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Using Epistemological Positions and Orientations to Instruction to Explore School-Based, Agricultural Educators' Perceptual Identities: A Q-Sort Study

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Abstract

Mounting empirical evidence suggests the conflation of teachers' instructional orientations and personal epistemological beliefs helps form the perceptual identity of educators. The current study, therefore, sought to describe in what way Oklahoma agricultural education teachers' epistemological beliefs and orientations toward instruction combine to form the dominant perceptual identities of school-based, agricultural education (SBAE) instructors. To accomplish this, a Q methodological approach was employed. Findings revealed three key perceptual identities of SBAE instructors: Diligent Educator, Daring Educator, and Devoted Educator. Each perceptual identity stressed the importance of experiential learning. However, positions differed in how they believed experiential learning should be delivered to students. For example, Diligent Educators maintained that learning should involve a well-designed educational plan that stresses hard work. Devoted Educators, however, placed emphasis on nurturing students throughout the learning process. Meanwhile, Daring Educators contend knowledge is more fluid and self-constructed. Using Perry's (1970) epistemological development scheme and Bowden's (1990) conception of phenomenographic pedagogy, recommendations for praxis are offered for each perceptual identity.

Keywords: epistemological positions; experiential learning; orientations to instruction; perceptual identities

Introduction

Why do educators choose to incorporate some instructional methods but ignore others? How can select educational techniques ignite a deep passion in teachers while others leave them feeling frustrated and underwhelmed? Mounting evidence (Braten & Stromso, 2005; Roth & Weinstock, 2013; Wadsworth, 2007) aimed at answering these questions points to a link between teachers' instructional orientations and their personal epistemological beliefs.

Personal epistemological beliefs, also known as *nontranscedental epistemologies*, are concerned with how *knowing* is situated in our daily lives (Perry, 1970; Schommer, 1990; Thayer-Bacon, 2003). Perry (1970) first explored this phenomenon through an investigation that traced the epistemological positioning of 700 male undergraduates from Radcliff and Harvard. Perry's (1970) work yielded an elaborate scheme of how the students progressed through four primary positions: (a) dualism, (b) multiplism, (c) relativism, and (d) relativism commitment. Today, most epistemological-based research stems from Perry's (1970) seminal work (Belenky, Clinchy, Golderberger, & Tarule, 1986; Bendixen, Schraw, & Dunkle, 1998; Brownlee, Purdie, & Boulton-Lewis, 2001; Schommer, 1990, 1993).

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Contemporary evidence on the personal epistemology construct is well situated in the literature in regard to understanding its influences on student outcomes (Brownlee et al., 2001; Bendixen et al., 1998; Schommer, 1990). The literature demonstrates epistemological beliefs can influence students' agricultural literacy, motivation, moral development, critical thinking, decision-making, as well as a number of key learning outcomes (Hyytinen, Holma, Toom, Shavelson, & Lindblom-Ylänne, 2014; Mars & Ball, 2016; Peng & Fitzgerald, 2006; Pintrich & Garcia, 1994; Schommer, 1993, Yang, 2005). Therefore, the epistemological lens students' use can shape their educational outcomes (Braten & Stromso, 2005; Bendixen et al., 1998; Schommer, 2004). However, conflicting evidence exists regarding the influence that teacher candidates' personal epistemological positions have on the educational experiences they intend to provide their students (Braten & Stromso, 2005; Fives & Buehl, 2008; Kagan, 1992; Pajares, 1992; Roth & Weinstock, 2013; Woolfolk-Hoy, Davis, & Pape, 2006; Wadsworth, 2007). For instance, Roberts, Baker, and Goossen (2016) found pre-service agricultural education students aligned congruently with Perry's (1970) scheme when asked to describe their beliefs concerning the nature of knowledge. However, a chasm emerged when the pre-service teachers began contextualizing those beliefs in the context of school-based, agricultural education [SBAE] (Roberts et al., 2016).

Despite the ambiguity of this construct, some scholars maintain teachers' beliefs presage action and outcomes across learning environments (Braten & Stromso, 2005; Fives & Buehl, 2008). For example, *effective teachers* understand and use numerous strategies, theories, and processes to solve instructional and contextual issues and problems (Fives & Buehl, 2008). Further, they often exhibit skills that assist them in navigating various career challenges. These characteristics appear be more implicit than explicit, but remain essential to effective instruction (Wadsworth, 2007). Through SBAE's programmatic dimensions, instructors are required to not only teach class at high level, but also advise students through their FFA and SAE experiences (Baker, Robinson, & Kolb, 2012). As a result, agricultural educators must take on an array of job duties and there resulting challenges (Delnero & Montgomery, 2001; Robinson, Krysher, Haynes, & Edwards, 2010). To this point, Torres, Ulmer, and Aschenbrener (2008) identified numerous instructional challenges agricultural educators face across learning contexts. However, a need existed to understand how these challenges blend to influence the self-perceptions of SBAE instructors.

Statement of the Problem, Purpose, and Research Question

The literature demonstrates teachers often conflate epistemological beliefs, instructional training, and societal expectations of effective instruction to construct a single perceptual identity (Korthagen & Kessels, 1999). To understand how SBAE instructors' perceptual identities are formed, it is important to understand how variables such as epistemological beliefs and teachers' orientations toward instruction combine conceptually. Therefore, the current study sought to describe in what way Oklahoma SBAE instructors' epistemological beliefs and orientations toward instruction combine to form their dominant perceptual identities. This study aligns with Priority 4 of the National Research Agenda, which stresses "meaningful, engaged learning in all environments" (Roberts, Harder, & Brashears, 2016, p. 37). The following research question guided the investigation: *How do SBAE instructors' epistemological beliefs and orientations to instruction combine to form their perceptual identities?*

Theoretical Framework

To accomplish study's purpose, we grounded this investigation in two theoretical frameworks: (a) Perry's (1970) epistemological development scheme, and (b) Bowden's (1990) conception of phenomenographic pedagogy. Both theories will be discussed independently, followed by a description of the importance of integrating each.

Epistemological Beliefs

Perry (1970) developed a scheme for classifying epistemological development through four major positions: (a) dualism, (b) multiplism, (c) relativism and (d) relativism commitment. The four positions are not conceptualized as fixed; rather they are situated on a continuum of shifting progression. Individuals operating in *dualism* believe knowledge is absolute (Perry, 1970). As such, knowledge and information should be delivered through an authority figure (Perry, 1970). In the second phase, *multiplism*, individuals believe knowledge is unsolidified instead of composed of facts and opinions (Perry, 1970). As individuals enter *relativism*, they undergo considerable growth in terms of epistemological sophistication (Perry, 1970). A key feature of relativistic thinking is the notion that knowledge is the result of effort. Further, they begin to consider that knowledge may be individually and contextually constructed. As individuals move into *relativism commitment*, relativistic thinking remains a key feature. However, fluidity among truths exists in which individuals value some beliefs over others (Perry, 1970).

Phenomenographic Pedagogy

The use of appropriate educational practices and conceptions of learning underpin phenomenographic pedagogy (Trigwell, Prosser, & Ginns, 2005). Bowden (1990) explained,

> In a sense phenomenographic research mirrors what good teachers do. It tries to understand what the students are doing in their learning. It attempts to discover what different approaches students are taking and to understand these in terms of outcomes of their learning activities. Good teachers do that as a preliminary to further action to help their students come to understand the concept and, of course, many do it instinctively. (Bowden, 1990, p. 9)

A key assumption of phenomenographic pedagogy is the notion that more complete approaches to teaching and learning exist (Bowden, 1990). This awareness predicates teachers' ability to facilitate *conceptual change learning* for their students (Bowden, 1990). Conceptual change learning is an advanced pedagogy in which students are challenged to problem solve, learn experientially, and develop key learning assumptions and conclusions themselves (Bowden, 1990; Trigwell et al., 2005). As such, this approach involves educators moving from a teacher-centered instruction where knowledge is handed down to more student-centered approaches. The theory involves many teaching and learning methods, however, it conceptualizes each on a continuum between teacher and student centered (Trigwell et al., 2005).

Because each theory considered beliefs and practices in a manner of shifting progression, the integration of Perry's (1970) epistemological development scheme and Bowden's (1990) conception of phenomenographic pedagogy provided the necessary framework to analyze and interpret this phenomenon. We, therefore, were emboldened to seek out the diverse and ranging viewpoints SBAE instructors held of the perceptual self.

Methodology

Historically, research considering personal epistemological beliefs and orientations to instruction has been conducted using interviews or other forms of qualitative data (Baxter & Magolda, 2004). More recently, researchers have attempted to use quantitative instruments to measure this phenomenon (Jehng, Johnson, & Anderson, 1993; Schommer, 1990; Schraw et al., 2002; Wood & Kardash, 2002). However, existing quantitative scales have produced inconsistent factor structures exhibiting low internal consistency reliability estimates (Schraw et al., 2002;

Schommer, 1993; Wood & Kardash, 2002). As a result, we determined Q methodology was the best way to explore SBAE instructors' perspectives of their perceptual identities. Q methodology offers a unique way to analyze individual beliefs and opinions at the conceptual level, while also generating new theoretical typologies (McKeown & Thomas, 2013; Watts & Stenner, 2013). In using Q in this study, our interest lied in categorizing the subjective beliefs of SBAE instructors.

To accomplish this, it was necessary to use a sorting procedure, called a Q-sort, which allows participants to organize their views holistically (McKeown & Thomas, 2013). For example, participants express their beliefs by ranking statements according to a condition of instruction. In the current study, the condition of instruction was *"What do you believe about teaching and learning in agricultural education?"* A correlation matrix is then produced based on participants' unique rank of the statements. It is important to note that unlike traditional factor analysis that correlates an instrument's items, Q methodology correlates individual sorts (Brown, 1980). By purposefully selecting individuals representing a wide-range of viewpoints, patterns of thought can emerge, or in the current study's case, SBAE instructors' perceptual identities.

Thereafter, the matrix's structure is analyzed through factor analysis. By analyzing and interpreting the factors, researchers can begin to identify similar and opposing views. As such, Q methodology promotes the idiosyncratic expression of participants' beliefs while also providing an assessable framework for interpretation. As a methodological approach, Q differs from traditional quantitative factor analysis in that correlations are made between sorters rather than items (Brown, 1980). As such, a key feature of Q is the use of purposeful sampling to select participants exhibiting a wide-range of viewpoints (Watts & Stenner, 2013).

Small sample sizes are also acceptable in Q-methodology because participants' *observational perspectives* are their own (McKeown & Thomas, 2013). Therefore, researchers' interpretations are secondary to participants' views emerging through the Q-sort procedure (Brown 1980; McKeown & Thomas, 2013; Watts & Stenner, 2013). As a result, validity and reliability are not major concerns in comparison to conventional research methodologies (Brown 1980; McKeown & Thomas, 2013; Watts & Stenner, 2013). In traditional quantitative research, reliability is determined by the degree to which instruments yield stable and consistent results (Creswell, 2012). In Q, however, emphasis is placed on replication. For instance, under a similar *condition of instruction* researchers may seek to compare whether similar factors emerge. Therefore, Q methodology provides a glimpse into participants' beliefs at a given time, rather than generalizing outcomes based on respondent characteristics. As a result, Q methodologists only seek to generalize to the concourse generated by participants' subjective viewpoints (Brown, 1980).

Methods

In the initial design of this study, we conducted a thorough review of the literature – including existing instruments designed to measure epistemological beliefs and orientations to instruction, to ensure participants' full range of views were represented (Belenky et al., 1986; Bowden, 1990; Perry, 1970; Roberts et al., 2016; Schraw, Bendexin, & Dunkle, 2002; Schommer, 1990; Schommer-Akins, 2004; Trigwell & Prosser, 2004; VanBeek, DeJong, Minnaert, & Wubbels, 2014). Further, we qualitatively analyzed written statements collected from SBAE instructors. Through this process, we generated 227 initial statements, which represented the *concourse* of this study (Watts & Stenner, 2013). However, the sheer volume of the concourse prevented us from using all 227 statements. Therefore, we developed four theoretical categories to structure a sampling of the concourse.

We used the following theoretical categories to guide our concourse sampling: (a) dualistic teaching, (b) multiplistic teaching, (c) relativistic teaching, and (d) relativistic commitment teaching. The categories uniquely merged the two theoretical frameworks employed in this study (McKeown & Thomas, 2013). In *dualistic teaching*, knowledge is received. Instructors deliver knowledge to students through fact-based, lecture-driven techniques. In the second category, *multiplistic teaching*, knowledge is subjective. For example, instructors' present multiple perspectives; however, knowledge remains fixed and certain. Meanwhile, in *relativistic teaching*, knowledge is procedural. Educators emphasize hard work that moves through a process of abstract concepts and hands-on application. In the final theoretical category, *relativistic commitment teaching*, knowledge is fluid and contextually constructed. Therefore, instructors encourage students to consider multiple sources and experiences to attain knowledge. Through the theoretical categories, we pursued statements reflecting homogeneity within each category, while maintaining heterogeneity between categories. To accomplish this, we negotiated statements through the theoretical categories. As a result, we chose to sample 36 statements —nine for each theoretical category — that best reflected participants' full range of views regarding the phenomenon. Appendix A provides a comprehensive list of the 36 sampled statements and their corresponding theoretical categories.

Participants, Data Collection, and Analysis

After obtaining our concourse sample, we began to recruit participants. The participants, known as the P-set in Q, consisted of 30 SBAE instructors from across Oklahoma. Upon IRB approval, we purposively selected 9 females and 21 males. Among the participants, 23 identified as white, six as American Indian, and one as other. Participants were between 23 to 57 years old and ranged in teaching experience from 1 to 34 years. We recruited participants by emailing them individually and sending them a description of the study, as well as a consent form. We then traveled to participants' location of preference to conduct the sort. To facilitate the procedures of this study, we provided participants a packet of 36 statements and asked them to sort the statements into three separate categories: (a) most like me, (b) most unlike me, and (c) neutral (McKeown & Thomas, 2013). Participants then self-sorted the statements and placed them onto a forced distribution (see Figure 1) in a ranking order of personal preference from -4 to +4.

We then sought to analyze participants' Q-sorts. Therefore, analysis began by entering data into PQ Method® version 2.35 (Schmolck, 2014). Through our use of PQ Method® we were able to conduct three statistical tests: (a) correlation, (b) factor analysis, and (c) computation of factor scores (McKeown & Thomas, 2013). Thereafter, we deeply analyzed the results of each test. The correlation matrix provided insight into how participants' sorts correlated to one another. Therefore, we were able to examine which participants were homogenous in their beliefs about teaching and learning in SBAE. To extract factors, we employed principle component analysis (PCA). PCA yields an unrotated factor report consisting of eigenvalues and the amount of explained variance in eight primary factors. In Q, eigenvalues are a numerical representation of the amount of variation in each factor (McKeown & Thomas, 2013). Therefore, factors are ranked in order of importance based on the magnitude of the eigenvalues. Brown (1980) suggested eigenvalues greater than 1.0 should be considered significant, while those below 1.0 should be excluded from further analysis.

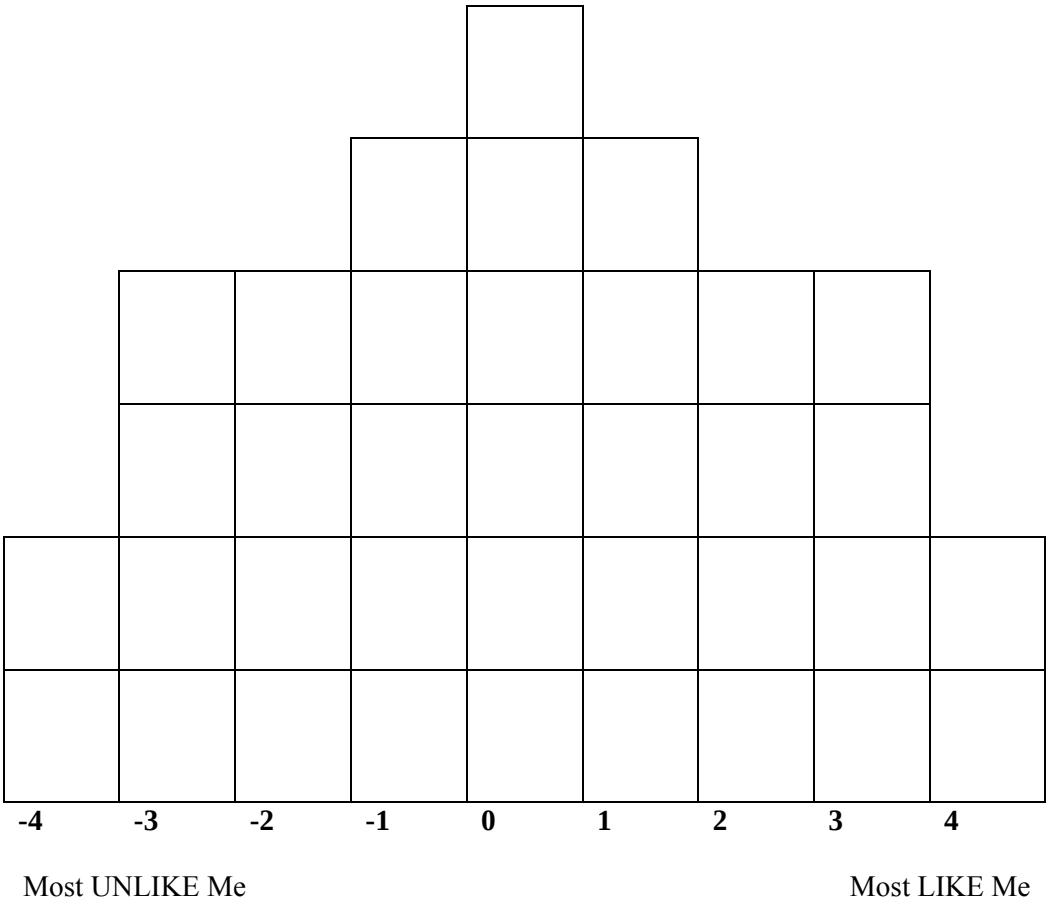

Figure 1. Example of a forced distribution participants received to complete the Q-sort.

Therefore, with the analytic assistance of PCA, we conducted a systematic comparison of one, two, three, four, and five factor solutions. Ultimately, we chose to use a three-factor solution to represent our findings because it accounted for the greatest number of participants as well as the largest amount of variance, i.e., 54% of the total variance. We then rotated the factor to a simple structure using the Varimax rotation. After rotating the factors, factor arrays were produced. The factor arrays illuminated subsets of participants who shared similar beliefs. Based on the selected factor solution, we also generated outputs for factor loadings, factor scores, and consensus and distinguishing statements unique to each factor.

To identify defining sorts, we analyzed the factor matrix (see Table 1) by establishing a base significance of 0.41. To be considered defining, a sort must load high (significantly) and pure on only one factor (all defining sorts are bolded in Table 2). In all, 20 sorts were considered defining. We considered sorts that did not load high and pure on only one factor to be confounded; therefore, they were not used for further analysis in this study.

Table 1

Factor Matrix with Participant Demographics

P Number/ Gender	Age	Years of Experience	Ethnicity	Factor Loadings 1	2	3
1-male	25	3	White	**0.61**	0.22	0.21
2-male	40	18	White	**0.47**	0.36	0.32
3-male	25	2	White	**0.63**	0.34	0.36
4-male	35	11	Native American	**0.77**	0.02	0.35
5-male	57	20	White	**0.63**	0.17	0.22
6-female	28	5	White	-0.16	**0.67**	0.37
7-male	26	4	White	0.15	**0.59**	-0.28
8-female	33	10	White	0.21	**0.70**	0.23
9-female	23	1	White	0.17	**0.66**	0.32
10-male	39	16	Native American	0.11	**0.57**	0.30
11-male	53	26	Native American	0.24	**0.50**	0.31
12-male	40	17	Native American	0.23	**0.58**	0.08
13-male	24	2	White	0.35	**0.63**	0.06
14-male	29	7	White	0.31	**0.47**	0.23
15-male	37	14	White	0.09	0.16	**0.72**
16-male	55	34	White	0.03	0.33	**0.79**
17-male	52	30	White	0.37	0.01	**0.53**
18-female	35	12	White	0.41	0.02	**0.71**
19-male	40	18	White	0.22	0.28	**0.69**
20-female	43	20	White	0.22	0.13	**0.72**
21-female	28	6	Native American	0.45	-0.63	-0.38
22-female	27	1.5	White	0.41	0.56	0.43
23-male	48	25	White	0.19	0.45	0.43

Table 1 (continued)

Factor Matrix with Participant Demographics

P Number/ Gender	Age	Years of Experience	Ethnicity	Factor Loadings 1	2	3
24-male	51	29	White	0.51	0.50	0.31
25-male	27	5	White	0.00	0.49	0.72
26-male	25	1	Native American	0.32	-0.05	-0.07
27-female	23	1	White	-0.04	0.34	0.04
28-male	41	17	White	0.34	0.51	0.45
29-female	25	2	Other	0.54	0.49	0.45
30-male	26	4	White	0.67	0.47	0.13
Number of Defining Sorts				5	9	6
% Explained Variance				15%	20%	19%

Note. Defining sorts are bolded.

Upon identifying the three-factor solution, we used abductive reasoning to analyze how the statements loaded on each factor (Schmolck, 2014). To assist in our interpretation, we conducted follow-up interviews with three high and pure loaders for each factor ($n = 9$). High and pure loaders were participants loading high on one factor, but low on the other two factors. After completing the follow-up interviews, we then used the NVivo® qualitative data software program to assist with the coding, categorization, and generation of themes using Corbin's and Straus's (2015) constant comparative method.

After developing initial themes from the qualitative data, we followed Mauldin's (2012) recommendations for interpretation. We began by developing comparison and contrast matrices that integrated data from multiple sources. For example, we compared correlations between factors, considered Z-scores differences, examined distinguishing and consensus statements for each array, compared statements across arrays, studied participants' demographics, reflected on memos of participants sorting behaviors in the field, and considered emergent themes from the qualitative strand of data. By comparing similarities and discrepancies across each data point, we constructed a unique profile of each factor (Mauldin, 2012).

Throughout this in-depth analytic process, we revised factor profiles multiple times to ensure participants' views were accurately represented (Mauldin, 2012). By comparing the data profiles against relevant theoretical and conceptual bases, three unique perceptual identities emerged: Diligent Educator, Daring Educator, and Devoted Educator. Each perceptual identity represents how epistemological beliefs and orientations combine to form a perception that SBAE instructors may hold regarding teaching and learning. In the findings, each perceptual identity is narratively and visually depicted to help provide a rich insight into each perspective.

Findings

Twenty of the participating SBAE instructors loaded significantly on one of three emergent perceptual identities: *Diligent Educator, Daring Educator,* or *Devoted Educator.* All three perceptual identities stressed the need for hands-on learning to enrich the acquisition of knowledge. However, each position also held a unique perspective concerning the role of the instructor in facilitating these experiences. To provide an evocative depiction of each perceptual identity, we chose to represent each using an expressive icon in Table 2.

Table 2

Expressive icon and description of each perceptual identity

Perceptual Identity	Expressive Icon	Description
Diligent Educator		Learning is a process involving persistence. Effort is the key to successful teaching and learning.
Daring Educator		Learning involves encouraging students to expand their ways of thinking through self-directed experiences.
Devoted Education		Learning depends on the amount of support provided. Students must receive encouragement when applying concepts.

In total, five teachers with a large range of teaching experience, 2 to 20 years, held the Diligent Educator perceptual identity. This identity is mainly comprised of white males, with only one identifying as Native American. Nine teachers also identified as a Daring Educator, which was the most diverse perceptual identity in terms of sex (6 males, 3 females), and ethnicity (6 white, 3 Native Americans). The final perspective, Devoted Educator, was largely composed of white males having significant teaching experience, 12 to 34 years. In the following sub-sections, each perceptual identity will be described narratively to offer a more nuanced representation of the viewpoint. Further, specific statements (along with their corresponding array position) will also be provided at the conclusion of each description to promote *credibility* of the study's findings.

Diligent Educator

For Diligent Educators, learning is a process involving persistence and follow-through, much like the American farmer. In fact, effort seems to be the key to successful teaching and learning (19, +3). Through the analysis of this perceptual identity, two major themes emerged from the data. Diligent Educators held the position that hard work is a major element of the learning process (20, +4). Therefore, they strive to ensure their students understand the content before moving into a higher level of abstraction (27, +3). For example, Diligent Educators might use direct

instruction to explain the subject matter and then carefully guide students through a step-by-step application of the concept (23, +4). Further, it is important for Diligent Educators to set and measure pre-established objectives of the learning process by clearly stating expectations. Through this calculated process, students begin to realize no agricultural concept is too challenging for them to grasp (3, -4). The key is simply exerting the necessary effort.

This identity also held the belief that authority should trump opinion. For instance, Diligent Educators do not see value in stimulating debates or hearing from various points-of-view (15, -3). Instead, lessons are carefully crafted and delivered to students based on experience (10, -4). Therefore, through their attentiveness, Diligent Educators can deliver valuable evidence-based information to students, rather than letting them discover the concepts (33, -3). As such, information from textbooks can often be neglected for what they, the authority, perceive as important or relevant to the students' learning (2, -3). One participant explained, "teaching is about sharing what you know, sometimes you just can't find that information in a textbook." The Diligent Educator also uses their authority to monitor students' progress and clarify their expectations of the learning outcomes. Table 3 provides the central statements to this perspective.

Table 3

Array Positions for Diligent Educator Statements

No.	Statement	Array Position
20	**One learns little if one does not work hard in agricultural classes.**	**+4**
23	In agricultural courses learning is a process that moves from teaching theory to hands-on applications of the subject.	+4
26	**It is important in agriculture courses to completely describe specific objectives that relate to what I expect them to learn.**	+3
27	I structure my teaching in agriculture courses to help students first understand the topic and then be able to apply it to the real world.	+3
19	**Knowing how to learn is more important than the acquired facts in the agricultural courses I teach.**	**+3**
15	**When teaching agricultural courses, I deliberately provoke debate and discussion. But there is always a winning side.**	**-3**
2	In agriculture courses, I mainly concentrate on covering the information available from key texts and readings	-3
33	**As an agricultural teacher, I am more a facilitator of the learning process. Students must discover the truth themselves.**	**-3**
3	The best ideas in agriculture are usually too complicated to understand.	-4
10	In agriculture what is true is a matter of opinion.	-4

Note. Distinguishing statements are in bold.

Daring Educator

Driven by a passion to explore the depths of the learning terrain (see Table 4), Daring Educators attempt to stretch their students' ways of thinking by daring them to dig deeper into concepts (36, +4). For instance, memorization is not valued. Instead, students should be provided learning experiences that ask them to question and possibly alter their existing thoughts about agricultural topics (29, +4). However, it is important for Daring Educators to empower their students to draw conclusions, which means they serve as a facilitator throughout the learning process, rather than an authority figure (33, +3).

Dissonance is also a key element Daring Educators employ to challenge their students' perspectives (34, +3). One Daring Educator explained,

> Sometimes to get your point across, some high school kids have to be thrown into a situation or problem so that they can just figure it out themselves. You know sometimes it just doesn't make sense to them unless they are facing the situation head on.

Because Daring Educators place emphasis on learning as a fluid process, they worry less about the amount of content learned and more about the depth of learning (6, -3). Therefore, an emphasis is placed on assisting learners as they begin to practice new learning behaviors and solve relevant issues and problems. They offer assistance by daring students to connect new ideas with existing knowledge; it is through this problem-solving technique that students can apply concepts to their lives, which reduces the complexity of some topics (3, -4). Through this challenging process, students can begin to see how their learning connects to real-world problems. Ultimately, Daring Educators attempt to help their students see problems differently (36, +4). Daring Educators significant statements are outlined in Table 4.

Devoted Educator

Devoted educators find it important to *support* students throughout the learning process (16, +3), while emphasizing that learning must be applicable to their everyday lives (27, +4). In fact, they maintain positive learning experiences are essential before learners can gain more complex skills and knowledge. They also emphasize learning as an intuitive process requiring proper facilitation, devotion, and a shared appreciation among all of those involved (23, +4). One sorter explained,

Having a connection with my students is key. When they are feeling frustrated with learning, I try to tell a personal story about when I struggled with learning something. It seems to encourage them when they see that sometimes I struggle to.

Table 4

Array Positions for Daring Educator Statements

No.	Statement	Array Position
36	**I see teaching as helping students develop new ways of thinking in agriculture**	**+4**
29	**Agriculture courses should help students question their own understanding of the subject matter**	**+4**
33	**As an agricultural teacher, I am more a facilitator of the learning process. Students must discover the truth themselves**	**+3**
28	**The more you know about agriculture, the more there is to know**	**+3**
34	**My students learn best when they are exposed to something that makes them uncomfortable. It makes them think more deeply and question their perspective**	**+3**
4	Agriculture instructors should focus on scientific theories	-3
6	**It is important to present a lot of content to students so they know what they have to learn for this subject**	**-3**
10	In agriculture what is true is a matter of opinion	-3
2	**In agriculture courses, I mainly concentrate on covering the information available from key texts and readings**	**-4**
3	The best ideas in agriculture are usually too complicated to understand	-4

Note. Distinguishing statements are in bold.

Devoted Educators maintained that learning should challenge students to think differently. They facilitate this belief by carefully monitoring students' feelings and by providing proper support (29, +3). Time is dedicated so students can reflect, discuss, and also form their own conclusions (16, +3). Through this support, students are able to properly form new perspectives on agricultural topics, while also feeling safe in their learning environment. For Devoted Educators, it is not about what students have accomplished, but the new heights they have reached through growing together (29, +3). For instance, group discussions and reflections stimulate various perspectives. Nevertheless, reflective writing strategies also allow students to form their own thoughts and have the final word. Ultimately, Devoted Educators goal is to help their students gain a deeper appreciation for new and diverse ways of thinking (36, +3). Devoted Educators significant statements are presented in Table 5.

Table 5

Array Positions for Devoted Educator Statements

No.	Statement	Array Position
27	I structure my teaching in agriculture courses to help students first understand the topic and then be able to apply it to the real world	+4
23	In agricultural courses learning is a process that moves from teaching theory to hands-on applications of the subject	+4
16	**I set aside some teaching time so that the students can discuss, among themselves, key concepts and ideas in this subject**	**+3**
36	**I see teaching as helping students develop new ways of thinking in agriculture**	**+3**
29	**Agriculture courses should help students question their own understanding of the subject matter**	**+3**
8	I should know the answers to any questions that students may put to me	-3
5	Just teaching students only facts about agriculture is silly	-3
24	How much you get from your learning in agricultural courses depends mostly on your effort.	-3
10	In agriculture what is true is a matter of opinion.	-4
4	Agriculture instructors should focus on scientific theories.	-4

Note. Distinguishing statements are in bold.

Conclusions

This study's purpose was to describe in what ways Oklahoma SBAE instructors' epistemological beliefs and orientations toward instruction combine to form their dominant perceptual identities. As a result, we identified three distinct perceptual identities for SBAE instructors: Diligent Educator, Daring Educator, and Devoted Educator. Alignment of epistemological beliefs and orientations to instruction seemed to complement the agricultural education literature base. For example, results suggested SBAE instructors' perceptual identities are rooted in experiential learning. This finding is congruent with current agricultural education literature (Roberts et al., 2016).

However, our findings also add important new elements to the knowledge base. For instance, although agricultural educators did believe in teaching experientially, each of the views differed in how they believed these experiences should be delivered to students. For example, Diligent Educators promoted hands-on learning but preferred to facilitate these experiences through teacher-centered methods. Conversely, Daring Educators, a position held by nine of the 30 participants, contended that knowledge is fluid. Therefore, SBAE instructors should be cautious to intervene during learning. This mindfulness allows students to make mistakes and self-construct knowledge through student-centered approaches. Meanwhile, Devoted Educators maintained the

learning environment is essential. Therefore, they emphasized nurturing and supporting students needs through hands-on activities.

Implications, Recommendations, and Discussion

The findings from this study are encouraging given Jenkins et al.'s (2010) finding that effective SBAE instructors should provide learning experiences that are hands-on and contextual. However, the literature also demonstrates SBAE instructors tend to misjudge their conceptions of and ability to deliver effective instruction (Roberts et al., 2016). Therefore, SBAE instructors might achieve instructional benefits by gaining a heightened awareness of their perceptual identity. For example, this awareness might maximize instructor effectiveness given agricultural education's diverse curricula and learning contexts (Robinson, Kelsey, & Terry, 2013). To that end, we offer a conceptual diagram of SBAE instructors' perceptual identities in Figure 2.

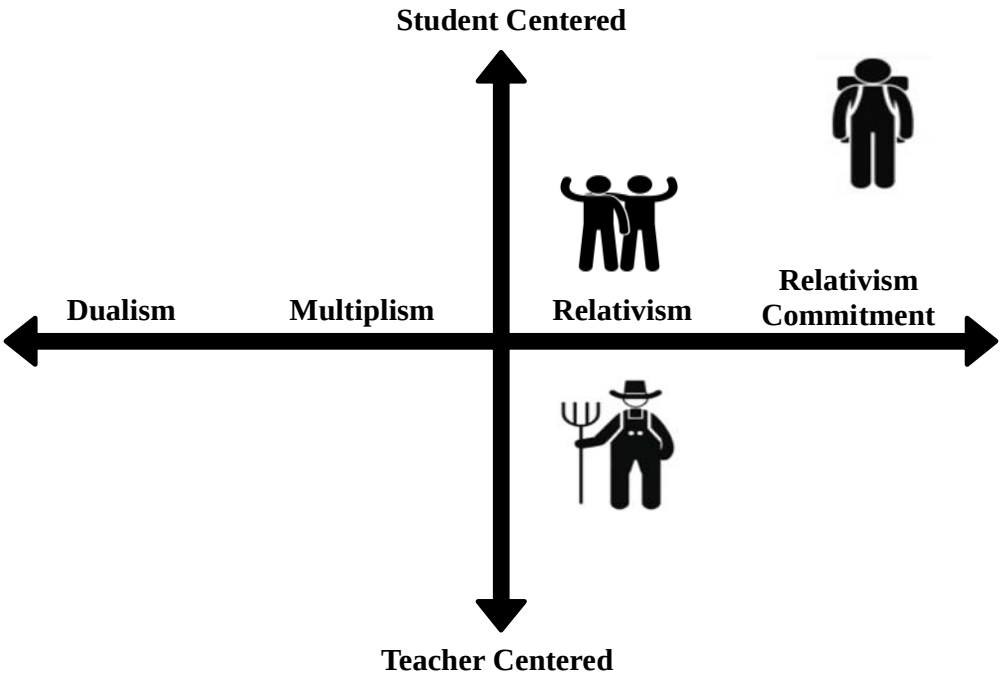

Figure 2. SBAE instructors' perceptual identities in conceptual space.

In the diagram, the three perceptual identities – Diligent Educator, Daring Educator, and Devoted Educator – are positioned in alignment with their epistemological and instructional prioritization. Therefore, we were not only able to examine *how* epistemological beliefs and orientations to instruction combined to form the perceptual identities of SBAE instructors but also *where* they combined in conceptual space. In the future, this diagram might be used as a tool to enhance educators' awareness of their perceptual identities. Through this awareness, professional growth might eventually be strengthened for SBAE instructors.

Mindfulness of practice has been shown to be an important characteristic of effective teachers. Such metacognitive awareness assists teachers in coping with the ill-defined problems they face in the school environment (Kitchener, 1983). Therefore, teachers that believe knowledge is absolute may have trouble adapting and working in ambiguous environments. By encouraging deeper awareness of epistemological beliefs and orientations to instruction, SBAE instructors might

find it easier to adjust to their working environment. For example, mindfulness of one's perceptual identity could encourage instructors to adapt the design of their courses to local contexts. Over time, these changes might also help SBAE instructors to mature into skilled professionals that can recognize the needs of their students and shift their practices accordingly. Such changes could also allow SBAE instructors to align more congruently with characteristics of effective instruction, which call them to "effectively determine student needs, plan for instruction, and evaluate students" (Roberts & Dyer, 2004, p. 85).

It is important to emphasize that each perceptual identity has a number of strengths and weakness associated with its unique position. However, through greater awareness, educators can begin to enhance their effectiveness by monitoring and modifying their teaching style to complement students' learning preferences (Hyytinen et al., 2014). Therefore, educators can make purposeful pedagogical decisions given the unique learning terrain in which they find themselves.

To help concretize the importance of epistemological positions and orientations to instruction for SBAE instructors, we offer the following recommendations for praxis for each perceptual identity. We would first like to emphasize that before SBAE instructors can increase their effectiveness, they must be open to transitioning into positions that go against their natural preference. Diligent Educators, for example, prefer to deliver instruction through teacher-centered approaches emphasizing hard work. We recommend that Diligent Educators recognize that to connect with learners' interests, that they take the time to build relationships and promote autonomy throughout the learning process (Rogers & Meek, 2015).

On the other hand, Daring Educators prefer to allow students the flexibility to test boundaries and construct their own knowledge. Nevertheless, it is important for Daring Educators to recognize that at times an outcomes-oriented approach is needed to ensure quality standards are achieved. Meanwhile, Devoted Educators feel it necessary to support students throughout their learning endeavors. Mounting empirical evidence demonstrates, however, that dissonance can often lead to more transformative learning (Mezirow, 1991; 2000). Therefore, Devoted Educators should recognize when a less structured learning environment might be more appropriate.

Korthagen and Kessels (1999) noted that societal expectations play a fundamental role in shaping SBAE teachers' perceptual identities; therefore, additional research is needed to understand the particular environmental factors that might influence epistemological beliefs and orientations to instruction. Understanding these influences more intimately could hold important implications for teacher resiliency. For example, could SBAE teachers who are more apt to believe there are multiple sources of knowledge and varying perspectives, be more resilient to societal expectations and environmental pressures? Future research should also explore whether targeting specific epistemological beliefs and instructional practices during teacher preparation and professional development might encourage SBAE instructors to evolve into a more sophisticated perceptual identity category.

With increasing environmental pressures (i.e. testing, reforms to teacher evaluations, etc.) influencing contemporary practice, it is also important to examine whether these factors might suppress SBAE instructors' epistemological beliefs and orientations to instruction. For example, could environmental factors influence SBAE instructors' use of particular teaching methods despite their innate beliefs about teaching and learning? As such, it is imperative to explore whether SBAE instructors' epistemological positions and orientations to instruction truly reflect their practice. Although the perceptual self is a complex construct, understanding its depths might hold powerful implications for the agricultural education discipline.

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Appendix A

Q Statements and Theoretical Categories

No.	Statement	Theoretical Category
1	Most things in agriculture worth knowing are easy to teach and for students to understand	Dualistic Teaching
2	In agriculture courses, I mainly concentrate on covering the information available from key texts and readings	Dualistic Teaching
3	The best ideas in agriculture are usually too complicated to understand	Dualistic Teaching
4	Agriculture instructors should focus on scientific theories	Dualistic Teaching
5	Just teaching students only facts about agriculture is silly	Dualistic Teaching
6	It is important to present a lot of content to students so they know what they have to learn for this subject	Dualistic Teaching
7	Lecturing is an effective way for students to learn agriculture content	Dualistic Teaching

No.	Statement	Theoretical Category
8	I should know the answers to any questions that students may put to me	Dualistic Teaching
9	In the ag classes I teach, I provide the students with the information they will need to pass the formal assessments	Dualistic Teaching
10	In agriculture what is true is a matter of opinion	Multiplism Teaching
11	If two people are arguing about an agricultural issue, both of them could be wrong	Multiplism Teaching
12	What is true today may not always be true tomorrow when teaching agriculture	Multiplism Teaching
13	There is always a right answer to the assignments I give students	Multiplism Teaching
14	In my interactions with students in agricultural courses, I try to stimulate discussions from various points-of-view	Multiplism Teaching
15	When teaching agricultural courses, I deliberately provoke debate and discussion. But there is always a winning side	Multiplism Teaching
16	I set aside some teaching time so that the students can discuss key concepts and ideas in this subject	Multiplism Teaching
17	I feel as though students learn best when they are allowed to debate the course material	Multiplism Teaching
18	If people can't understand something in agriculture right away, they should keep on trying	Relativism Teaching
19	Knowing how to learn is more important than the acquired facts in the agricultural courses I teach	Relativism Teaching
20	One learns little if one does not work hard in agricultural classes	Relativism Teaching
21	Everyone in agricultural classes first needs to learn how to learn	Relativism Teaching
22	Ag students will learn better if they focus more on the process of understanding rather than the facts to be acquired	Relativism Teaching
23	In agricultural courses learning is a process that moves from teaching theory to hands-on applications of the subject	Relativism Teaching
24	How much you get from your learning in agricultural courses depends mostly on your effort	Relativism Teaching

No.	Statement	Theoretical Category
25	Just because one tries hard in agricultural classes, doesn't mean they will understand the course material	Relativism Teaching
26	It is important in agriculture courses to completely describe specific objectives that relate to what I expect them to learn	Relativism Teaching
27	I structure my teaching in agriculture courses to help students first understand the topic and then be able to apply it to the real world	Relativism Teaching
28	The more you know about agriculture, the more there is to know	Relativism Commitment Teaching
29	Agriculture courses should help students question their own understanding of the subject matter	Relativism Commitment Teaching
30	A lot of teaching time in agriculture courses should be used to question students' ideas	Relativism Commitment Teaching
31	Students should question what experts say in agriculture, and discover the truth themselves	Relativism Commitment Teaching
32	If students try hard enough in agricultural classes, they can find the answer to almost anything	Relativism Commitment Teaching
33	As an agricultural teacher, I am more a facilitator of the learning process. Students must discover the truth themselves	Relativism Commitment Teaching
34	My students learn best when they are exposed to something that makes them uncomfortable. It makes them think more deeply and question their perspective	Relativism Commitment Teaching
35	It is important to make opportunities available for students to discuss their changing understanding of agricultural topics	Relativism Commitment Teaching
36	I see teaching as helping students develop new ways of thinking in agriculture	Relativism Commitment Teaching