Mixed Measures of Preservice Agricultural Educators’ Epistemological Beliefs of Teaching and Learning

Abstract

The purpose of this study was to see if two instruments grounded in two different methodologies used to identify epistemological beliefs were empirically aligned. This collective case study investigated 21 preservice agricultural educators’ ways of knowing of teaching and learning using a positivist method, Epistemological Beliefs Survey, and a post-positivist method, Measures of Epistemological Reflection. The two methods were compared to each other and an interpretivist method, a self-identified ways of knowing class activity, to determine if the methods were empirically aligned with the construct of epistemological beliefs. The two instruments were not empirically aligned, and the positivist method was not aligned with the participants’ self-identified ways of knowing. The post-positivist method was empirically aligned with the participants’ self-identified ways of knowing.
Introduction & Theoretical Framework

The ways that people know and process knowledge are guided by a set of assumptions and beliefs. These beliefs influence how students learn in their college courses. Beliefs guide how students acquire, structure, and process knowledge. Students in the same classroom may have very different beliefs about knowledge and knowing. However, instruction in the college classroom is often lecture based and tailored to the transmission of knowledge (Perry, 1997). Differentiating instruction helps teachers accommodate students with different ways of knowing (Schommer-Aikins, Duell, & Barker, 2003). This issue may be particularly important in teacher education, given that teachers will need to understand their own ways of knowing, as well as those of their students.

The groundwork for studying these ways of knowing, or epistemological beliefs, of college students was established by William Perry (1970). Since that time, many researchers have found that epistemological beliefs impact learning at the collegiate level in a number of ways. Students come to the classroom with epistemological beliefs and theories that influence how they interpret instruction (Hofer, 2001). For example, students who believe that knowledge never changes have a hard time accepting tentative answers (Schommer, 1990). Furthermore, the beliefs one holds about knowledge may influence strategy use (Schommer, Course, & Rhodes, 1992), cognitive processing (Kardash & Howell, 2000), and conceptual change learning (Qian & Alvermann, 2000). Epistemological beliefs influence not only how one learns in school, but also affect how one interacts with new information, draws conclusions, and makes decisions over the course of the life span (Hofer).

The conceptual framework of this study was based on the premise that college students possess different ways of knowing and these ways of knowing influence how they learn and acquire knowledge. Currently, there have been few research studies in agricultural education concerning ways of knowing or epistemological beliefs. Professors who understand the epistemological beliefs of future educators can enable them as learners because there is a pressing need to differentiate instruction for a growing population of diverse learners. Previously, research in agricultural education has focused on differences in students’ learning styles by using a form of an embedded figures test to assess whether students are field-dependent or field-independent learners (e.g., Cano, Garton, & Raven, 1992; Rudd, Baker, & Hoover, 2000). While this instrument may indicate learning style in a general sense, it specifically measures spatial ability by having subjects recognize a shape by mentally manipulating that same shape in a different position (Eliot & Smith, 1981). However, a student’s learning style, or ability in spatial reasoning, is not synonymous with what a student believes about the nature, structure, and acquisition of knowledge.

Researchers struggle to accurately measure beliefs. Constructs should be represented by more than one measure (Snow, Corno, & Jackson, 1996). It is imperative that instruments used
to measure epistemological beliefs are empirically aligned and valid measures of students’ ways of knowing. If the instruments are not valid, it brings into question whether or not the instruments actually measure epistemological beliefs. Common forms of self-reported measures of epistemological beliefs need to undergo further validation, by developing equivalent forms of the same instrument and by triangulating self-reported instruments (Schraw, 2001). The researchers not only wished to know what epistemological beliefs preservice agricultural educators held but if two different methodologies would measure beliefs of a similar construct.

Drawing on Denzin and Lincoln’s (2000) nature and purpose of a researcher’s paradigm, similarly, teachers are guided by philosophy of highly abstract principles about the nature of knowledge, the relationship between the teacher (or learner) and knowledge, and how knowledge is learned. These principles are embedded in beliefs about ontology (What is the nature of knowledge?), epistemology (What is the relationship between the inquirer [teacher or learner] and the known?), and methodology (How do we know the world, or gain knowledge of it?). These beliefs shape how teachers see the world and act in it (Denzin & Lincoln). Teachers have a mental framework, or paradigm, that serves as a “basic set of beliefs that guides action” (Guba, 1990, p. 17). The researchers focused on behavioralist and constructivist beliefs about teaching and learning in college course for this study. The epistemological beliefs about teaching and learning are expressed as beliefs about the nature of knowledge, how knowledge is acquired, and ways knowledge is known. Greeno, Collins, and Resnick (1996) clarified the nature of knowing, learning and transfer, and motivation and engagement regarding three paradigms in the theory cognition and learning. The behavioralist focuses on accumulating associations and acquiring skills through extrinsic incentives. The cognitive-constructivist focuses on constructing organized patterns and concepts through problem-solving, metacognitive processes, and intrinsic interests of learners. The situative-constructivist focuses on developing knowledge through interactions among individuals and groups with physical and technological systems.

Personal epistemology research can be conceived of as investigating one’s thinking and beliefs about knowledge and knowing (Hofer, 2001). Schommer (1990) expanded on Perry’s (1970) work by proposing personal epistemology as a system of beliefs. She theorized that one’s epistemological beliefs are more or less separate dimensions (Schommer-Aikins et al., 2003; Buehl & Alexander, 2001). The five separate beliefs that Schommer (1990) hypothesized were beliefs about the following: structure of knowledge, stability of knowledge, source of knowledge, speed of learning, and the ability to learn. Given that these beliefs are more or less independent, they may not develop at the same rate (Schommer-Aikins et al.). Therefore, researchers cannot assume that epistemological beliefs are in synchrony with one another (Duell & Schommer-Aikins, 2001). By adapting items from Perry’s original work, Schommer (1990) developed a paper and pencil instrument, the Epistemological Beliefs Questionnaire, to measure the various dimensions of beliefs (Duell & Schommer-Aikins; Buehl & Alexander). This instrument was further modified by Wood and Kardash (2002) to measure similar dimensions of beliefs. Responses to the belief factors assessed by Wood and Kardash reveal either a behavioralist (knowledge is certain) or constructivist (knowledge is uncertain) way of knowing.

Baxter Magolda (1992) expresses personal epistemological beliefs as ways of knowing (Duell & Schommer-Aikins, 2001). The epistemological model developed by Baxter Magolda is strongly tied to concerns within education (Duell & Schommer-Aikins). The quest to understand how college students develop intellectually is the focal point for meaningful educational
practices. Students interpret their educational experiences based on their assumptions about the source, boundaries, and certainty of knowledge. Studying college students at Miami University, Baxter Magolda identified four ways of knowing held by college students: absolute (knowledge is certain or absolute), transitional (knowledge is partially certain or absolute), independent (knowledge is uncertain, individuals have their own beliefs), and contextual (knowledge is judged on evidence in context). These four ways of knowing form the Epistemological Reflection Model (Baxter Magolda). While similar to Perry’s scheme, this model seeks to understand the beliefs that influence how college students interpret their educational experiences (Hofer, 2001). Absolute and independent ways of knowing appear to be expressed by behavioralists, while independent and contextual ways of knowing appear to be expressed by constructivists in the college classroom.

Teachers and learners alike make meaning of their experiences based on their beliefs (Baxter Magolda, 1992). Therefore, teachers will approach and interact in their classrooms with a particular way of knowing. While there is growing interest in researching the epistemological beliefs of teachers, few researchers have studied these issues in agricultural education. Hoop (2003) found that 55% of the intern teachers in agricultural education at two midwestern universities had behavioralist ways of knowing about teaching and learning. Hoop also found that the interns were more positive attitudes regarding lesson planning and enjoyed how to plan lessons when their ways of knowing were congruent with the epistemological beliefs of their teacher educators. Wardlow and Scott (2000) found that agricultural education student teachers generally prefer the constructivist approaches compared to traditional approaches to teaching and learning. Buttles, Graham, and Hieronimczak (2003) found that secondary agricultural educators’ opinions about various instructional methods were aligned with constructivist beliefs about learning.

Epistemological beliefs influence how teachers solve problems of practice. Teachers confront problems beyond those that are technical in nature, such as teaching skills. Teachers are expected to resolve problems and situations that have different and even contradictory criteria (Donmoyer, 2001). For example, teachers are expected to have control of their classrooms, yet create an educational environment that fosters independent, creative, self-directed learners. Shulman (1986) suggested that teachers must attend “to different phenomena of interest, different conceptions of the problem, and different aspects of events likely to be ignored within a single perspective to make appropriate decisions” (p. 5). However, the majority of research on epistemology has focused on theoretical issues and few studies have provided suggestions for classroom practice. Understanding the epistemological beliefs of preservice teachers may enable teacher educators to be more aware of how their students think about knowledge and solve complex problems. Teachers naturally exemplify their beliefs for students (Baxter Magolda, 1992). Teacher educators need to better understand the types of epistemological beliefs held by experienced and novice teachers and how those beliefs impact student learning (Schraw, 2001).

Several methods for measuring epistemological beliefs have developed, as various researchers have elaborated on Perry’s (1970) original work. There is little consensus among researchers about the components of a core set of epistemological beliefs, how they are related, and how they tend to develop (Schraw, 2001). Donmoyer (2001) noted that there are differences among paradigms used to guide research on teachers’ knowledge and thinking, but tend to
endorse a similar notion that “methodological differences are rooted in fundamentally different epistemologies” (p. 180). Although most research in agricultural education has been informed by a positivist epistemology, interpretivist methods should be used to study human phenomena (Woods & Trexler, 2001). The researchers were interested in comparing two instruments with methodological differences fundamentally rooted different epistemologies (Donmoyer) to see if they were empirically aligned on epistemological beliefs of teaching and learning. While there are many instruments used to measure epistemological beliefs, few studies have been concerned with triangulating data from such instruments to determine if they are valid and credible. There is a gap in the literature of studies that seek to determine if instruments that measure epistemological beliefs are empirically aligned (Schraw). Therefore, this study was conducted to determine if two instruments grounded in two different methodologies used to identify epistemological beliefs of preservice agricultural educators were empirically aligned.

**Purpose & Objectives**

The purpose of this study was to compare two instruments used to describe and interpret epistemological beliefs of preservice agricultural educators. The objectives of the study were to: (a) describe preservice agricultural educators epistemological beliefs using a positivist methodology and a close-ended instrument, (b) understand ways of knowing of preservice agricultural educators using a post-positivist methodology and an open-ended instrument, and (c) determine if the existing close-ended and open-ended instruments which measure epistemological beliefs are empirically aligned with one another and with pre-service agricultural educators self-identified ways of knowing. These self-identified ways of knowing were determined using an interpretivist methodology and a classroom activity.

**Methods & Procedures**

The researchers sought to describe and interpret the epistemological beliefs of preservice agricultural educators using positivist, post-positivist, and interpretivist methodologies. The participants of this collective case study were 21 students enrolled in a teaching methods course in agricultural education during the fall 2003 semester at a midwestern land grant university. The small number of participants was a limitation of this study. Fourteen participants were majoring in agriculture teacher education, and seven were majoring in agriculture leadership education. Nineteen participants were undergraduates and two were graduates. The agriculture teacher education participants were preparing for the student teaching internship. Six of the seven agriculture leadership students had completed an internship. All of the students were Caucasian. Twelve participants were female, and nine were male. Of the 21 participants, 16 were from a farming background. Two participants were from a rural (non-farming) background, two were from a small community, and one was from a suburban background.

For Objective 1, participants’ ways of knowing were measured from a positivist stance using the Epistemological Beliefs Survey (EBS) (Wood & Kardash, 2002), which contained 25 closed-end items to assess three factors of epistemological beliefs: attainability of objective truth; structure of knowledge; and, knowledge construction and modification. Participants were asked to respond to items such as, “Wisdom is not knowing the answers, but knowing how to find the answers,” and “The information we learn in school is certain and unchanging.”
A summated rating scale was used to measure beliefs for each factor: (1) strongly disagree; (2) moderately disagree; (3) slightly disagree; (4) slightly agree; (5) moderately agree; and, (6) strongly agree. The questionnaire was administered face to face during regular classroom instructional time. Woods and Kardash (2002) established content validity and reliability for the existing instrument. The post-hoc reliability coefficients (Cronbach’s alpha) for the three epistemological factors were: (1) attainability of objective truth = 0.77; (2) structure of knowledge = 0.80; and, (3) knowledge construction and modification = 0.58.

For Objective 2, participants’ beliefs were measured from a post-positivist paradigm using a questionnaire. The questionnaire, Measures of Epistemological Reflection (MER) (Baxter Magolda & Porterfield, 1985) contained ten open-end items to assess epistemological development of college students. Credibility, transferability, and trustworthiness were established by Baxter Magolda and Porterfield (1985). Participants were asked for written responses to questions such as “Do you learn best in classes that focus on factual information or classes that focus on ideas and concepts?” and “As you think back to instructors you have had, describe the method of instruction that had the most beneficial effect on you.”

For Objective 3, a third method employing an interpretivist methodology was used to help validate the preservice agricultural educators’ epistemological beliefs of teaching learning. Preservice agricultural educators participated in a 110-minute classroom activity that asked them to self-identify and validate their ways of knowing about teaching and learning. This classroom session took place 3 weeks after the participants had completed the EBS and MER. The participants received classroom instruction about ways of knowing and epistemological beliefs. The instructor carefully explained the characteristics of behavioralist and constructivist ways of knowing as they relate to teaching and learning. During the classroom activity, students were asked to reflect upon whether they possessed a behavioralist or constructivist way of knowing and to break into groups based upon their way of knowing. The students discussed their ways of knowing and were free to move between groups as they clarified their thinking. Because the participants understood the concept of ways of knowing, the researchers assumed that this interpretivist method most accurately identified their epistemological beliefs of teaching and learning. The positivist and post-positivist measures were compared to the interpretivist self-identified ways of knowing. Further, the positivist and post-positivist measure were also compared.

Descriptive statistics were used to analyze the metric data from the closed-ended questionnaire. The data set was analyzed using SPSS. Data were analyzed using population means, standard deviations, and frequencies. The researchers operated under the assumption that a mean of 3.5 or greater on factor 1 (attainability of objective truth) and factor 2 (structure of knowledge) indicated a behavioralist way of knowing, while a mean of 3.5 or greater on factor 3 (knowledge construction and modification) indicated a constructivist way of knowing. The assumption was based upon Greeno et al.’s (1996) description of behavioralist and constructivist ways of knowing after analyzing the behavioralist and constructivist beliefs underlying each factor. Similarly, a mean of 4.5 or greater was considered to indicate moderate to strong agreement with that particular factor, while a mean of 2.5 or less was considered to indicate moderate to strong disagreement with that particular factor. Data were reported for each factor as behavioralist, constructivist, moderate behavioralist, or moderate constructivist beliefs about each particular factor.
The researchers collected and interpreted the data from a post-positivist stance (Lincoln & Guba, 2000). A word processor, paper, pencils, and highlighted markers were used to help create organizers to collect and summarize the qualitative data from the open-ended questionnaire. Coaxial coding was used to analyze the data. The responses were initially sorted into tentative groups according to ways of knowing. Next, the responses were coded based on how participants within each group believed how knowledge existed, how knowledge is acquired, and how people think about knowledge. The researchers created a coding scheme of the major concepts, central ideas, or related responses (Glesne, 1999). Trustworthiness, believability, and confirmability were established through the use of peer debriefing, direct quotes, an audit trail, and a reflexive journal (Donmoyer, 2001; Lincoln & Guba, 1985).

A table was created that compared the results between the positivist, post-positivist, and interpretivist methods for each preservice agricultural educator. Means for the three positivist factors were replaced with descriptors. Percentages were reported based on the congruency of each instrument compared to self-identified ways of knowing, and congruency between the three factors from the EBS and MER. The instruments were considered to be aligned if the results from the positivist and the post-positivist instruments were congruent with the preservice educators’ self-identified ways of knowing, and if the results from the EBS and MER were congruent with one another.

Results & Findings

For Objective 1, 11 (52%) preservice agricultural educators agreed that objective truth could be attained. Of these 11 educators, three (14%) were in moderately strong agreement with this factor. Of the ten who did not agree that objective truth could be attain, six (29%) were in moderately strong disagreement. For the second factor, 19 (90%) preservice agricultural educators believed in the absolute and certain structure of knowledge. Ten (48%) of these 19 preservice agricultural educators were moderately strong in their agreement with that factor. Of the two (10%) preservice agricultural educators who disagreed that knowledge was absolute and certain in structure, one (5%) preservice agricultural educator was moderately strong in disagreement with this factor. For the third factor, 20 (95%) preservice agricultural educators agreed that knowledge could be constructed and modified by an individual, and five (24%) of those were in moderately strong agreement with that factor.

For Objective 2, the preservice agricultural educators clustered into two groups. The first group ($N = 11$) expressed a desire to learn factual information in a straightforward manner with concrete justification behind the material presented. The second group ($N = 8$) expressed a preference for focusing classroom instruction on concepts and constructing personal meaning out of those concepts within the context of various ideas, interpretations, and opinions. Two themes emerged when comparing and contrasting the two groups. These themes centered upon how preservice agricultural educators wanted to be taught and why they wanted to be taught in a certain way.

The first group expressed that they wanted to be taught in clearly structured classroom sessions with effective notes and discussion. Emma was a member of this group. She said, "The method of instruction that worked well for me was when instructors lectured, staged activities,
discussions, etc.” They commented that learning, for them, meant acquiring knowledge through examples, activities, application problems, and review questions. They enjoyed learning information in a sequential manner. Jacob commented, “Everything is straightforward and predictable. You learn the information and go on.”

The first group expressed that they wanted to be taught in the way mentioned above because they believed that knowledge is factual and certain by nature. Preservice agricultural educators stressed that they preferred learning about facts because they are clear, concrete, straightforward, and easy to understand. Emma stated that she likes material to be “cut and dry.” Preservice agricultural educators in this group wanted to learn in a way that provided for definite answers. Kasey said, “I like problem solving things that have solid answers.” Brad commented, “I just need to know the answer. I tend not to care if someone thinks this is the way it happens. I want to know how and why it happens the way it does.”

The second group expressed that they wanted to be taught in a way that allowed them to develop their own thoughts, interpretations, and opinions about the material. They wanted classroom instruction to be centered upon concepts. As a member of this group, Annie commented, “When focusing on ideas and concepts, my own perception is acceptable and I’m more likely to enjoy it and remember it if it is my own interpretation.” Preservice agricultural educators in this group also expressed a preference for acquiring knowledge within the context of a group. Shane said he benefited from working with others because, “We got to know more people and we helped each other out.” Dawn commented on the benefits of students exploring their “…own talents and individual strengths and weaknesses.”

The second group articulated that they preferred instruction to be centered on concepts because of the changing nature of knowledge. Preservice agricultural educators in this group conceived of knowledge as varying and full of possibilities. Annie stated, “Things are left open-ended. Anything is possible.” These preservice agricultural educators also viewed the construction of knowledge as an ongoing process involving creativity and interaction with others. Kevin commented, “Advantages can be freethinking, …able to show creativity on top of knowledge. “ The preservice agricultural educators in this group preferred instruction to focus on concepts because they had a desire to have ownership and individuality within the knowledge they learned. They believed that this ownership helped them to remember what they had learned on a long-term basis. Brian stated, “If a student is just told what he is supposed to think or just given facts, he will just be memorizing. In the long run, memorizing is not learning.”

For Objective 3, 11 (52%) preservice agricultural educators’ responses for the attainability of objective truth were congruent with their self-identified ways of knowing (Table 1). For the second factor, 11 (52%) participants’ responses on the structure of knowledge were congruent with their self-identified ways of knowing. For the third factor, 11 (52%) participants’ responses on knowledge construction and modification were congruent with their self-identified ways of knowing. In comparing the post-positivist and interpretivist results, 19 (91%) participants’ responses on the MER were aligned with their self-identified ways of knowing. Two (9%) participants’ responses on the MER were not congruent with their self-identified ways of knowing and they indicated they were unsure of their way of knowing on the MER. In comparing the positivist and post-positivist methods, one (5%) of the participant’s responses across the three EBS factors and the MER were congruent. Each single factor from the EBS was
compared to the participants’ responses on the MER. Thirteen (62%) participants’ responses were congruent between the two instruments for attainability of objective truth. Thirteen (62%) of participants’ responses were congruent between structure of knowledge and the MER. Nine (43%) of the participants’ responses for knowledge construction and modification were congruent with the MER.

Table 1.  
*Preservice Agricultural Educators’ Epistemological Beliefs (N = 21)*

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<th>Post-Positivist</th>
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Note. Scale: B = Behavioralist, C = Constructivist, B<sub>m</sub> = Moderate Agreement with Behavioralist, C<sub>m</sub> = Moderate Agreement with Constructivist

Conclusions, Implications, & Recommendations

Preservice agricultural educators varied in their epistemological beliefs on attaining objective truth, the structure of knowledge, and constructing and modifying knowledge when measured by a positivist method. According to the Epistemological Beliefs Survey, about 50% of the preservice agricultural educators held behavioralist beliefs about the attainability of objective truth, which was consistent with Hoop’s (2003) study. In contrast, 9 out of 10 of the preservice agricultural educators held behavioralist beliefs about the structure of knowledge, and all but one of the participants held constructivist beliefs about knowledge construction and modification. These findings are difficult interpret. On one hand, this variability among the
three EBS factors may be consistent with Schommer-Aikins et al.’s (2003) view that epistemological views may not develop at the same rate, and may not be in synchrony with each other (Duell & Schommer-Aikins, 2001). On the other hand, these findings contradict Schommer-Aikins et al.’s view that not all epistemological beliefs are held in separate dimensions. Nonetheless, these findings raise the question of whether or not an individual can agree with a behavioralist factor (factor 2) and a constructivist factor (factor 3) at the same time. Further research is necessary in order to determine if it is possible to hold such varying beliefs. Another possible issue may be that people have a tendency to agree with statements in positivist self-reported questionnaires if they perceive them as being positive regardless of what they really believe.

Nearly two-thirds of the preservice teachers had behavioralist ways of knowing and one-third had constructivist ways of knowing as measured by a post-positive method. This finding was inconsistent with two other studies that found preservice and inservice teachers in agricultural education preferred constructivist teaching and learning approaches (Buttles, Graham, & Hieronimczak, 2003; Wardlow & Scott, 2000). When using MER, the preservice agricultural educators clustered into two groups, which were aligned with Greeno et al.’s paradigms (1996). The first group (N = 13) had behavioralist ways of knowing and expressed that knowledge was organized as facts, learned systematically, and considered as absolute. The second group (N = 8) had constructivist ways of knowing and expressed that knowledge is organized as concepts, learned as one constructs meaning, and considered as contextual. Five preservice agricultural educators within this group had cognitive-constructivist beliefs and three participants had situative-constructivist beliefs. Professors, teacher educators, and future educators are more likely to accommodate learning differences if they understand the relationship between classroom instruction and beliefs. Further investigations should study college students’ achievement, performances on authentic tasks, problem-solving strategies, and motivation as informed by their epistemological beliefs. Moreover, understanding the implicit beliefs underpinning how people think and learn may help teachers and their students communicate more explicitly about the tacit nature of teaching and learning. By engaging in such communications, learners can begin to see the “rules” that are embedded within the context of the learning environment.

The post-positivist method (MER) was more aligned with the preservice educators’ self-identified ways of knowing (interpretivist method) than was the positivist method (EBS). Furthermore, the positivist (EBS) and post-positivist (MER) methods were not empirically aligned. This disparity suggests that there may be a problem with the instruments or the methodologies used to measure epistemological beliefs. This finding aligns with Schraw’s (2001) contention that there is little agreement among researchers on what constitutes epistemological beliefs or how they are measured. Although there appears to be agreement that ways of knowing informs how teachers and learners perform, the inconsistency between instruments in this study suggests several possibilities: (a) methodological incompatibility; (b) methodological validity concerns; (c) instrument validity concerns; and, (d) limitations within the group of participants studied.

Measuring ways of knowing about teaching and learning may be best accomplished through qualitative methods, which supports Woods and Trexler’s (2001) recommendation.
Based on the high level of congruency, interpretivist and post-positivist methods, such as open-ended questions, interviews, observations, and guided self-identification activities, should be used in studying epistemological beliefs of teaching and learning. The researchers caution using mixed methodologies to measure beliefs. Researchers may argue that two different methodologies cannot be compared because they are inherently informed by different assumptions. It could be argued that comparing positivist and post-positivist methods on the same construct is like comparing apples to oranges because they are methodologically incompatible. Donmoyer (2001) suggested that these differences among paradigms used to guide research on teachers’ knowledge and thinking tend to endorse a similar notion that “methodological differences are rooted in fundamentally different epistemologies” (p. 180). Regardless of the methodology, researchers should be more explicit in describing the constructs they intend to measure. Further philosophical and empirical studies should investigate if there are compatible mixed methodologies regarding epistemological beliefs such as post-positivist and interpretivist methods used in this study (Snow et al., 1996). Further studies should continue to triangulate using various methods and instruments to clarify validity concerns.

The researchers also caution against generalizing these findings beyond this study due to limited number of participants. The participants in this study may have varied in their development of epistemological beliefs in general. They may also have been at various stages of development across the EBS factors. This study should be replicated for greater generalizability and transferability on several dimensions. Future studies should try to understand the construct and how epistemological beliefs guide learners and inform teaching practices across disciplines, stages of learner and teacher development in different educational environments, and career preparation. Perhaps the participants in this study faced the contradictions that teachers face in the field. Donmoyer (2001) described that teachers make decisions in complex, paradoxical situations—such as, establishing and maintaining an orderly classroom that is warm, positive, and encourages creativity. Perhaps the participants agreed with the paradox that knowledge contains structure and objectivity that can be created through social experiences. As such, the participants provided more authentic responses for the open-ended questions and experiential learning activity than they did for the closed-ended self-reported instrument.

References


