the necessary skills to assist volunteers with curriculum implementation within their county. Providing guidelines for content would also give all instructors a starting place for further lesson plan adaptation to their local community needs. Instructor guides may be useful due to the lack of competencies. Determining what content and strategies that should be included in this training should again involve individuals in the agriculture industry that are from various backgrounds, communities, and have differing belief systems. An additional focus on how to assess student knowledge would also be beneficial to all

instructors as many are not currently assessing or were unclear about the various assessment strategies available.

All instructors used showing livestock for the county fair as their primary vehicle for teaching animal food production. While raising animals for fairs or shows provides youth with important information related to animal husbandry practices, its use as the sole context for to teach animal food production requires specific connections to be made between show animals and commercial animal food production. These connections include why structural correctness is important on a commercial scale, the market price of livestock verses what youth receive for livestock at the fair, and how quality and yield grades work, to name a few. Raising show animals teaches youth valuable lessons and can contribute to levels of caring, contribution, and character (Arnold et al., 2007). A recent 4-H study revealed the main motivating factors for youth to participate in county fairs were having fun, achieving goals, spending time with friends, and enhancing teamwork (Arnold et al., 2007). If the values that youth are currently learning from raising fair animals can be combined with lessons about how commercial animal production takes place, raising show animals could become an invaluable way to increase agricultural literacy while maintaining the hands-on experience that instructors prefer to use in 4-H programs. Animal food production on a commercial level provides the country with most of its meat-based protein (Farming and Farm Income, 2020), which further illustrates the need for youth to be educated on where their food is coming from and how it is processed.

4-H groups located in the southwestern state have regular meetings where youth are taught how to care for their fair animal project, including feeding, grooming, exercising, and analyzing their animals. This meeting structure provides an ideal situation for instructors to explain how an animal should be fed in order to meet the goals of a show animal and then to

transition to how animals are fed as it applies to a commercial setting. This could assist in dispelling misconceptions students may have about animal agriculture and increase the agricultural literacy of students in the two different, but closely related, areas of showing livestock and commercial livestock production. The suggested increased focus on animal food production to meet agricultural literacy needs can be taken a step farther in recommending that a separate program beyond raising show animals be made available to youth to learn about animal food production within the United States. This program could illustrate to youth where their food comes from, how it is processed, and the practices that are commonly used when producing animals that are ultimately used for consumption, areas identified as lacking within the existing literature (Trexler, 2000). Some counties have a carcass show integrated into their county fair that reflects animal food production as portrayed by large scale food production. Expanding these programs may be a way to help increase the agricultural literacy of youth working on fair projects.

The essence of the phenomenon centered around anxiety can be classified as an environmental factor that impacts instructors' decisions about what and how to teach animal food production to youth (Jones & Carter, 2007). Anxiety facilitates the need to avoid communicating with strangers and creates behavior patterns during social decision making (Wu et al., 2012). These behavior patterns may impact how an instructor plans their lesson or may change what the instructor is planning on teaching when presented to an audience. Anxiety of instructors present within the essence of the phenomenon was commonly related to perceived misconceptions held by youth about animal food production and the felt need to eliminate these misconceptions to improve agricultural literacy. Providing a curriculum to use as a guide could assist instructors in planning for their lessons and increase their efficacy for teaching material for

students, leading to decreased anxiety. Additional support for instructors via training and the aforementioned teaching curriculum and materials may dull the impact of anxiety on their teaching of animal food production to youth in non-formal teaching settings. While this study took place within 4-H, the responsibility of educating youth about animal food production is not the sole responsibility of 4-H within the agricultural industry. The agricultural literacy problem is an agriculture industry issue and the responsibility lies with all the programs and agencies involved including 4-H, school-based agricultural education programs and FFA, science educators, commercial producers, and any other individuals involved in animal food production.

Further research can provide a more detailed view of agriculture ideologies. Agriculture is frequently changing in order to sustain the growing population. Due to the dynamic nature of the agriculture industry, agricultural ideologies may need to be re-evaluated in the future to ensure they match the current climate and beliefs of individuals. While most of the instructors in this study held beliefs that largely align with agrarian populist ideology, individuals with more diverse beliefs may not fit into the ideology continuum. Additional research is recommended to expand upon the nuances present within the two ideologies and most importantly the impact these beliefs have on instruction. Further research should also be conducted to unpack how anxiety and the continued pressure of producing agriculturally literate citizens impacts instructors teaching agriculture in both formal and non-formal settings. Finally, this study should also be replicated in other states and for other content areas taught in 4-H beyond animal food production.

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