An International and Domestic Examination of Faculty Epistemological and Pedagogical Teaching Beliefs[1]

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Abstract

Recent research has raised doubts about the quality of undergraduate teaching in the United States. Quality post-secondary education becomes more and more critical to both national competitiveness and the development of a robust agricultural economy. There is a continual need for productive research on effective teaching. To ensure undergraduate students are receiving the quality of education needed to be competitive in our global society, colleges of agricultural sciences must constantly advance their education and scholarship. The purpose of the research study is to identify the epistemological and pedagogical teaching beliefs of faculty in two colleges of agricultural sciences. The study employed a multiple case–study approach utilizing a basic qualitative design to frame their one-on-one structured interview research methods. The results were discovered through in-depth content analysis for rich description expressing the faculty member's beliefs they hold about their teaching. Findings revealed faculty at both agricultural institutions held contextualistic epistemological beliefs and learner-centered pedagogical beliefs. More dynamic assessment of epistemological and pedagogical beliefs are recommended in colleges of agriculture around the world to identify the interactive relationships between the development of epistemological and pedagogical beliefs of teachers and students, cultures and learning environments. Further research will also lead to identifying the philosophy of a culture and values embedded in a culture that impact the development and strengthening of teacher and student beliefs.

Introduction

A vibrant U.S. agriculture enterprise is paramount to the future well-being of the nation (National Academy of Sciences, 2009). By 2018, 44% of jobs in agriculture, food and natural resources will require some postsecondary education (U.S. Department of Agriculture Economic Research Service, 2014). Colleges of Agricultural Sciences are charged with the task of addressing our nation's societal and industry challenges by preparing *"a diverse workforce that includes scientists and professionals with knowledge and skills beyond today's standards"* (Doerfert, 2011, p. 19).

To expand and improve the current vision of effective teaching in the United States' agriculture education, it is imperative to gain a more global understanding of the pedagogical approaches of other leading agricultural universities award-winning teaching faculty. In its first articulated international strategy, the United State Department of Education (2012) called for "global competencies for all students" and "education diplomacy and engagement with other countries" (p.1). The global nature of the agriculture industry means that much can be learned from our peers engaging in similar missions across the world. This synergy can help ensure the U.S. agricultural education achieves its maximum potential.

Transforming and sustaining education in agriculture requires an ongoing commitment and investment in undergraduate education (National Academy of Sciences, 2009). Investment in undergraduate education will play an important role in shaping the future of agriculture and in meeting the challenges of the 21st century and beyond (National Academy of Sciences, 2009). Teaching of the agricultural sciences at the post-secondary level is strongly influenced by the skills, knowledge and dispositions of the faculty (National Academy of Sciences, 2009). Improving the undergraduate learning experience for students in agriculture, food and natural resources disciplines requires innovations in teaching, learning and the curriculum must be addressed (National Academy of Sciences, 2009). Emphasis on promoting teaching and learning and focusing on faculty develop-

ment to ensure quality instruction and student engagement was a strong recommendation from the council (National Academy of Sciences, 2009).

For decades, educational researchers have examined the many facets of teaching practices, theories and effectiveness. The role of teachers' personal beliefs and theories have on their actual teaching practice has been a central focus of educational research in the past (Bullough, 1997; Clark and Peterson, 1986; Ethell, 1997; Kagan, 1992; Kane et al., 2002; Pajares, 1992; Richardson, 1996; Trumbull, 1990). Previous research has presented the complex relationship between teachers' beliefs and practices (Kynigos and Argyris, 2004). The literature has provided evidence that posits teacher beliefs being consistent and having a direct relationship with teacher practices, as well as, the complexities of beliefs and teaching practices that have little to no relationship (Bingimlas and Hanrahan, 2010). The study will expand on the influence of teacher beliefs on their practice of post-secondary agricultural educators.

The purpose of the research study is to identify the epistemological and pedagogical teaching beliefs of faculty in two colleges of agricultural sciences. The research study will allow for researchers to make further links between post-secondary agricultural sciences faculty espoused teaching theories and their actual teaching practice. The study was guided by the following objectives:

1. Identify the epistemological teaching beliefs of faculty in two colleges of agricultural sciences.
2. Identify the pedagogical teaching beliefs of faculty in two colleges of agricultural sciences.

Methods

The researchers employed a qualitative case study approach (Gube and Lincoln, 1989) and a constant comparative method was employed for data analyses (Strass and Corbin, 1990). Each university served as a case. The instructors selected to participate within each case were deemed to be excellent teachers according to their receipt of an award honoring their teaching. A purposive, extreme case sample (Gall et al., 2003) of seven university faculty at The Swedish University of Agricultural Sciences (SLU) and nine university faculty within the College of Agricultural Sciences at The Pennsylvania State University (PSU), served as the participants for the study. The participants represented ten different disciplines within Agricultural Sciences.

The Swedish University of Agricultural Sciences (SLU) and the College of Agricultural Sciences at The Pennsylvania State University (PSU) were selected for their dedication to scholarship in the area of agricultural sciences. The universities were also comparable in institutional mission, size and degree granting disciplines. The researcher conducted an exhaustive review of faculty members who teach undergraduate courses at each university and had been recognized through a teaching award for their teaching. Each university has an established teaching award that served

as the initial source for identifying teachers recognized for their teaching. Those individuals who had won the award at their respective university for their teaching at the university level were considered potential study participants. A list was then generated by the researcher of faculty who were award winning and nominated by their university's administration. A list of twenty-seven faculty members combined from both Universities was generated who met all of the inclusion criteria. Seven faculty members from The Swedish University of Agricultural Sciences (SLU) and nine faculty members from the College of Agricultural Sciences at The Pennsylvania State University (PSU) agreed to participate in this study.

The research design was developed in order to capture both what teachers say about their teaching and to observe their teaching practice directly (Kane et al. 2002) within two institutions that focus on post-secondary agricultural education. This qualitative case study used multiple data sources to enhance data credibility (Patton, 1990; Yin, 2003). The data from the multiple sources included both qualitative and quantitative data.

Data was collected using in-depth, structured interviews. The use of in-depth interviews provided an opportunity for formal, structured interactions with the participants and informal conversation as well (Rossman and Rallis, 2003). A structured standardized open-ended interview method was utilized. A modified version of the Teacher Beliefs Interview (TBI) was used to capture the beliefs of agricultural sciences professors because of its special focus on epistemological beliefs (Luft and Roehrig, 2007).

The TBI was found to be both valid and reliable for secondary teachers and has been used and validated with college-level instructors (Addy and Blanchard, 2010).

Data analysis began with the interviews being transcribed verbatim. To analyze the transcribed interviews, content analysis was used. Content analysis is a technique that enables researchers to study human behavior in an indirect way, through an analysis of their communications (Fraenkel and Wallen, 2009). A conventional qualitative content analysis approach was used while utilizing a constant comparative strategy between the philosophy statements. Themes emerged both from the data (an inductive approach) and from the investigator's prior theoretical understanding of the phenomenon under study (an a priori approach). Researchers identified the presence of words and concepts that represent their epistemological and pedagogical beliefs within the transcribed interviews. After the coding was completed, the researchers compared similarly coded data to identify each possible dimension of a theme and the relation of a theme to other categories and themes (Corbin and Strauss, 2008). Coding identified different aspects of the same phenomenon and provided elaboration and variation. By using the constant comparative approach, the researchers were able to saturate the categories, searching for instances that represent the category until

the data does not provide additional insight to the category (Creswell, 2007).

Results and Discussion

Beliefs about the nature of knowledge, "epistemological beliefs," are important to understanding teachers' educational strategies. Prior research has documented teachers' beliefs influence teachers' practice and learning (Abdelraheem, 2004; Richardson, 1996). In the study, award winning teachers' epistemic beliefs (beliefs about knowledge and learning; Schommer, 1990) and their pedagogical beliefs were investigated (beliefs about teaching; Teo et al., 2008).

The findings regarding the epistemological and pedagogical beliefs are reported in the form of themes supported by quotes from the interview transcripts followed by text containing verbatim quotes.

Theme 1: The SLU faculty held a range of epistemic attitudes that were contextualistic in orientation.

The seven faculty members were likely to hold a range of epistemic beliefs. Teachers' epistemological beliefs influence the ways that they make important instructional decisions related to the curriculum, pedagogy and assessment (Schraw and Olafson, 2002). Schraw and Olafson (2002) describe three kinds of epistemological world views; realist, contextualist and relativist. A realist assumes that knowledge is acquired through experts and learning is a passive act. Contextualists see themselves as facilitators, who along with the learners collaboratively construct shared understanding. While the relativists view learners as independently and uniquely creating their own knowledge.

Professor Cathy: *"I'm a service marketing kind of person and I think the value created is created between us, between students, and between students and me, so if either of us are not interested, then there will be no value, so to me the student is a value creator as well, and a contributor in the case of case studies, sometimes the students may have more legal background, for example, than I do, and that sometimes interesting things in marketing will have a close connection to what's legal*

and what's not, and then I'll just have to stand back and say, tell us about it, could you share some of your wisdom. In that case the student will be the one with the greater wisdom sharing. My role is made of that of an orchestra setting the kind of and then remembering to bring in all the instruments so that everyone is participating as much as possible."

Professor Matt: *"The role of the students should be an active one, of course. The student is constructing, I like the concept of constructivism, and has to be expose to some extent of confusion and the process of assimilation and acclimation events that take place that must make people realize that they don't know everything."*

Professor Don: *"We're equally important and maybe the students are more important, but there is a responsibility on me as a teacher as in some way a more experiences person to give this frame to try to explain why is this important, why do you need to learn this and that is more to motivate them to really start doing the hard job themselves, because they have to do it themselves, and so the motivator is my role more I would say."*

Realists believe that there is a fixed, core body of knowledge that is best acquired through experts via transmission and reconstruction. Realists teach actively to students who are viewed as passive recipients of a pre-established knowledge base. Contextualists posit that students must construct their own knowledge and that the teacher serves as a facilitator for collaborative, shared construction of knowledge. Teaching faculty with advanced education and teaching experience, more sophisticated epistemological beliefs should naturally have teaching practices that support and promote sophisticated epistemological beliefs. In summary, the seven participants of this study appeared to embrace both the realist and the contextualist epistemic beliefs.

Theme 2: The SLU faculty held a range of pedagogical beliefs that learner-centered in orientation.

Ertmer (2005), investigated teacher beliefs about teaching and learning, called these beliefs pedagogical. Teachers' pedagogical beliefs play a central role in their teaching practices, including choosing the subjects and activities, decision-making and evaluation in

Table 1. Summary of Epistemological and Pedagogical Themes of SLU Faculty	
Themes	Descriptions
The SLU faculty held a range of epistemic attitudes that were realist and contextualistic in orientation.	Realists see themselves as the expert, actively disseminating knowledge. Realist teacher d believe that there is an objective body of knowledge that must be acquired, this position would hold that curriculum is fixed and permanent and focuses on fact-based subject matter Contexualists see themselves as facilitators, who along with the learners collaboratively construct shared understanding. Teachers who are Contextualists view knowledge as temporary, specific to a given situation, and constructed collaboratively. The knowledge can be evaluated by criteria which depend on the context of the situation (Schraw & Olafson, 2002).
The SLU faculty held a range of pedagogical beliefs that were learner-centered in orientation.	Learner-centered belief emphasizes student responsibility for learning and is focused on knowledge construction and how students are induced to work and learn together.
The SLU Faculty equally engages in reflection-in-action and retrospective reflection-on-action on their teaching practices.	Reflection-in-action, which occurs continuous and synchronous with teaching, and reflection-on-action, which occurs asynchronously at some point after class, and disconnected from teaching actions.
The SLU Faculty feel confident in their teaching abilities.	Individual faculty members belief about their ability to perform specific teaching skills in the classroom which affect their practice through the selection of teaching methods, their motivation to follow through with those methods, their persistence when they encountered difficulties in the classroom environment, and their ability to recover after perceived failure
Table 1 provides a summary of the epistemological and pedagogical themes of the award winning faculty at the Swedish University of Agricultural Sciences.	

the classrooms (Ertmer, 2005). A commonly used distinction in studies is associated with two prototypical ideologies: teacher-centered or teaching-oriented belief and learner-centered or learning-oriented belief (Meirink et al., 2009; Schuh, 2004). The teacher-centered belief is based on an assumption of knowledge delivery that resembles traditional teaching methods and underscores the importance of knowledge reproduction; while the learner-centered belief emphasizes student responsibility for learning and is focused on knowledge construction and how students are induced to work and learn together. In terms of acquiring knowledge, teacher beliefs about teaching and learning can be broadly classified in the knowledge transmission category or knowledge construction category (Chan and Elliott, 2004; Samuelowicz and Bain, 2001). Thus, teacher beliefs typically encompass teacher-centered and leaner-centered pedagogical beliefs (Chai et al., 2009).

Professor Ellie: *"I look a lot on learning from the learners perspective and that you need to, I'm so convinced, both from my own children, my own experience and from all the students I've seen throughout the years, that this view that you have to start where you are, you have to find out where am I, and that is something like in problem-based learning, part of the process is to find out what do I know and what do I not know, where do I stand, and if there is more group discussing some of them might know more, some of them might know less, but they have to identify where am I in this understanding so where do I start when I need to fill up on this, where I need to learn more."*

Professor Don: *"I can present, but then we must work, the students must work and practice with something and that could be in group discussions as I said, it could be some sort of exercise, but it almost always after say twenty minutes, maybe an hour, it ends up with the students getting a task and working with and that could be in various ways - lectures and various forms of student activating lecture forums, exercises."*

The statements in the findings illustrate SLU faculty's beliefs that the teacher does not function as the primary source of knowledge in the classroom. Instead, the professor wishes to be viewed as a facilitator who assists students who are seen as the primary designers of their learning.

Theme 3: The SLU Faculty equally engage in reflection-in-action and retrospective reflection-on-action on their teaching practices.

There are different traditions in reflective practice that influence how one conceptualizes the role or emphasis of reflection in the life of the teacher (Zeichner, 1994). Schön (1987) highlighted the value of reflection in helping professionals learn about and improve their teaching practices. Reflection can occur at different points in relation to instruction. It can occur prior to, concurrent with and retrospective to instruction. Schön (1987) identified two categories of reflection, reflection-in-action, which occurs continuous and synchronous

with teaching and reflection-on-action, which occurs asynchronously at some point after class and disconnected from teaching actions. The process of reflection promotes the interplay between general and personal pedagogical knowledge such that perceptions formed by personal beliefs and experiences are broadened and made more objective while conceptions and principles of pedagogy explicated by research are exemplified and contextualized (Shulman, 1987; Gess-Newsome and Lederman, 1999). The result of the reflection process is the context-specific pedagogical knowledge that helps guide teachers' decisions and actions (Gess-Newsome and Lederman, 1999).

Professor Philip: *"I always do, because very often even when you see the students' answers on the written exams or you can also see yourself that it's not, you look at the eyes of them and they look like they don't understand anything, and I often ask myself is this effective to just stand there and have our lectures, is that okay? I have reduced my lectures and let the students work more with questions, and then we reflect on the answers and go back, but I think it's very important that we tried to understand and tried to discuss and explain the subject in that way get them high level knowledge. I don't think it's effective just standing there talking to them, I don't think that. So I have reduced them, actually, but it's time I ask the question is this effective actually? This is the way you should teach children, and I'm not sure. I always question myself."*

Professor Ava: *"Well, we have a system I guess you have already heard about it at our university where we do evaluations in a very straight way, written and oral evaluations, so that's what I've been doing at the university. We do the same naturally when we do courses for industry assistance, where we have written evaluations, and I use those evaluations very actively every year when I'm going to plan the next year's teaching activities."*

Professor Don: *"One thing is, of course, the course evaluations. If my parts of the course or whatever is judged as good, then of course that's good, and if it's next year a little bit better and it could also be that the students who fill in the form say that okay, this is good, but that we didn't understand, okay, then until next year I may change that task a little bit or may exclude it or I may have it the same but give more information around it and see and try to improve single parts of it, so that's one thing. One thing is of course the meeting in the classroom and seeing spontaneously how the students react, and I see it quite quick, I think, and I see if students sitting like this, I know they're not listening now, but if I can have them listen and really they look almost like they want to eat, then I know this is good, this is good, so afterwards looking in the forms, continuously checking the students."*

Reflection is the vehicle for turning experience into learning (Boud et al., 1985; Sternberg and Horvarth, 1995). The findings present examples of the SLU faculty turning experience into knowledge through the use of reflection to improve and build on their teaching.

Theme 4: The SLU Faculty feel confident in their teaching abilities.

Faculty in higher education play an important role in preparing students for the demands of solving society's complex issues. Faculty beliefs about their teaching capabilities affect their classroom teaching behaviors (Morrell and Carroll, 2003; Yeung and Watkins, 2000). Individual faculty members' beliefs about their capability to perform specific teaching skills in the classroom affect their practice through the selection of teaching methods, their motivation to follow through with those methods, their persistence when they encountered difficulties in the classroom environment and their ability to recover after perceived failure (Bandura, 1997; Dellinger, 2001; Tschannen-Moran et al., 1998).

Professor Matt: *"Yes, I have to believe in my abilities, yes. Generally, I do. So that means if I see that they are frustrated because they don't understand, I believe both in their ability to learn and in my ability to sort of guide them through the learning, so I like that challenge actually, when they say they don't understand anything. So I think I am confident in my teaching ability, but I'm not confident in the way I teach, or we discussed a lot on how I choose methods. I'm never convinced that I have reached the final and best way of teaching."*

Professor Roger: *"I definitely feel confident in one sense absolutely. I don't go to the starting course and think, I can't do this, and I'm not a good teacher. So I certainly feel confident that I can teach well, but I don't just take it for granted."*

Professor Philip: *"Actually, I do. I feel since I used to say to my colleagues that when I had a course, I mostly felt it was a catastrophe, I think, and [now] each time I have it, the students are very satisfied and give me very good assessment. And when I talk to students and when I have my lecture, I actually feel very confident."*

Professor Cathy: *"For the most part, for the most part, yes. When I don't, it's usually when I have been stressed out by too many things that I have to do."*

Research into teacher beliefs about the nature of knowledge is important because of the pervasive influence that those beliefs have over attitude, motivation, and behavior. A great deal of empirical evidence has established the significance of beliefs for understanding teacher behavior (Clark and Peterson, 1986; Kane et al., 2002; Pajares, 1992). The findings regarding the epistemological and pedagogical beliefs of the PSU faculty are reported in the form of themes supported by quotes from the interview transcripts. Table 2 provides a summary of the epistemological and pedagogical themes of the PSU faculty followed by text containing verbatim quotes.

Theme 1: The PSU faculty held a range of epistemic attitudes that were both contextualistic and relativistic in orientation.

As previously mentioned, the researchers referred to Schraw and Olafson's (2002) teacher epistemological worldviews classification to categorize the PSU faculty beliefs. Schraw and Olafson's (2002) realitivist category describes knowledge as fixed, universal unchanging; known to the teachers as authority; and transmitted by them to the students. Teachers who hold relativists beliefs see knowledge as self-constructed and highly individualistic, with no opinion considered more valuable than another (Schraw and Olafson, 2002). Teachers who are contextualists view knowledge as temporary, specific to a given situation and constructed collaboratively. Contextualists posit that students must construct their own knowledge and that the teacher serves as a facilitator for this collaborative, shared construction of knowledge.

Professor Gabe: *"I would say that I don't know anything myself. In my graduate contemporary theory class, we read a lot of critiques of positivism and various post-structuralism, relativism, et cetera, et cetera – various kinds of social construction of reality and so forth. In any given day, I could go either way…I don't think we discover knowledge, I think knowledge is things that we construct collectively and not out of thin air, of course…I'm a pragmatist, John Dewey had it right, too, which he said it may be slightly less straightforward than Marx, but that we construct these things collectively and in his book, The Public and It's Problems, where a problem doesn't really exist until two people start talking about it as a problem, and I'd say it's the same about knowledge. Knowledge emerges when two people start talking about it and then maybe a third joins in and so*

Table 2. Summary of Epistemological and Pedagogical Themes of PSU Faculty	
Themes	Descriptions
The PSU faculty held a range of epistemic attitudes that were both contextualistic and relativistic in orientation.	Contextualists posit that students must construct their own knowledge and that the teacher serves as a facilitator for this collaborative, shared construction of knowledge. Relativists also indicate that students need to construct their own knowledge and teachers should build an environment where students construct their knowledge and learn to think independently.
The PSU faculty held a range of pedagogical beliefs that were learner-centered in orientation.	Student-centered teachers have been found to use a wider repertoire of teaching methods, than teachers who adopt a teacher-centered approach to teaching. In student-centered teaching, transmission may be a component, but not an aim, as the focus is more on the students and their learning, rather than on teacher and his or her teaching. Teaching is interactive in a way that observes students' existing conceptions. Teaching is about facilitating students' learning:
The PSU Faculty equally engages in reflection-in-action and retrospective reflection-on-action on their teaching practices.	Reflection-in-action, which occurs continuous and synchronous with teaching, and reflection-on-action, which occurs asynchronously at some point after class, and disconnected from teaching actions.
The PSU Faculty feel confident in their teaching abilities.	Individual faculty members belief about their ability to perform specific teaching skills in the classroom which affect their practice through the selection of teaching methods, their motivation to follow through with those methods, their persistence when they encountered difficulties in the classroom environment, and their ability to recover after perceived failure
Table 2 provides a summary of the epistemological and pedagogical themes of award winning College of Agriculture Faculty at The Pennsylvania State University.	

forth and you begin to establish something that maybe you could point to, that's not a bad idea, and you have knowledge."

Professor Kaleb: *"I guess I have two thoughts of that. On my own as a student I was perfectly happy in lectures and I was motivated to learn so that environment was fine for me and I also was really shy, so it would be kind of hypocritical for me to say that the way I'm doing it now is the right way, because the way I'm teaching now is really different from how I learned. I think there's kind of an array of epistemological beliefs that are effective. Anyway, let me talk about how I teach rather than how I learned, because how I teach is that I think that students are going to be engaging with each other and in this field where I teach environmental science in teams and complex problems where there are no right answers, and so I think that lecture solely is not effective for teaching that kind of thinking because it implies that the material that I'm projecting is kind of the way the world is, and I think in reality it's these problems that they're going to be facing are really messy. So my belief is that having the students do some co-learning where they are bringing forward ideas that confront my ideas and each other's ideas it's much more like the real world, and so I try and create environments where the students are doing that and honestly some of them don't like it, they think it vague and lame, but I think it reflects on the way environmental science happens."*

The PSU faculty espoused epistemological beliefs that contributed to both a contextualist and relativist standpoint.

Theme 2: The PSU faculty held a range of pedagogical beliefs that were learner-centered in orientation.

Pedagogical beliefs refer to preferred ways of teaching by teachers. These range from teaching as presenting or imparting structured knowledge, to teaching as facilitating understanding and bringing about conceptual change and intellectual development. Teachers who conceive teaching as transmitting knowledge are more likely to adopt a teacher-centered approach to teaching, while those who regard teaching as facilitative, tend to use student-centered approaches. In teacher-centered teaching, transmitted knowledge is gained or constructed by the teacher. Students are considered more or less as passive recipients of that information, and the existing knowledge students have is not taken into account. Learning outcomes are expressed in quantitative rather than qualitative terms without concern of the students' understanding of knowledge. In student-centered teaching, transmission may be a component, but not an aim, as the focus is more on the students and their learning rather than on teacher and his or her teaching. In student-centered instruction, the teacher believes teaching is about facilitating students' learning. Students are encouraged to construct their own knowledge and understanding and to strive towards becoming an independent learner. A student-centered teacher tries to rec-

ognize students' differing needs and take these as the starting point when planning the course (Biggs, 1996; Kember and Kwan, 2002; Prosser and Trigwell, 1999; Prosser et al., 1994; Samuelowicz and Bain, 2001; Vermunt and Verloop, 1999).

Professor Kaleb: *"It's a mix, so that's why I don't like the word primary because my most common approach is to mix very small short lectures that are 20 to 30 minutes long followed by class discussions, or if not discussions, in-class work, active learning in class, so I guess that's my primary approach is to do those two things."*

Professor Jacob: *"I guess I would have to go back to King (1993) that says, guide on the side. I do want to be a facilitator, I don't want to be the dispenser of knowledge, and I think again, that's probably why I rely so much on class discussion, because while I can kind of come up with a topic area and the content areas that are important to program planning and Ag education, let's say, or to becoming an effective teacher in the Ag mechanics laboratory, a lot of times it's better for us to get the content out there and discuss it so I do really see myself as a facilitator of the content rather than just a lecturer of the content."*

The statements in the findings illustrate PSU faculty's beliefs that the teacher does not function only as the primary source of knowledge in the classroom. Instead, the professor wishes to be viewed as a facilitator who assists students who are seen as the primary designers of their learning.

Theme 3: The PSU Faculty equally engage in reflection-in-action and retrospective reflection-on-action on their teaching practices.

Through the process of reflecting both "in practice" and "on practice," practitioners continually reshape their approaches and develop mastery in their practice. Activities such as debriefing with peers or learners, seeking feedback from learners on a regular basis, and keeping a journal can provide vehicles for reflective practice. The following statements support the PSU faculty engaging in both reflection-in-action and reflection-on-action.

Professor Bob: *"I do try to look at the end of the semester, even during the semester, the things that I'm doing and what I'm doing in class and try to think about, okay, how can I do it better? I certainly read through the SRTE's as positive and negative as that can be at times. I try to think, okay, what are the common themes, how can I make those things better, and how can I improve? I try to look at what others are doing, watch other teachers, again, going to things like NACTA, it was fantastic, I wish I could go again this year. That was a terrific opportunity and for me, I am not again as many people here, my main training is not as a teacher so when you get the opportunity to see what it's like to learn and some other techniques, most of the time I'm thinking about nutrition or what new lab technique I can use, and I'm spending all of my creative energy trying to learn those things. I've come to, oh, wow this is really cool, I can do some new things here, I can do things differently."*

Professor Hannah: *"I do it pretty regularly because I often think when I'm done teaching a class, oh, I should have done this, or next time I'll have to do this to maybe make it clearer. I look at my SRTE's each year, and I always use them when I'm revising and reorganizing my class the next year I teach it. I basically every year, I change things in my classes – try to make the issues more current, improved based on what I realized I could have done to enhance understanding, based on student feedback, and also based on the kinds of workshops or insights I get from reading materials or going to workshops."*

Professor Mark: *"When I am done with every class, I have notes, I also hand out to my students, I have an example here, a sheet at the beginning of the year on bright colored paper that says complaints, gripes, compliments, and whatever, and dates, comment. I ask them to write the date down, and it's on bright colored paper because I want it in their notebook. I use the SRTE's along with all my notes where I've written 'this didn't work', a big 'X' through it – don't do this again – and then every year I rebuild my notes and rebuild my course—minor, it's not major usually, but trying to incorporate in the feedback I get from the students and myself as I go through…You know when you walk out of a class whether that one hit on all cylinders or it was a flop."*

Theme 4: The PSU Faculty feel confident in their teaching abilities.

Bandura (1993) presented the construct of self-efficacy as the beliefs one has about his or her ability to perform the actions required to achieve specific outcomes. Teacher-efficacy refers to *"the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context"* (Tschannen-Moran et al., 1998, p. 233). Pajares (1992) contended that "beliefs are the best indicators of the decisions individuals make throughout their lives" (p. 307). Thus, it follows that teachers' beliefs about their teaching abilities may be an indicator of their future behavior, decisions, and classroom organization. In the teaching context, teacher-efficacy is expected to influence the goals teachers identify for the learning context as well as to guide the amounts of effort and persistence given to the task (Bandura, 1997; Tschannen-Moran et al., 1998). The following statements provide a rich description of the PSU faculty members' confidence in teaching.

Professor David: *"I do. I also don't think I'm the best at it. There's lots of room for improvement. I've gotten better over the years, I think, but I don't think I'm at the top of the hill yet and hopefully never will think I'm at the top of the hill because I think that would be a bad thing. I'm confident I guess in looking at my students' success. Again that's the measure to me is not whether they get an A or got a B, it's what can they really do, how do they perform when they're out on an internship, how do they perform when they graduate and go out, how do they perform when they're members of a community, and all those things are what's important, and I've got students who have left here with a 2.1 average, and I just knew they were going to be successful, and it didn't matter that they had a 2.1. I've had others that have gone out of here with a 3.9 and it was like, what in the world is this person going to ever do? Hopefully they find themselves. Am I confident? I would say I am, but I try not to be over confident about it, try not to be satisfied with it."*

Professor Cory: *"I know that I'm not perfect. Yes, I feel confident in my teaching abilities, but I also understand that there's lots of room for improvement, especially teaching with Dale! [Laughter] You see somebody who does it really well and you realize…"*

Professor Gabe: *"More confident than I did when I was first starting out…I'm confident in the fact that students tend to enjoy and learn from good, critical conversations, and I think I'm confident in my ability to do that – to lead those kinds of conversations. I can choose a good article or book that I think will stimulate conversation in the classroom, and then we can have a good conversation, so I think I'm confident in that…So I'm somewhat confident."*

Summary

The findings present the conclusion that epistemological and pedagogical beliers of award winning faculty members, do not fall neatly into one category. The participants endorsed more than one epistemological belief. The SLU participants supported two epistemological beliefs indicated agreement with both the contextualist and realist beliefs. While the PSU participants supported two categories of beliefs as well, however, they endorsed the contextualist and relativist beliefs. The findings indicate that the faculty at both institutions has diverse beliefs that guide their practices. Presently, it is not clear whether this is because the award winning faculty deliberately chose to blend beliefs from different epistemological views in order to mix and match specific assumptions of these beliefs, or because they are somewhat naïve and have not closely scrutinized their own beliefs to examine whether they are conceptually consistent. Participants from both institutions held pedagogical beliefs that endorsed student-centered instruction; however, it is not clear whether this espoused belief guides their actual practice.

The present study provides an exploration of award winning faculty in colleges of agriculture teacher beliefs. Understanding the beliefs of teachers is critical to develop programs that have a lasting impact on new and experienced faculty. As we begin to understand how the beliefs of agricultural education faculty form, we will be able to develop professional development programs that are conducive to the optimal development of faculty members. Further research is needed that explores the relationship between espoused teaching beliefs of colleges of agriculture faculty and their actual practice.

More dynamic assessment of epistemological and pedagogical beliefs is also recommended in colleges of agriculture around the world to identify the interactive relationships between the development of epistemological and pedagogical beliefs of teachers and students, cultures and learning environments. Further research will also lead to identifying the philosophy of a culture and values embedded in a culture that impact the development and strengthening of teacher and student beliefs. More empirical studies are needed for researchers to build better understanding about which belief is affecting which action, and subsequently how to address or change teachers' beliefs (Ertmer, 2005).

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