TEACHING BELIEFS AND INSTRUCTIONAL PRACTICES OF AWARD-WINNING FACULTY AT TWO AGRICULTURAL UNIVERSITIES

A Dissertation in
Agricultural and Extension Education

by

Laura Lea Rice

© 2015 Laura Lea Rice

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

August 2015
The dissertation of Laura Lea Rice was reviewed and approved* by the following:

Daniel D. Foster  
Assistant Professor, Agricultural and Extension Education  
Dissertation Advisor  
Co-Chair of Committee

Edgar P. Yoder  
Professor, Agricultural and Extension Education  
Co-Chair of Committee

John C. Ewing  
Associate Professor, Agricultural and Extension Education

Kathy L. Jackson  
Senior Research Associate, Schreyer Institute for Teaching Excellence

Connie D. Baggett  
Associate Professor, Agricultural and Extension Education  
Head of Graduate Program

*Signatures are on file in the Graduate School
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 was to investigate links between post-secondary agricultural sciences faculty espoused teaching theories and their teaching practice. The research study allowed for researchers to better understand how university academics learn to teach to improve post-secondary agriculture education. The research study compared two leading agricultural science post-secondary institutions on the approaches to teaching of identified excellent teachers. 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 analysis for rich description expressing the faculty member’s beliefs they hold about their teaching. Findings revealed lecture as the dominant teaching method currently in use by faculty at one university, and lecture with integrated active learning techniques was the dominant teaching method at the other university. Data revealed current teaching strategies were influenced by prior educational experiences; however, there was very little exposure to instruction in teaching methods. Although faculty at both institutions had received very little training in teaching, all felt confident in their ability to teach. Findings revealed the teaching beliefs and philosophies of interviewed faculty were well established; however, faculty at one university were aware the practices used in the classroom did not necessarily align. The teaching practices of the other faculty aligned with their teaching beliefs and stated philosophies. Faculty interviewed agreed class size, time, and
budgetary constraints affect the teaching method employed as different constraints that limit employing some of their philosophical beliefs in the classroom. More empirical studies are needed for researchers to build better understanding about which belief affects which action, and subsequently how to address or change teachers’ beliefs. Future research should refer to student ratings of teaching effectiveness to compare longitudinally.
# TABLE OF CONTENTS

List of Figures ............................................................................................................. viii
List of Tables ........................................................................................................... ix
Acknowledgements .................................................................................................. x

Chapter 1 Introduction ................................................................................................. 1
  Purpose and Objectives ......................................................................................... 11
  Summary ............................................................................................................. 12

Chapter 2 Review of Literature ...................................................................................... 13
  Purpose and Objectives ......................................................................................... 13
  Purpose of Higher Education ............................................................................. 14
  Stakeholder Perceptions of Higher Education ..................................................... 17
  Scholarship of Teaching and Learning ................................................................. 20
  Scholarship of Teaching ....................................................................................... 22
  Teachers’ Pedagogical Knowledge ..................................................................... 24
    Content Knowledge ............................................................................................ 24
    Pedagogical Knowledge ..................................................................................... 25
    Pedagogical Content Knowledge .................................................................... 29
  Epistemology ....................................................................................................... 30
  Discipline Specific Pedagogies ............................................................................ 31
  Colleges of Agriculture ....................................................................................... 32
  Swedish University of Agricultural Sciences Development ............................ 35
  Effective Teaching in Post-Secondary Education in Agriculture Education ....... 37
  Theoretical Foundation ....................................................................................... 39
  Conceptual Framework ....................................................................................... 41

Chapter 3 Methods .................................................................................................... 44
  Purpose and Objectives ....................................................................................... 44
  Participant Selection ............................................................................................ 46
    Faculty ............................................................................................................. 46
    Students .......................................................................................................... 49
  Qualitative Approach ........................................................................................... 49
    Faculty Interviews ............................................................................................. 49
    Faculty Teaching Video Recording .................................................................. 50
  Qualitative Analysis ............................................................................................. 52
    Content Analysis of Transcribed Interviews ..................................................... 52
  Ethical concerns and IRB compliance .................................................................. 54
  Video Recording Analysis ..................................................................................... 54
  Reliability and Validity ......................................................................................... 56
  Faculty Survey Instrument ................................................................................... 59
  Quantitative Approaches ..................................................................................... 60
    Student Survey Instrument .............................................................................. 60
Quantitative Analysis .................................................................61
Quantitative and Qualitative Data Synthesis .................................61
Participant Description ..............................................................63
  SLU Faculty .......................................................................63
  PSU Faculty .....................................................................66
Summary .................................................................................72

Chapter 4 Results and Findings ......................................................73

Study Overview ..........................................................................73
Swedish University of Agricultural Sciences Results ........................74
  Epistemological and Pedagogical Teaching Beliefs (Objective One and Two) 74
  Teacher Beliefs and Instructional Practice (Objective Four) ..............88
Student Perceptions of SLU Teacher Effectiveness (Objective Six) ..........94
Relationship between identified teaching beliefs, operationalized definitions, and student perceptions of SLU faculty performance (Objective Seven) 95
Penn State University Results .......................................................99
  Epistemological and Pedagogical Teaching Beliefs (Objective One and Two) 99
  Faculty members’ operationalization of their instructional pedagogy (Objective Three) .................................................................122
  Teacher Beliefs and Instructional Practice (Objective Four) ..............134
  Faculty Members’ Perceptions of Discipline Specific Pedagogy (Objective Five) .................................................................140
Student Perceptions of Teacher Effectiveness of PSU Faculty (Objective Six) 143
Relationship between identified teaching beliefs, operationalized definitions, and student perceptions of PSU faculty performance (Objective Seven) ....145

Chapter 5 Discussion ...................................................................157

Purpose and Objectives ..............................................................157
Objective One - Epistemological Teaching Beliefs ...........................158
  Conclusions for epistemological teaching beliefs .............................159
  Implications .......................................................................160
  Recommendations ................................................................160
Objective Two - Pedagogical Teaching Beliefs .................................161
  Conclusion for pedagogical teaching beliefs ..................................162
  Implications .......................................................................162
  Recommendations ................................................................163
Objective Three - Operationalization of instructional pedagogy ...........164
  Conclusion for Operationalization of Instructional pedagogy ............165
  Implications .......................................................................165
  Recommendations ................................................................166
Objective Four - Differentiation between teachers’ beliefs and instructional practice ....166
  Conclusion for differentiation between teachers’ beliefs and instructional practice .................................................................166
  Implications .......................................................................166
  Recommendations ................................................................168
Objective Five - Discipline Specific Pedagogies ...............................168
  Conclusion for Discipline Specific Pedagogies ...............................169
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implications</td>
<td>169</td>
</tr>
<tr>
<td>Recommendations</td>
<td>169</td>
</tr>
<tr>
<td>Objective Six - Students’ Perceptions of Teacher Effectiveness</td>
<td>170</td>
</tr>
<tr>
<td>Conclusion for students’ perceptions of teacher effectiveness</td>
<td>171</td>
</tr>
<tr>
<td>Implications</td>
<td>171</td>
</tr>
<tr>
<td>Recommendations</td>
<td>171</td>
</tr>
<tr>
<td>Objective Seven - Relationship between identified teaching beliefs</td>
<td>172</td>
</tr>
<tr>
<td>operationalized definitions, and student perceptions of faculty</td>
<td>172</td>
</tr>
<tr>
<td>performance</td>
<td>172</td>
</tr>
<tr>
<td>Conclusion</td>
<td>173</td>
</tr>
<tr>
<td>Implications</td>
<td>173</td>
</tr>
<tr>
<td>Recommendations</td>
<td>173</td>
</tr>
<tr>
<td>Reflections of the Researcher</td>
<td>173</td>
</tr>
<tr>
<td>Summary</td>
<td>175</td>
</tr>
<tr>
<td>References</td>
<td>178</td>
</tr>
<tr>
<td>Appendix A: <em>Request for Research Study Participation (SLU)</em></td>
<td>211</td>
</tr>
<tr>
<td>Appendix B: <em>Faculty Informed Consent Form</em></td>
<td>212</td>
</tr>
<tr>
<td>Appendix C: <em>Interview Guide</em></td>
<td>214</td>
</tr>
<tr>
<td>Appendix D: <em>Student Survey</em></td>
<td>216</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1. Examples of Indicators of the Scholarship of Teaching ........................................ 28
Figure 2. Categories Contributing to Pedagogical Content Knowledge ............................... 26
Figure 3. Facets of Pedagogical Knowledge ...........................................................................28
Figure 4. Conceptual Framework ............................................................................................43
Figure 5. Strategies to Increase Validity in Qualitative Research ..........................................57
LIST OF TABLES

Table 1. Summary of Epistemological and Pedagogical Themes of SLU Faculty .................75
Table 2. Faculty Beliefs and Instructional Practice Comparison of SLU Faculty .................90
Table 3. SLU Faculty Demographic Information ..................................................................93
Table 4. Mean Scores of Student Perceptions of Teacher Effectiveness of SLU Faculty ......94
Table 5. SLU Student Survey Mean Scores and Standard Deviations ...............................98
Table 6. Summary of Epistemological and Pedagogical Themes of PSU Faculty .............100
Table 7. Synthesis of Operationalized Instructional Pedagogies of PSU Faculty ..............123
Table 8. Emerged Themes from Operationalization of Instructional Pedagogies by PSU Faculty .............................................................................................................123
Table 9. Faculty Beliefs and Instructional Practice Comparison of PSU faculty ..............136
Table 10. PSU Faculty Demographic Information (n=9) ..................................................139
Table 11. Perceived Discipline Specific Pedagogies by PSU Faculty ...............................141
Table 12. Mean Scores of Student Perceptions of Teacher Effectiveness of PSU Faculty .....144
Table 13. PSU Student Survey Mean Scores and Standard Deviations ...........................146
ACKNOWLEDGEMENTS

First and foremost, I would not have been able to do any of this without the strength of Jesus Christ. I give all glory to Jesus.

I have been so blessed to have had such an incredible experience completing a doctoral program. This journey would not have been made possible without my advisor Dr. Daniel Foster. It has been with determined persistence in which Dr. Foster has pushed my intellectual, personal, and professional growth. He has been an incredible mentor and friend to me throughout my graduate school years. His encouragement and faith in me has never wavered over the years and to him I am indebted. I will forever be grateful for our time together.

I would like to extend sincere gratitude to the individuals who served on my dissertation committee. Thank you, Dr. John Ewing, Dr. Ed Yoder, and Dr. Kathy Jackson. You each have been incredible role models, showing me the true meaning of patience and support. I thank each of you for your time, encouraging words, shared wisdom, insight, and thoughtful criticism in the design and revision of my dissertation research.

I would like to especially thank my family. To my parents, Frank and Dawn, thank you for your unconditional support and love since I began this journey. The completion of this degree is a reflection of the fundamental teachings you have provided me with over the years: devotion, dedication, and diligence. To my sisters and their families, thank you for your constant encouragement and inspiration; your steady cheerleading made this journey possible. I am forever thankful for all of your love and friendship.

Finally, I am forever grateful to my husband, Tyler, and my son; Ulysses. Thank you for joining me in this stressful, yet rewarding, process. Thank you for your steadfast belief in my abilities, selfless and numerous sacrifices, and ardent focus on what is most valuable in life. Tyler, you are a tremendous father to Ulysses and leader to our family. Thank you for being my best friend and loving every part of me. To Tyler and Ulysses this work is dedicated.
Chapter 1

Introduction

Recent research has raised doubts about the quality of undergraduate learning in the United States (Arum & Roksa, 2011). Arum and Roksa found that large numbers of students are making their way through college with minimal exposure to rigorous coursework, only a modest investment of effort and little or no meaningful improvement in skills like writing and reasoning. Worldwide, 31 percent of employers are struggling to fill available positions despite the economic downturn—not because there are not enough workers, but because of “a talent mismatch between workers’ qualifications and the specific skill sets and combinations of skills employers want” (Manpower, 2010). The arrival of the “knowledge economy” is generating unprecedented demands for greater quantity and quality of educational achievement, a proliferation of suppliers, and urgent calls for more efficient and effective instruction and quality assurance.

Historically the United States has been recognized for their superiority in the fields of science, technology, engineering, and mathematics (STEM) (Engage to Excel, 2012). According to economic analyses, if the United States is to maintain its historic superiority in the fields of science, technology, engineering, and mathematics (STEM)—and gain the social, economic, and national security benefits that come with such superiority—it must produce approximately one million more STEM professionals over the next decade than are projected to graduate at current rates (Engage to Excel, 2012). For the United States to meet this goal, the number of students who receive undergraduate STEM degrees will need to increase by about 34% annually over current rates (Engage to Excel, 2012). Well-documented trends have been reported nationally of
declining interest, poor preparedness, a lack of diverse representation, and low persistence of U.S.
students in STEM disciplines. Responding proactively to the needs for education in STEM and
STEM-influenced fields is imperative for institutions of higher education.

Since the earliest times of the United State, agriculture has played a central role in the
social and economic activity. Since that time, the United States has depended on agriculture not
only to feed its citizens, but also as a major driver of its economy. A vibrant U.S. agriculture
enterprise is paramount to the future well-being of the nation (National Research Council, 2009).
Although the United States is the undisputed world leader in agricultural production today
(USDA, 2015), continued innovation and investment are essential to maintaining a competitive
advantage in the future. 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). Graduates must be “prepared for discovery science, teaching and learning, science,
technology, engineering, and mathematics (STEM) integration, and application of innovation for
public, private, and academic settings” (Doerfert, 2011, p. 19). By 2018, 44 percent of jobs in
agriculture, food and natural resources will require some postsecondary education (U.S.
Department of Agriculture Economic Research Service, 2014). A recent report released by the
STEM Food and Ag Council (2014) identified a growing gap between the supply of new
graduates trained in agriculture-related STEM fields and the demand for young professionals in
related roles by global food and agriculture employers. The report recommended that the food
and agriculture industries work closely with education institutions on closing the employment gap
necessary to sustainably feed an expected global population of nine billion people by 2050
(STEM Food and Ag Council, 2014).

Quality post-secondary education becomes more and more critical to both national
competitiveness and the development of a robust agricultural economy; however, the quality of
undergraduate education has been challenged over the last decade (Arum & Roksa, 2011; Dill, 2005; Kuh, 1999). Instructional faculty at post-secondary levels are being held to a higher standard of accountability for student success and teaching excellence (“The Future of Learning and Teaching”, 2012). To meet the needs of the students, faculty are demanded to expand their teaching strategies beyond the traditional lecture model (Austin, 2002; Lingenfelter, 2012); no longer is subject matter expertise alone considered sufficient grounding for effective teaching (Kane, Sandretto, & Heath, 2002; Lingenfelter, 2012; Shulman, 2004). At the same time, institutional incentives such as tenure and promotion criteria that focus on research achievement negatively impact faculty motivation to devote the necessary time and energy into ramping up their pedagogical skills (Booth, 2004; Sabagh & Saroyan, 2014).

Teaching excellence is at the center of national and international higher education policy discourse. Much has changed in the higher education policy in recent years, which has drawn attention to defining notions of teaching excellence a key priority. Concepts of excellence, like concepts of quality, are subject to debate. How excellence is defined, operationalized, and measured in relation to teaching and learning still lacks a clear consensus. Marsh (2011) suggested that effective teaching is a hypothetical construct for which there is not a single indicator. Both, researchers and practitioners (Abrami & d’Apollonia, 1991; Cashin & Downey, 1992; Henderson, Beach & Finkelstein, 2011; Marsh & Roche, 1997; Maxwell, Vincent &Ball, 2011) agree that teaching is a complex activity with multiple interrelated components (e.g., clarity, interaction, organization, enthusiasm, feedback). Research demonstrates that effective instruction is centered on encouraging students to be self-directed, active learners, involving a high degree of interaction, and consistent and frequent feedback (Chickering & Gamson, 1987; Pascarella & Terenzini, 2005). Past and current research has revealed a list of attributes characteristic of good teaching that include: the critical role of teacher’s enthusiasm to motivate students to learn (Ballantyne et al. 1999; Kember & McNaught, 2007; Race, 2001; Ramsden,
commitment to pedagogical approaches that promote engagement and deep learning (Kember & McNaught 2007; Ramsden, 2003 [1992]); the use of experientially based activities to make learning meaningful and relevant (Kolb, 1984); and the importance of a soundly designed, logically connected curriculum (Light, et al., 2010).

Globally, institutions continue to tackle questions of excellence in university teaching. As identified by the Centre for Higher Education Research and Information (CHERI) report and reiterated in Little and Locke (2011, p. 120), the notions employed to promote excellent university teaching include: excellence as a ‘positive for students’; aspirational targets for quality enhancement; reputational advantage for ‘competing’ institutions in a given national or transnational context; and means of achieving governmental goals, particularly social inclusion and workforce impact.

Researchers have found that faculty are interested in implementing effective pedagogical approaches, but they often lack the training and support to do so successfully (Marbach-Ad, Schaefer Ziemer, Thompson, & Orgler, 2013). Research has indicated that faculty reliance on lecturing could stem from their previous experiences as students (Anderson & Helms, 2001), lack of formal training in teaching (Adamson et al., 2003), large class sizes, pressure to cover increasing amounts of material in a limited amount of time, insufficient preparation time, fear of negative student reactions to active-learning approaches, and lack of confidence to implement new instructional approaches (Henderson, Dancy, & Niewiadomska-Bugaj, 2012; Wieman, 2007).

Historically, student ratings have dominated as the primary measure of teaching effectiveness for the past 30 years (Seldin, 1999). Over the last decade the measure of teaching effectiveness has evolved to supplement teacher effectiveness ratings with other data sources of teaching performance. Such sources can serve to broaden and deepen the evidence base used to evaluate courses and assess the quality of teaching (Arreola, 2000; Knapper & Cranton, 2001).
Several comprehensive models of faculty evaluation have been proposed that include multiple sources of evidence with greater weight attached to student and peer input and less weight attached to self-evaluation, alumni, administrators, and others. According to Berk (2005), there are 12 potential sources of evidence of teaching effectiveness: (a) student ratings, (b) peer ratings, (c) self-evaluation, (d) videos, (e) student interviews, (f) alumni ratings, (g) employer ratings, (h) administrator ratings, (i) teaching scholarship, (j) teaching awards, (k) learning outcome measures, and (l) teaching portfolio.

There is a continual need for productive research on effective teaching. Effective teaching has benefits for all undergraduate students. 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 (National Academy of Sciences, 2009). The National Research Agenda for the American Association for Agricultural Education points out that “research is needed to achieve the goal of having all learners in all agricultural education learning environments actively and emotionally engaged in learning, resulting in high levels of achievement, life and career readiness, and professional success” (Doerfert, 2011, p. 9). University instructors must focus on the continuing need for “quality teaching and learning outcomes and life-long human capital development of our workforce” (Doerfert, 2011, p. 20).

Changes are needed in the undergraduate experience in agriculture education (Clark & Button, 2011; National Academy of Sciences, 2009). The National Academy of Sciences (2009) took action to address national concerns in agricultural education. The council stressed the importance of focusing energy on improving the undergraduate experience to produce flexible, well-prepared graduates that are appropriately skilled, socially responsive, and technically proficient for the agricultural industry. 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 development 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 & Peterson, 1986; Ethell, 1997; Kagan, 1992; Kane, Sandretto, & Heath, 2002; Pajares, 1992; Richardson, 1996; Trumbull, 1990). Kynigos and Argyris (2004) have purported the complex relationship between teachers’ beliefs and practices, and that the researcher must question common assumptions made about it. Literature supports teacher beliefs being consistent and having a direct relationship with teacher practices, as well as, literature that presents the complexities of beliefs and teaching practices that have little to no relationship (Bingimlas & Hanrahan, 2010). The study will expand on the influence of teacher beliefs on their practice of post-secondary agricultural educators and if a disconnect exists between the beliefs and conceptions of teachers and their actual classroom practices.

Teachers possess a variety of beliefs, and those beliefs influence how teachers teach (Brownlee, Purdie, & Boulten-Lewis, 2001; Khader, 2012; Pajares, 1992; Tickle, Brownlee, & Nailon, 2005). Researchers have established that there is a significant relationship between a
teacher’s epistemological beliefs and their tendency to adopt specific pedagogical practices (Chan, 2003; Luft & Roehrig, 2007; Maggioni & Parkinson, 2008; Pajares, 1992).

Some researchers have described inconsistencies between teachers’ beliefs and their classroom practices (Ertmer, Gopalakrishnan, & Ross, 2001; Fang, 1996; Kane et al., 2002). For example, Fang (1996) described a number of studies in which researchers found little relationship between teachers’ beliefs and their instructional reading practices, and suggested that contextual factors interfered with teachers’ ability to consistently apply their beliefs in practice. Ertmer et al. (2001) reported that teachers’ beliefs about classroom technology use did not always match their classroom practices. Ertmer et al. (2001) concluded, that despite the fact that most of the teachers described themselves as having constructivist philosophies, they implemented technology in ways that might best be described as representing a mixed approach, at times engaging their students in authentic, project-based work, but at other times asking them to complete tutorials, practice skills, and learn isolated facts. Teachers’ explanations for these inconsistencies were found to include references to contextual constraints; such as curricular requirements or social pressure exerted by parents, peers, or administrators (Ertmer et al., 2001).

There is a lack of recent empirical evidence depicting university instructors espousing their teaching beliefs and then actually practicing those beliefs, which presents challenges when trying to articulate the relationship between teacher beliefs, teachers’ classroom practices and pedagogies, and student outcomes in postsecondary agriculture education. There remains a need to further explore the phenomenon occurring in the college classroom; empirical evidence needs to be collected to reduce limitations in current studies centered on improving teaching in higher education, specifically agriculture education.

Pajares (1992), in her review of research into teachers’ beliefs, cautions that “little will have been accomplished if research into educational beliefs fails to provide insights into the relationship between beliefs . . . and teacher practices, teacher knowledge and student outcomes”
Kane et al. (2002) conclude on the basis of their review of the relevant literature, there is insufficient empirical support for the claim that there is a relationship between teaching academics’ espoused beliefs about teaching and their specific teaching practices. Recent studies continue to present the relationship between beliefs of teachers and how these beliefs impact decision making in the classroom (Bisogno, 2011; Ertmer, 2005; Hativa & Goodyear, 2002; Marra, 2005 & Speer, 2008).

Speer (2008) argues there are limited attempts to understand the connection between beliefs held by teachers and decisions made in the classroom. Schoenfeld (2000) describes a lack of powerful explanations in how beliefs mold practice and more is needed than just a description of what teachers are able to do or what they are willing to do; the questions of how and why beliefs affect practice are needed. Speer (2008) states that, “very little is known about the influence of beliefs on teaching practices at the very level of detail where it appears development most productively occurs” (p. 219).

Kane et al. (2002) described studies that failed to provide enough evidence to support assertions on actual teaching practice. As Kane et al. (2002) addressed, Gow and Kember (1993) did not actually examine teaching practice and like many similar studies, assumed teaching practice from espoused theories of action, that is, from teacher responses to questions about their behavior in a teaching situation. Kane et al. (2002) argued that an analysis of a teacher’s professed views should be supplemented by an examination of their actual teaching or theories in use, and of the relationship between what teachers say they do and what they actually do in teaching settings. Without such examination, the validity of teachers’ descriptions of their practice; of the assumed link between their conceptions and practice and of the assumed link between their practices and their students approaches to learning, are untested. To address this limitation, more research needs conducted where not only the espoused teaching philosophies are examined, but also observation and analysis of the actual teaching practice. Close examination of
the actual teaching practice will lead to further discussion on teaching strategy effectiveness and student achievement.

Previous research studies in undergraduate courses have focused on the teaching of the lecturer (Bligh, 2000; Kember & Kwan, 2000; McKeachie, 2001; Nilson, 2003 & Trigwell & Prosser 1996). It has been argued that the teaching practices lecturers adopt are based on their conceptions. There is clear evidence indicating the links between teaching conceptions, teaching methods and student learning (Trigwell & Prosser 1996; Kember & Kwan, 2000). Studies have shown that university lecturers adopted methods of teaching that were in line with their beliefs about teaching (Trigwell & Prosser 1996; Kember & Kwan, 2000; McAlpine & Weston, 2000). Other researchers have repeated the same view: ‘Fundamental changes to the quality of university teaching are unlikely to happen without changes to professors’ conceptions of teaching’ (McAlpine & Weston, 2000, 377). Pajares (1992) argued that the conceptions which teachers hold influence their judgments, which, in turn, affect their classroom teaching behavior. Kane et al. (2002) held similar sentiments and suggested that such research be embedded in the understanding that teaching conceptions direct the teachers’ practices.

Disciplinary differences have been studied by a number of educational researchers over the past few decades (Biglan, 1973; Kolb, 1981; Donald, 1986; Moses, 1990; Becher, 1994; Healey, 2000) and agree that advances in the scholarship of teaching will occur more readily if they are closely aligned to the conceptual structure and epistemology of the discipline.

Disciplines differ in how they prepare future practitioners. Teacher practices and perspectives on preparing members of a discipline are so “idiosyncratic, habituated, and completely embedded in a particular discipline that can be called ‘signature pedagogies’” (Golde, 2007, p. 345). The epistemological beliefs and the knowledge structures of different disciplines have been analyzed in many studies (Neumann et al., 2002). Furthermore, there is research on disciplinary ways of
thinking and the effect of discipline on teaching, learning and doing research (Smeby, 1996; Neumann, 2001).

Lueddeke (2003) showed that teachers who teach in the disciplines related to the physical sciences, engineering and medicine, were more likely to apply a teacher-centered approach to teaching, whereas teachers from disciplines related to the social sciences and humanities took a more student-centered approach to teaching. Trigwell (2002), in a study of design and physical sciences teachers’ approaches to teaching, showed that design teachers were significantly more student-centered than science teachers. Trigwell did not utilize a control for the teachers’ experience of the teaching context; thus findings can be considered to be no more than an indicator of the possibility of disciplinary difference.

Exploring Signature Pedagogies, Approaches to Teaching Disciplinary Habits of Minds (Gurung, Chick, & Haynie, 2008) explores and identifies signature pedagogy or pedagogies in disciplines within the Humanities, Liberal Arts, Social Sciences, Natural Sciences, and Mathematics. Michel Wattiaux, a professor of Dairy and Animal Science, authored the chapter “Signature Pedagogy in Agriculture” (Gurung, Chick, & Haynie, 2008, p. 207). Wattiaux argues classrooms in Colleges of Agriculture provide genuine discipline-specific learning experiences in which instructors and students are fully engaged in decision-making and real-world problem solving. Wattiaux provides an accurate account of the objective of post-secondary agricultural education, however, a more thorough look at discipline-specific pedagogies is needed within post-secondary agricultural education to provide more explicit examples of what pedagogical practices are implemented into college of agriculture classrooms and the epistemological beliefs behind the teachers’ instructional choices.
Purpose and Objectives

The purpose of the research study is to make links between post-secondary agricultural sciences faculty espoused teaching theories and their teaching practice. The research study will allow for researchers to better understand how university academics learn to teach to improve postsecondary agriculture education. The research study will compare two leading agricultural science postsecondary institutions on the approaches to teaching of identified excellent teachers. 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.
3. Identify faculty members’ operationalization of their instructional pedagogy.
4. Differentiate between faculty members’ beliefs and instructional practice.
5. Describe faculty members’ perceptions of discipline specific pedagogy.
6. Describe students’ perceptions regarding the effectiveness of the faculty member to deliver a course as stated in the operationalized epistemological beliefs of faculty.
7. Analyze relationships between identified teaching beliefs, operationalized definitions, and students’ perceptions of utilization of operational definitions of faculty at two colleges of agricultural sciences.
Summary

Current research must pay more attention to the complexity of teaching when attempting to further understanding of university-level teaching. Researching discipline specific pedagogies holds exciting potential for developing more complex understandings of university academics as teachers, which in turn has implications for the improvement of university-level teaching. Research into this would require linkages to be made between teacher conceptions, strategies and methods of teaching and the student experience to identify if there are preferred conceptions of teaching to enhance the student learning experience. College learning environments possess a multitude of interactions that ultimately influence student learning, and research will further clarify how teachers’ beliefs influence their pedagogical decisions (Schuh, 2004). Continuing research along this line of inquiry will uncover if espoused theories in use align with theories in action of post-secondary instructors. Educational researchers continue to “advocate the need for closer examination and direct study of the relationship between teacher beliefs and educational practices” (Savasci-Acikalin, 2009, p. 5).
Chapter 2

Review of Literature

Chapter two contains conceptual, theoretical, and empirical research identified by the researcher as relevant to the study. Chapter two includes information related to the following areas: 1) the purpose of higher education; 2) stakeholders perception of higher education; 3) the Scholarship of Teaching and Learning; 4) scholarship of teaching; 5) pedagogical content knowledge; 6) epistemology; 7) discipline specific pedagogies; 8) Colleges of Agriculture; 9) Swedish University of Agricultural Sciences development; and 10) effective teaching in post-secondary education in agriculture education.

Purpose and Objectives

The purpose of the research study is to make links between post-secondary agricultural sciences faculty espoused teaching theories and their teaching practice. The research study will allow for researchers to better understand how university academics learn to teach to improve postsecondary agriculture education. The research study will compare two leading agricultural science postsecondary institutions on the approaches to teaching of identified excellent teachers. 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.

3. Identify faculty members’ operationalization of their instructional pedagogy.
4. Differentiate between faculty members’ beliefs and instructional practice.
5. Describe faculty members’ perceptions of discipline specific pedagogy.
6. Describe students’ perceptions regarding the effectiveness of the faculty member to deliver a course as stated in the operationalized epistemological beliefs of faculty.
7. Analyze relationships between identified teaching beliefs, operationalized definitions, and students’ perceptions of utilization of operational definitions of faculty at two colleges of agricultural sciences.

**Purpose of Higher Education**

The purpose of higher education in the United States has been a topic of debate for many years. The United States has a 200-year tradition of higher education where colleges are focused in preparing individuals for productive contribution through character development. The skills race of the 21st Century values the skills and knowledge of most of the workforce as a key to economic prosperity, national security, and social wellbeing (National Research Council, 2009).

As Rhodes (2001) observed,

“Universities are the engines of economic growth, the custodians and transmitters of cultural heritage, the mentors of each new generation of entrants into every profession, the accreditors of competency and skills, and the agents of personal understanding and societal transformation.”

Newman, Couturier, and Scurry (2004), however, purport,

“A significant gap has developed between the public purposes of higher education, the needs of society that should be met by universities, and the actual performance of these institutions. The growing power of market forces will, in the absence of skilled intervention in the functioning of the market, make a difficult situation worse.”
The establishment of higher education began in the 1600’s. The Colonial period (1636-1787) has been identified as the era marking the beginning of higher education. During this time, American colonial and antebellum colleges were established with both public and private control as a result of European social forces and cultural movements (Brubacher & Rudy, 1997). In the early years, American colonial colleges had served two primary purposes: 1) settler’s determination to live a life different from the government and 2) Protestantism and Anglicanism desire to separate from Catholicism (Brubacher & Rudy, 1997).

The oldest institution of higher education in the United States is Harvard University. Harvard was founded in 1636, sixteen years after the Mayflower landed at Cape Cod in present-day Massachusetts (Archibald, 2002). By the time of the Revolutionary War, there were nine chartered degree-granting colleges established in the colonies (Trow, 1988). The colonial colleges—Harvard, William and Mary, Collegiate School (which became Yale), Academy of Philadelphia (University of Philadelphia), College of New Jersey (Princeton), King’s College (Columbia), College of Rhode Island (Brown), Queen’s College (Rutgers), and Dartmouth—were organized to closely resemble Cambridge and Oxford. Like their English models many cases required religious affiliation. Resettled Puritan, Presbyterian, as well as Baptist sects variously exercised control over specific schools while William and Mary and King’s College were primarily under the auspices of the Church of England (Archibald, 2002).

The mission and administration of these colleges directed their students toward spiritual studies “in line with the spirit of [the] religious tradition” that accompanied colonial America’s early years (Brickman, 1972). During colonial times, a college education was fairly exclusive, the costs of operating a university made the price of an education unaffordable for most people. America provided some options to the specific demographic of wealthy, white men, most of whom were interested in becoming members of the clergy (Archibald, 2002).

At the turn of the 20th century, Flexner wrote (1908, 30-31):
Forty years ago [in 1867] the Bachelor's degree conveyed a specific and practically invariable meaning. There was one narrow path to academic confirmation; every candidate had to traverse it. Perhaps the college graduate did not expect to be a lawyer or a clergyman; he had, however, to be content with an education strictly relevant only to these two learned callings. A cultivated man was one who, whatever ignorance or limitations in other directions, had enjoyed a liberal education of this description. The classics were the backbone of the college curriculum; they were supplemented by the cut and dried philosophy and rhetoric then current, some mathematics and bookish science, and an occasional dip into modern literature.

From once preparing individuals for clergymen to now preparing invested students for all types of social, economic, and environment services, higher education in the United States has served a democratic purpose by providing “knowledge for the sake of serving society and knowledge for the sake of serving social demands” (Guttmann, 1987, p. 188).

The United States’ higher education system has been influenced by three major philosophical beliefs. The first philosophical belief was informed by the Jeffersonian ideals of limited government and freedom of expression. States, religious communities, and individuals established and maintained a range of higher education institutions and continued to protect these institutions from the levels of government control seen in most other countries (American Council on Education, 2001). Thomas Jefferson was one of the first proponents of higher education and advocated for public higher education to foster an informed citizenry and also as an investment in the nation’s economic future. Jefferson also championed “the lecture method, the elective system,” free from religious affiliation that would be adopted by the emerging network of colleges across the expanding United States. At the center of his philosophy was the belief “that education should reinforce republican politics by teaching citizens and leaders their rights and responsibilities” (Addis, 2003).
The second set of influences on the American higher education system has been capitalism and the belief in the rationality of markets (Brubacher & Rudy, 1997). American colleges and universities vie for students, faculty, and funding under the assumption that diversity and high quality are best achieved through competition rather than centralized planning (American Council on Education, 2001).

The final major philosophical influence on American higher education is a widespread commitment to equal opportunity and social mobility (Brubacher & Rudy, 1997). Higher education was an elite activity for much of its history, excluding individuals based on gender, religion, race/ethnicity, and social class. During the 20th century, economic and social changes transformed higher education into a primary gateway to the middle-class, and women and minorities made advances against exclusion from mainstream higher education. Americans came to view broad access to higher education as a necessary component of the nation’s ideal as a “land of opportunity” (American Council on Education, 2001).

Higher education responded to the public need by broadening access. The Morrill Act is recognized as a significant advancement in higher education for American citizens. The Act established the land-grant university system, which was signed into law on July 2, 1862 by President Abraham Lincoln. The Morrill Act made it possible for new western states to establish colleges for their citizens. The new land-grant institutions, which emphasized agriculture and mechanic arts, opened opportunities to thousands of farmers and working people previously excluded from higher education.

Stakeholder Perceptions of Higher Education

All higher education institutions, both public and private, state colleges and research universities to community colleges to a wide variety of technical and professional schools, serve a
public purpose (Shapiro, 2005). The evolution of higher education has led universities to gain external constituencies that are both broad and complex. Constituencies that are recognized as clients of university services are no longer just students but also a variety of stakeholders; federal, state, and local governments; business and industry; and the public at large (Duderstadt, 2008). The university is held to higher standard to not only be accountable to the vast base of present stakeholders, but it also must accept a stewardship to the past and future stakeholders (Duderstadt, 2008). Duderstadt states: “In many ways, the increasing complexity and diversity of the present day university and its missions reflect the American and global society. The diversity of the values, needs, and expectations of the various constituencies served by higher education poses a major challenge” (2008, p. 13).

Shapiro (2005) asserts:

As one imagines the future of the American university, it is quite clear that its functions and responsibilities will once again be transformed, at least partially, by new advances in science and technology, by our changing understanding of the human condition, by changing perspectives on how to live a meaningful life, by new ideas regarding our responsibilities and relationships with societies elsewhere in the world, and by evolving social views regarding the importance and use of new knowledge and advanced training. The historical record makes clear that eventually no facet of higher education is exempt from the impact of social change. The institutional history of American higher education reflects at its very base the need for a continuing examination of the relationship between the polity and the educational institution. (p. 14)

Stakeholder theory suggests that those individuals who either can affect organizational achievements, or are themselves affected by the policies or practices of an organization, have legitimate interests in both the procedural and substantive aspects of organizational activity (Carroll, 1996; Donaldson & Preston,1995; Freeman & McVea, 2001).
According to Watson and Reigeluth (2008), education in the United States is undergoing a systemic perceptual change as a result of society's dissatisfaction with individual learner's achievement in the education arena. In education, most systemic transformation efforts involve stakeholders that are critical to achieving the desired changes.

Higher education is increasingly seen as an investment that should contribute to national prosperity in the long term; therefore, the return on the investment must be good (Yorke, 2000). Quality assurance in higher education has also become a focus of attention for private universities (Jones, 2003). Students, who are increasingly paying tuition fees, might now be considered as “clients” of higher education institutions (Telford & Masson, 2005). Students are therefore also very concerned about the quality of the lectures they pay for. As the “culture of higher education” has become “increasingly market oriented” (Green, 1993), external demands for quality of teaching have increased.

Education drives the economy. There is an overwhelming consensus among United States employers that too many recent college graduates lack critical thinking skills and the ability to communicate effectively, solve problems creatively, work collaboratively and adapt to changing priorities (Lumina Foundation, 2014). The fundamental restructuring of the national economy in the 1970’s is what triggered a growing mismatch between the needs of business and the offerings of the Untied States education system (Lumina Foundation, 2014). Since that time, “technological advances have revolutionized most industries, transforming the nature of the tasks of most employees, the kind of activities they engage in and their responsibilities. Manufacturing, once focused on the mass production of standardized goods, has come to be dominated by companies whose fortunes rest instead on variety and constant innovation” (Lumina Foundation, 2014, p. 4).

The United States education system was relatively efficient at keeping up with the demands of employers over the decade, however, by the 1980s, demand for skilled workers began
to outpace the system’s ability to produce them. The jobs evolving to meet a changing society’s needs, began to require some level of post-secondary education or training, whereas previously, a high school diploma sufficed (Lumina Foundation, 2014). Industry personnel recognized a need to partner with higher education institutions to meet the workforce skills gap that was present (Lumina Foundation, 2014). United States industry employers continue to seek to improve partnerships and collaborations with higher education institutions to foster skills, knowledge, and dispositions acquisition for current and future workforce employees (Lumina Foundation, 2014).

**Scholarship of Teaching and Learning**

The most influential advocates of the need to emphasize the importance of the scholarship of teaching are the late Ernest Boyer and his colleagues at the Carnegie Foundation for the Advancement of Teaching (Boyer, 1990; Glassick, Huber, & Maerof, 1997; Hutchings & Schultman, 1999; Schultman, 1993, 1999). These highly regarded researchers support the need to give scholarship a broader meaning so as to define the work of university teachers in ways that enrich the quality of post-secondary education. Four areas of scholarship were identified by these scholars: the scholarship of discovery research; the scholarship of integration, including the writing of textbooks; the scholarship of service, the practical application of knowledge; and the scholarship of teaching.

In 1990, The Carnegie Foundation published Ernest Boyer’s “Scholarship Reconsidered: Priorities of the Professoriate.” Boyer (1990) began the process of examining the relationship between research and teaching and advocated for the scholarly consideration of how teaching methods relate to the subject content being learned by students. Boyer's study sparked lively debate across the country and continues to influence the debate about the meaning of scholarship in higher education. Boyer (1990) focused his debate on not only teaching but on teaching as a
part of the larger whole of academic work. Boyer (1990) focused on the idea that scholarship exists in all aspects of academic work. Boyer (1990) stated “surely, scholarship means engaging in original research. But the work of the scholar also means stepping back from one’s investigation, looking for connections, building bridges between theory and practice, and communicating one’s knowledge effectively to students” (p. 16).

The framework for recognizing and valuing different types of scholarship, included:

(a) The scholarship of discovery – closely aligned with traditional research;
(b) The scholarship of integration - making connections across disciplines;
(c) The scholarship of application - using research findings and innovations to remedy societal problems; and
(d) The scholarship of teaching – both educates and entices future scholars by communicating the beauty and enlightenment at the heart of significant knowledge (Boyer, 1990).

The works of Boyer (1990) and Glassick et al. (1997) have promoted research studies in the Scholarship of Teaching and Learning arena. Lueddeke (2003) conducted a study that investigated the relationship between a number of factors that characterize academics working in higher education and their approaches to the scholarship of teaching. Findings from the exploratory study suggested that the factor having the strongest influence on teaching scholarship was discipline and teaching conceptualization, while qualifications and years of teaching have a moderate impact, and gender and post do not appear to play a significant part. General strategies in support of teaching scholarship that emerged from the study convey the importance of educational and organizational development.
Scholarship of Teaching

Schulman (1999) asserts teaching and learning in higher education are inextricably linked, so the scholarship of teaching is as much about learning as it is about teaching. Shulman, in *The Course Portfolio* (1998), states that

“a scholarship of teaching will entail a public account of some or all of the full act of teaching—vision, design, enactment, outcomes, and analysis—in a manner susceptible to critical review by the teacher’s professional peers and amenable to productive employment in future work by members of the same community” (p. 6).

Glassick, Huber, and Maeroff (1997) have suggested that all forms of scholarly work, including the scholarship of teaching, should be characterized and assessed by the following six standards: clear goals, adequate preparation, appropriate methods, significant results, effective presentation, and reflective critique (p. 25).

Keber and Cranton (2000) contend that “the scholarship of teaching includes both learning about teaching and the demonstration of teaching knowledge” (p. 476). Keber and Cranton (2000) conducted research that suggested twenty-seven examples of indicators of learning and knowing about teaching. Figure 1 presents all twenty-seven indicators.
**INSTRUCTIONAL KNOWLEDGE**

**Indicators of Content Reflection:**
Discussing materials and methods with students or colleagues
Reading articles on "how to" teach
Keeping a journal or log of methods and materials used

**Indicators of Process Reflection:**
Collecting data on students' perceptions of methods and materials
Asking for peer review of course outline
Comparing results of research on teaching to results in own classroom

**Indicators of Premise Reflection:**
Experimenting with alternatives and checking out results
Writing critiques of methods articles or books
Challenging the departmental or institutional norms or values regarding teaching methods

**PEDAGOGICAL KNOWLEDGE**

**Indicators of Content Reflection:**
Administering learning styles or other inventories to students
Reading articles or books on learning theory, critical thinking, self-directed learning
Writing an article on how to facilitate learning in the discipline

**Indicators of Process Reflection:**
Gathering feedback from students on their learning the concepts of the discipline
Conducting an action research project on student learning
Comparing classroom experience to formal research results on student learning

**Indicators of Premise Reflection:**
Writing a critique of an article on student learning in the discipline
Seeking out literature that questions the importance of learning styles, self-directed learning, etc.
Participating in philosophical discussions on student learning, for, e.g., a listserv or with colleagues

**CURRICULAR KNOWLEDGE**

**Indicators of Content Reflection:**
Reviewing goals of the session, course, or curriculum
Reading articles and books about the goals of higher education
Including a rationale and goals in course outlines

**Indicators of Process Reflection:**
Conducting a review of curriculum goals including a comparison to current practices
Tracing the history of program goals
Reading books on the goals of higher education and comparing goals to those underlying the programs offered in the department

**Indicators of Premise Reflection:**
Checking with employers, business, industry, etc., to see what their expectations and goals are in hiring graduates from program
Writing an article envisioning what higher education without curriculum goals may look like
Initiating or joining a committee on program goal review

---

*Figure 1.* Examples of Indicators of the Scholarship of Teaching as defined by Keber and Cranton (2000).
Singer (1996) conducted research with the purpose of determining the impact of an array of variables on the espoused teaching paradigms and instructional behaviors of college faculty. Singer (1996) found teaching paradigms of college faculty are shaped by individual attributes and formal education experiences. Indicators of teaching paradigms were explicitly reflected in the frequencies of instructional behaviors reported by the surveyed faculty (Singer, 1996).

**Teachers’ Pedagogical Knowledge**

Three types of teacher knowledge were formalized by Shulman (1987) and others (Grossman, 1990; Hill, Schilling, & Ball, 2004) that need to be transformed in order to support teacher learning: (1) content knowledge, (2) pedagogical knowledge, and (3) pedagogical content knowledge. While researchers have differed in their characterization of the relationship between various sub-domains of teacher knowledge, four commonalities have consistently appeared: pedagogical knowledge, subject matter knowledge, pedagogical content knowledge, and knowledge of context (Park & Oliver, 2008).

**Content Knowledge**

Content knowledge represents teachers’ understanding of the subject matter taught. According to Shulman (1986), “[t]he teacher need not only understand that something is so, the teacher must further understand why it is so” (p. 9).

Shulman (1986) notes content knowledge includes knowledge of concepts, theories, ideas, organizational frameworks, knowledge of evidence and proof, as well as established practices and approaches toward developing such knowledge.
Pedagogical Knowledge

Koehler and Misha (2009) define pedagogical knowledge as “teachers’ deep knowledge about the processes and practices or methods of teaching and learning” (p.64). This form of knowledge applies to understanding how students learn, general classroom management skills, lesson planning, and student assessment (Koehler & Misha, 2009). A teacher with deep pedagogical knowledge understands how students construct knowledge and acquire skills and how they develop habits of mind and positive dispositions toward learning. As such, pedagogical knowledge requires an understanding of cognitive, social, and developmental theories of learning and how they apply to students in the classroom.

The conceptualization of pedagogical knowledge will serve as an important factor in the framework of this study. The following two figures represent the conception of pedagogical knowledge. Figure 2 shows Gess-Newsome and Lederman’s (1999) interpretation of pedagogical knowledge in relation to the full set of categories of teacher knowledge as identified by Shulman (1987). In this presentation of pedagogical knowledge, Gess-Newsome and Lederman (1999) note that there are three important points to their thought process. The researchers contend that knowledge of educational ends and purposes is inseparable from knowledge about evaluation and assessment procedures. Secondly, the researchers believe that curriculum knowledge is fed by both content knowledge and knowledge of goals/assessment procedures, while pedagogical knowledge is fed by both knowledge of learners-learning and knowledge of goals/assessment procedures. A third finding from the researchers shows the category of knowledge of general education contexts is further delineated to the sub-category of knowledge specific contexts, but each of the other categories contributing to pedagogical content knowledge can be so delineated (Gess-Newsome & Lederman, 1999).
Figure 2. Categories Contributing to Pedagogical Content Knowledge as interpreted by Gess-Newsome and Lederman (1999).
Figure 3 presents the researchers (Gess-Newsome & Lederman, 1999) conception of the various facets of pedagogical knowledge based on the literature and research on teaching. Research in classroom organization and management, instructional models and strategies, and classroom communication and discourse contribute to general pedagogical knowledge (Gess-Newsome & Lederman, 1999). Figure 3 confirms the relationship with Figure 2 by representing educational goals/evaluation and learners as critical contextual features of pedagogical practice. Figure 3 depicts the interplay between general pedagogical knowledge, which is derived from the research and scholarly literature, and personal pedagogical knowledge, which is contrived by personal beliefs and personal practical experience (Gess-Newsome & Lederman, 1999). As shown in Figure 3, reflection promotes the interchange 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 and exemplified and contextualized. What results from this process is the context-specific pedagogical knowledge that helps to guide teachers’ decisions and actions (Gess-Newsome & Lederman, 1999).
Figure 3. Facets of Pedagogical Knowledge representing educational goals/evaluation and learners as critical contextual features of pedagogical practice
**Pedagogical Content Knowledge**

An increasing foundation in the scholarship of teaching literature is pedagogical content knowledge, which distinguishes the knowledge base of the scholar from the knowledge base of the scholarly teacher (Rice, 1992; Paulsen, 2001). Pedagogical content knowledge distinguishes novice teachers from expert teachers, as stated by Shulman (1987), “the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful and yet adaptive to the variations in ability and background presented by students” (p. 15). Griffin (1999) asserts there is an expectation of teachers to understand their respective discipline as well as know how to use multiple teaching strategies. Researchers (Trigwell & Prosser, 1996; Prosser & Trigwell, 1999; Samuelowicz & Bain, 2001), stress the contextual and dynamic nature of approaches to teaching.

Shulman (1987) defined pedagogical content knowledge (PCK) as follows:

> It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction (p.8).

This definition implies that “Pedagogical content knowledge is both an external and internal construct, as it is constituted by what a teacher knows, what a teacher does, and the reasons for the teacher’s actions” (Baxter and Lederman 1999, p. 158). Hence, pedagogical content knowledge encompasses both teachers’ understanding and their enactment. Fernandez (2005) defines pedagogical content knowledge:

> Such knowledge entails understanding how students think about specific content, in particular the difficulties it presents to them, and being familiar with productive strategies that can be used in the classroom to further develop
students' thinking and help them overcome their difficulties (Fernandez, 2005, p.2).

**Epistemology**

Epistemology is the study of beliefs about the origin and acquisition of knowledge (Hofer, 2004). How individuals view knowledge and knowing has been studied under the general heading of “personal epistemology” (Hofer & Pintrich, 2002).

A growing body of research related to epistemic beliefs has been identified as crucial for understanding teaching and learning (Yadav, Herron, & Samarapungavan, 2011). In a seminal work on teacher beliefs, Nespor (1987) explained that beliefs are a stronger predictor of behavior than knowledge. Pajares (1992) summarized that teachers have beliefs about their ability to affect student performance, causes of teachers’ or students’ performance, perceptions of self and feelings of self-worth, ability to perform certain tasks, specific subjects or disciplines, and the nature of knowledge and how learning occurs. Teachers’ beliefs about learners and learning influence their instructional practices and their interactions with students (Jordan, Kircaali-Iftar, & Diamond, 1993; Skinner, Bryant, Coffman, & Campbell, 1998; Soodak & Podell, 1994; Wilson & Silverman, 1991). Epistemological beliefs influence the development of knowledge because they are considered to be the central values or theories that are functionally connected to most other beliefs and knowledge (Hofer & Pintrich, 1997). According to both Tobin (1993) and Peterman (1993), instructional choices are the primary confirmation of the teacher’s beliefs.
Discipline Specific Pedagogies

There is little research on the effect of discipline on approaches to teaching. The issue of whether, and how, teaching varies across various disciplines has received limited attention (Hativa & Marincovich, 1995; Hativa, 1997; Quinlan, 1997). Research has been conducted on identifying disciplinary differences in the academic culture. The epistemological beliefs and the knowledge structures of different disciplines have been analyzed in many studies (Biglan, 1973; Kolb, 1981; Becher, 1987, 1994; Neumann et al., 2002). Research studies have also focused on disciplinary ways of thinking and the effect of discipline on teaching, learning and doing research (Smeby, 1996; Neumann, 2001). Knowledge of instructional strategies and representations for teaching consists of two categories: subject-specific strategies and topic-specific strategies (Magnusson et al. 1999). Subject-specific strategies are general approaches to instruction that are consistent with the goals of teaching in teachers’ minds such as learning cycles, conceptual change strategies, and inquiry-oriented instruction. Topic-specific strategies refer to specific strategies that apply to teaching particular topics within a domain of the specific discipline.

According to Becker and Riel (1999), teachers’ practices and beliefs are continually shaped by their ongoing experiences as teachers, by the values and opinions expressed by those around them, and by the expectations of influential others, all of which are transmitted through formal and informal norms, rules, and procedures. Putnam and Borko (2000) noted that teachers’ practice is more likely to change as they participate in professional communities that discuss new materials, methods, and strategies, and that support the risk taking and struggle involved in transforming practice.

Exploring Signature Pedagogies, Approaches to Teaching Disciplinary Habits of Minds (Gurung, Chick, & Haynie, 2008) explores and identifies signature pedagogy or pedagogies in disciplines within the Humanities, Liberal Arts, Social Sciences, Natural Sciences, and
Mathematics. Teaching scholars authored chapters within their respective disciplines. The authors reflected on ways to improve the teaching and learning process within their field of study by gaining a better understanding of one’s own discipline, its “habits of the mind”, and the teaching related approaches that instructors of the discipline ten to take for granted (Gurung, Chick, & Haynie, 2008). The scholars also reflected on ways to improve the teaching and learning process by examining and understanding better the values, ways of knowing, and manners of thinking of other disciplines (Gurung, Chick, & Haynie, 2008). Michel Wattiaux, a professor of Dairy and Animal Science, authored the chapter “Signature Pedagogy in Agriculture” (Gurung, Chick, & Haynie, 2008, p. 207). Wattiaux argues classrooms in Colleges of Agriculture provide genuine discipline-specific learning experiences in which instructors and students are fully engaged in decision-making and real-world problem solving. Wattiaux further explained the carefully designed capstone course has provided students and teachers the opportunity to appreciate the complexity of real-world problems, to solve the problems with science-based knowledge, and to create a dynamic of common purpose that encourages students’ higher levels of thinking (Gurung, Chick, & Haynie, 2008).

**Colleges of Agriculture**

The Morrill Act of 1862 marked the first Federal aid to higher education. Continental Congress in the Northwest Ordinance of 1787 (National Archives, 1995) wrote, “Knowledge, being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged” (p. 57).

The Morrill Act committed the Federal Government to grant each state 30,000 acres of public land issued in the form of “land scrip” certificates for each of its Representatives and Senators in Congress (U.S. Department of the Interior, 1999). Although many states misused the
revenue from this endowment, which grew to an allocation of over 100 million acres, the Morrill land grants laid the foundation for a national system of state colleges and universities (U.S. Department of the Interior, 1999). In some cases, the land sales financed existing institutions; in others, new schools were chartered by the states. Some existing major universities were chartered as land-grant schools. State colleges brought higher education within the reach of millions of students, a development that could not help but reshape the nation’s social and economic status (Williams, 1991; U.S. Department of the Interior, 1999).

Much academic and political maneuvering lay behind later legislation (U.S. Department of the Interior, 1999). In 1872, Senator Morrill unsuccessfully introduced a bill to increase the endowments of land-grant colleges whose growth had stalled. The following year, he enlisted the assistance of astute 1862 college presidents, including Penn State president George Atherton, who had political influence with the federal government and with the National Grange (U.S. Department of the Interior, 1999). The bill passed with this crucial support. To lobby for funding legislation for agricultural research, Atherton successfully rallied the newly organized Association of American Agricultural Colleges and Experiment Stations; these educators provided much of the information and argument for the 1887 Hatch Act, which provided annual appropriations for agricultural research stations (U.S. Department of the Interior, 1999). Atherton and the association he headed continued to press for annual appropriations for educational programs at the land-grant colleges, which led to the Second Morrill Act of 1890 (U.S. Department of the Interior, 1999).

Morrill’s second Land-Grant College Act was signed into law in 1890 and provided for the establishment and support of colleges to serve the African American population. These universities are often referred to as the 1890 Land-Grant institutions or Historically Black Colleges and Universities; located primarily in the south. In 1972, land-grant status was assigned to universities in the Pacific and U.S. Caribbean Territories. The Equity in Educational Land-
Grant Status Act of 1994 conferred land-grant status on 29 Native American colleges “…to encourage American Indians—especially those living on reservations—to overcome the barriers in higher education” (National Research Council, 1995).

Twenty-five years after the Morrill Act was passed, Congress passed the Hatch Act - on March 2, 1887 (National Research Council, 1996). The Hatch Act established agricultural experiment stations in connection with the land grant colleges so research could be conducted and applied in practice. Named for Congressman William Henry Hatch of Missouri, the Hatch Act established not only experiment stations, but also distribution of information to the people of the United States on subjects connected with agriculture (National Research Council, 1996). The Hatch Act also provided an annual payment to each state and territory for the expenses of research, as well as for printing and distributing the results.

In 1914, the Smith-Lever Act was accepted and passed by Congress, which granted land-grant institutions a third function, called "extension." Extension was designed to disseminate agricultural college-generated knowledge beyond the campus to farms and consumers (National Research Council, 1995). Extension was to foster a partnership of cooperative activity between the federal government, through the United States Department of Agriculture, and the states (through the land grant colleges). County governments, through a network of county extension agents, soon became cooperative extension partners (National Research Council, 1995).

These legislations profoundly changed the course of American public higher education (National Research Council, 1996). A land-grant institutions college of agriculture system has a distinctive organization and is defined by some unique institutional arrangements. The land grant system formed the framework for the land grant institutions' missions of teaching, research and extension. The land grant universities generally, and their colleges of agriculture specifically, have raised the level of education of the U.S. citizenry and its agriculturalists (National Research Council, 1996).
Access was also increased by the creation of another unique American type of institution identified as the community college. Community colleges were created in the 20th century to ensure open access to higher education for individuals of all ages, preparation levels, and incomes. Guided by these beliefs, U.S. higher education reflects essential elements of the American character: independence, determination, inclusiveness, and competitiveness (American Council on Education, 2001).

Maintaining high-quality undergraduate and graduate teaching programs in food and agricultural fields and to attract the best and brightest students into these programs is in the best interest of the United States. As the nature of agriculture evolves, so must the preparation process of graduates to meet the changing needs (National Research Council, 2009). As agriculture will need to adapt to progress, colleges and universities will have to change to advance education and scholarship in all agriculture education effectively and to foster enhanced public literacy about these issues (National Research Council, 2009). Colleges and universities, including land-grant institutions, should produce employees, managers, leaders, policy-makers, and natural and social scientists that accept and respond to the dynamic world of the food, fiber, and natural resources (National Research Council, 2009).

**Swedish University of Agricultural Sciences Development**

Sweden is one of the world’s most innovative and research-intensive nations (Dutta & Lanvin, 2013). Education and research play a central role in the potential to shift to a sustainable society and meet future challenges in an effective way. The first university founded in Sweden was Uppsala University in 1477 (Swedish Agency for Networks and Cooperation in Higher Education, 2008). The mission was to educate clergy for the church. During the 16th century, no other universities were established due to political unrest in the country. In the 17th century,
Sweden had its great period of power around Europe, which resulted in the need of government officials that could represent Sweden in other countries within Europe. An expansion of higher education was established as a solution, and in 1668 Lund University was founded (Swedish Higher Education Authority, 2013). Lund focused its teachings on medicine and natural sciences. The quality of teaching in the university rose steadily and entrance requirements became standardized and enforced (Swedish Higher Education Authority, 2013). Added to the university acceptance requirements was an entrance examination that all applicants had to pass (Swedish Agency for Networks and Cooperation in Higher Education, 2008).

In the 19th century, the need for more universities became clear, at the end of the 19th century two new universities were established: Stockholm University was established in 1878 and Gothenburg’s University in 1891. The two new university’s focus was on the natural sciences. The need for more educational institutions continued throughout the 19th and 20th centuries. New research greatly expanded in the institutions of higher education, especially during the cold war era (Swedish Agency for Networks and Cooperation in Higher Education, 2008).

In the middle of the 18th century, steps were taken to establish education and research in the fields of forestry, farming and veterinary medicine. Sweden’s first agricultural institute was formed in Degeberga in the county of Västergötland in 1833 (Swedish Higher Education Authority, 2013). A second agricultural institute was established in Ultuna fifteen years later. In the 20th century, other institutes formed and combined to establish three agricultural colleges. In 1977 the university received the name it is recognized for today, Swedish University of Agricultural Sciences. The main areas of focus for Swedish University of Agricultural Sciences (SLU) are food quality, animal husbandry, forestry and sustainability of both land and urban centers (Swedish Higher Education Authority, 2013).

Higher education and research in green industries is mainly offered in Sweden at the Swedish University of Agricultural Sciences (SLU). Education and research aim to produce and
communicate new knowledge as well as educate qualified personnel for industries and enterprises within such areas as forestry, the entire food production chain, landscape preservation and aquaculture (Swedish Higher Education Authority, 2013).

Formas, the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, promotes research for sustainable development and research on biological natural resources, land and water resources, as well as society's sustainable use of these resources. In addition, Formas supports environmental and development research. Formas falls under the responsibility of the Ministry of the Environment, but approximately half of its budget comes from the Ministry for Rural Affairs (Swedish Higher Education Authority, 2013).

In Sweden, overall responsibility for higher education and research rests with the Riksdag (Swedish Parliament) and the Government (Swedish Higher Education Authority, 2013). The Riksdag decide on the regulations that apply to the higher-education area. The Swedish Parliament also determines objectives, guidelines and the allocation of resources for the area (Swedish Higher Education Authority, 2013). The Ministry of Education and Research is responsible for issues relating to schools, Higher Education Institutions, research, adult education, popular education and student finance. The public sector Higher Education Institutes are public agencies accountable to the Ministry of Education and Research (Swedish Higher Education Authority, 2013). One exception is Sveriges Lantbruksuniversitet (Swedish University of Agricultural Sciences), which is accountable to the Ministry of Rural Affairs (Swedish Higher Education Authority, 2013).

**Effective Teaching in Post-Secondary Education in Agriculture Education**

Faculty in higher education institutions are predominately hired for technical expertise (Adams, 2002; Boyer, 1990) and with little teaching experience (Adams, 2002; Austin, 2002).
Previous research has revealed teacher-centered activities generally dominate college of agriculture classrooms and are often associated with lower cognitive learning levels (Ewing & Whittington, 2009; McCarthy & Anderson, 2000; Whittington, 1995).

Estepp, Stripling, Conner, Giorgi, and Roberts (2013) investigated the teaching behaviors of successful instructors in a college of agriculture. The study investigated the learning activities used by the instructors, the cognitive level of instruction, and the teaching immediacy behaviors employed. The researchers found lecture was utilized majority of the time by the instructors; however, the instructors also employed a variety of learning activities, such as cooperative learning, discussion, questioning, and individualized application. Also discovered by the researchers was that the instructors taught mostly at lower cognitive levels, except when using cooperative learning (Estepp, Stripling, Conner, Giorgi, & Roberts, 2013).

Previous studies have also contributed to the knowledge base on the practice of exemplary teaching professors in colleges of agriculture. Mitchell, Knobloch, and Ball (2004) found five cognitive themes on how the exemplary teacher think about their disciplinary content and how they think their students should learn the material. The themes were Context and Relevance; Applying Knowledge; Learning Concepts; Differentiated Instruction; and Reflective. The themes supported the researchers’ conclusions that mental images of teaching were shaped by their professional discipline and they integrated research and/or Extension appointments to complement their teaching. Four themes that were discovered regarding teaching practices in the same study were Planning Skills; Interpersonal Skills, Communication Skills, and Assessment Skills. The themes supported previous research that teaching practices aligned with effective teaching in higher education. (Mitchell, Knobloch, & Ball, 2004).

Maxwell, Vincent, and Ball (2011) conducted a phenomenological study to describe the phenomena of effective teaching for nine award winning faculty instructors. Findings revealed that effective teaching was not focused specifically on teaching skills or traits, rather particular
habits of mind about teaching. Participants in the study agreed teacher effectiveness included focusing on students, engaging in dialogue, relevant content, and encouraging students to think and critically analyze (Maxwell, Vincent, & Ball, 2011). The researchers (Maxwell, Vincent, & Ball, 2011) presented themes the participants expressed on the act of becoming and evolving as an effective teacher as well. The participants believed teaching was scholarship, teaching and learning is a process of growth, and there is continual need for improvement (Maxwell, Vincent, & Ball, 2011).

**Theoretical Foundation**

The theoretical foundation used to guide the study is Theories of Action developed by Agyris and Schön (1974). Agyris and Schön (1974) define “theories of professional practice” as a set of interconnected propositions about the purpose of teaching, the roles of the teacher and students, and the set of teaching practices employed in their classrooms. This foundation “include[s] the values, strategies, and underlying assumptions that inform individuals’ patterns of interpersonal behavior” (Schön 1987, p. 255). Argyris and Schön (1974) distinguished between two types of professional theories: theories of action and theories-in-use. When applied to the practice of teaching the theories of action differentiate between teachers’ espoused theories of action and theories-in-use. Espoused theories of action are those theories “that we use to explain or justify our behavior” (Schön 1987, p. 255). These theories are easy to articulate and could be interpreted as what teachers *say* about their own teaching. Theories-in-use, however, are the tacit theories that underpin practice. Schön (1987) explained:

> often we are unable to describe [our theories-in-use], and we are surprised to discover, when we do construct them by reflecting on the directly observable data of our actual
interpersonal practice, that they are incongruent with the theories of action we espouse (p. 256).

Argyris and Schön (1974) purport a teacher’s espoused professional theories may not be consistent with each other and the teacher may not even be aware of such incompatibilities:

When someone is asked how he would behave under certain circumstances, the answer he usually gives is his espoused theory of action for that situation. This is the theory of action to which he gives allegiance, and which, upon request, he communicates to others. However, the theory that actually governs his action is his theory-in-use, which may or may not be compatible with his espoused theory; furthermore, the individual may or may not be aware of the incompatibility of the two theories. (Argyris & Schön, 1974, pp. 6-7)

Tinning (1988) emphasized that theories of action “may be at variance with theories-in-use, which are actually the assumptions embedded within the practice itself” (p. 87). In such cases, the only way to determine the teacher’s theories-in-use may be through observations of these professional practices (Sanders & McCutcheon, 1986).

Teachers’ theories may have been acquired and formed during their experiences as young pupils themselves, from life experiences, or through their teacher education professional preparation program (Fang, 1996; McNamara, 1990; Pajares, 1992; Zeichner, 1987). An assumption of uniformity in teachers’ theories is flawed (Feiman-Nemser & Floden, 1986; McCutcheon, 1992). Limited empirical work exists on the alignment of teachers’ theories and actions (Fang, 1996). Studies in general education have shown inconsistent results, with a few researchers reporting that teachers’ theories are related to their practices (Richardson, Anders, Tidwell, & Lloyd, 1991) while others have supported Argyris and Schön’s theory of the misalignment of theories and practices (Wilson, Konopak, & Readance, 1991).

Clark (1988) asserts that teachers’ theories influence perception, interpretation, and judgment; thus have important consequences for what teachers do and say. Nespor (1987) found
that teachers’ theories play a critical role in defining teaching tasks and organizing the knowledge and information relevant to those tasks.

Espoused theories of action and theories-in-use distinguish between what people say they do and what they actually do. For researchers to further study the complexity of teaching, multiple and various forms of methods and data collection must be utilized to allow researchers to access both what teachers say about their teaching and what they do in practice. The Theories of Action framework assisted the researcher in achieving this goal.

**Conceptual Framework**

The conceptual framework for this study was guided by relevant theoretical and empirical research. The researcher’s conceptual model examines practitioners of post-secondary Agriculture Education, qualitatively and quantitatively, on the role pedagogical content knowledge and discipline specific pedagogies play in forming a practitioner’s discipline specific content knowledge. The discipline specific content knowledge creates an epistemological lens in which the practitioner develops a teaching theory, which includes discipline specific teaching practices and strategies. The researcher will determine if the espoused theories in action are the actual theories in use of the identified practitioners, and then, determine the students’ perception of the teaching pedagogy effectiveness. Figure 4 provides a visual model of the conceptual framework for this study.

All teachers hold beliefs about their work, their students, and their subject matter, which are part of their broader general belief system. Pedagogical content knowledge plays an important role in teachers’ understanding and enactment of teaching. Shulman (1987) defined pedagogical content knowledge as “the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse
interests and abilities of learners, and presented for instruction” (p.8). This definition implies that “Pedagogical content knowledge is both an external and internal construct, as it is constituted by what a teacher knows, what a teacher does, and the reasons for the teacher’s actions” (Baxter & Lederman 1999, p. 158).

Shulman (2005) builds and expands his work in pedagogical content knowledge to include the discipline specific, signature pedagogies within academics. The concept of discipline specific signature pedagogies builds on the widely accepted assumption that they will lead to significant student learning (Gurung, Chick, & Haynie, 2008). Gurung, Chick, and Haynie (2008) purport practitioners will develop discipline specific pedagogies that will guide personal pedagogical decisions and practices.

The beliefs that teachers hold about their teaching are often referred to as teachers’ theories, personal theories, practical theories, or theories of professional practice (Argyris & Schön, 1974; Clark & Peterson, 1986; Sanders & McCutcheon, 1986; Siedentop, 1991). Teachers’ theories are a collection of beliefs related to teaching and schooling. Argyris and Schön (1974) explained “theories of professional practice” as a set of interconnected propositions held by teachers about the purpose of teaching, the roles of the teacher and students, and the set of teaching practices enacted in their classrooms. Argyris and Schön (1974) argue that people have mental maps with regard to how to act in situations, which include the way teachers plan, implement and review their actions. Furthermore, Argyris and Schön (1974) assert that it is these maps that guide teachers’ actions rather than the theories they explicitly espouse, and fewer teachers are aware of the maps or theories they do use (Argyris, 1980).
Figure 4. Conceptual Framework examines practitioners of post-secondary Agriculture Education, qualitatively and quantitatively, on the role pedagogical content knowledge and discipline specific pedagogies play in forming a practitioner’s discipline specific content knowledge.
Chapter 3

Methods

Chapter 3 will describe the methodology for conducting the study. Included in this chapter are the research objectives, research design, target population, data collection, and data analysis procedures utilized. This study was conducted in accordance with The Pennsylvania State University Institutional Review Board (IRB) guidelines. The study was assigned IRB# 42862.

Purpose and Objectives

The purpose of the research study is to make links between post-secondary agricultural sciences faculty espoused teaching theories and their teaching practice. The research study will allow for researchers to better understand how university academics learn to teach to improve postsecondary agriculture education. The research study will compare two leading agricultural science postsecondary institutions on the approaches to teaching of identified excellent teachers. 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.
3. Identify faculty members’ operationalization of their instructional pedagogy.
4. Differentiate between faculty members’ beliefs and instructional practice.
5. Describe faculty members’ perceptions of discipline specific pedagogy.
6. Describe students’ perceptions regarding the effectiveness of the faculty member to deliver a course as stated in the operationalized epistemological beliefs of faculty.

7. Analyze relationships between identified teaching beliefs, operationalized definitions, and students’ perceptions of utilization of operational definitions of faculty at two colleges of agricultural sciences.

This study employed a case–study approach (Gall, Gall, & Borg, 2003) for each institution involved. The instructors selected to participate within each case were deemed to be excellent teachers according to their receipt of an award honoring their teaching. 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. Although the study is not a true mixed methods design as defined by Creswell (2002), which is a procedure for collecting, analyzing and “mixing” both quantitative and qualitative data at some stage of the research process within a single study, to understand a research problem more completely, the study did employ a qualitative approach that included quantitative strategies to provide more dimension to the qualitative findings. The most common sources of qualitative data include interviews, class observations, and documents (Patton, 2002). Researchers use a basic qualitative design to frame their interview research methods (Creswell, 1994). Faculty members were asked specific questions tailored from their interview through an email questionnaire, but the research relied heavily on one-to-one structured interviews (Merriam, 1998). Interviews were transcribed verbatim. The method of analysis in this research project involved both deductive and inductive logic. While the researcher was looking for certain thematic categories, the researcher was also open to emergent themes in the interviews that could exemplify the phenomenon under investigation.
The analysis of the research study consisted of illustrating the beliefs, knowledge, and practices of the participating teachers from two agricultural universities. Data from the following sources were analyzed: video footage, transcripts of the interviews with the teachers, questionnaire completed by the faculty, and a student survey. The triangulation of the multiple data sources used in this research helps to ensure the credibility, transferability, dependability, confirmability, and authenticity of the data (Lincoln & Guba, 1985).

**Participant Selection**

The following section will provide details of the participants of this study. Included in this section is the selection process of the participating faculty and students.

**Faculty**

Creswell (2007) discusses the importance of selecting the appropriate candidates for interviews. A purposive, extreme case sample (Gall, Gall, & Borg, 2003) of seven university faculty at The Swedish University of Agricultural Sciences and nine university faculty within the College of Agricultural Sciences at The Pennsylvania State University, served as the participants for the study. The participants represented ten different disciplines within Agricultural Sciences.

The participants for the research study were identified award-winning teachers at The Swedish University of Agricultural Sciences and The Pennsylvania State University, College of Agricultural Sciences. Participants were identified by previous receipt of a teaching excellence award, pedagogical prize or recognized by their respective University administration as excellent, effective teachers. The key to qualitative research and, in particular, grounded theory is to generate enough data so that the illuminate patterns, concepts, categories, properties, and
dimensions of the given phenomena can emerge (Glaser & Strauss, 1967; Strauss & Corbin, 1998). Obtaining an appropriate sample size that will generate sufficient data is essential (Auerbach & Silverstein, 2003). The point at which this is achieved is when theoretical saturation is reached ((Glaser & Strauss, 1967; Strauss & Corbin, 1998). Theoretical saturation occurs in data collection when:

“(a) no new or relevant data seem to emerge regarding a category,
(b) the category is well developed in terms of its properties and dimensions demonstrating variation, and
(c) the relationships among categories are well established and validated” (Strauss & Corbin, 1998, p. 212).

In the case of interviews, there is no set number for when theoretical saturation occurs (Glaser & Strauss, 1967; Strauss & Corbin, 1998). One of the aspects is that sample size dependents on the research question (Morse, 2000; Sobal, 2001). Strauss and Corbin recommend narrowing the focus of the research question at the beginning or after three or four interviews (1998). By using the first few interviews as guides to the essence of the phenomena, the researcher can narrow the focus and reduce the number of interviews (Kwortnik, 2003, Strauss & Corbin, 1998).

The Swedish University of Agricultural Sciences and the College of Agricultural Sciences at The Pennsylvania State University 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 and nine faculty members from the College of Agricultural Sciences at The Pennsylvania State University agreed to participate in this study.

**Excellent vs. Effective Teachers**

The terms *excellent* and *effective* are often used interchangeably when describing award winning teachers. For this study, a clear distinction of *excellent teachers* and *effective teachers* is needed, as defined by the researcher for this particular study.

The researcher recognizes that winning an award for teaching excellence encompasses and takes into account more than the faculty members teaching practices. The researcher understands that winning an award for teaching excellence does not necessarily correlate to utilizing effective teaching techniques. It should also be noted, that there are effective teachers who may never be recognized for their extraordinary efforts in the classroom.

The frame for the study was selected purposefully because the individuals had already been identified as excellent teachers from their respective institutions. The faculty members were labeled *excellent* based on the criteria of their respective university’s teaching award.
Students

Students enrolled in the undergraduate courses taught by the identified award-winning teachers were also utilized in the study. The undergraduate students were currently enrolled in the participating faculty members’ class that was recorded for the study.

Qualitative Approach

The qualitative approach for the study was selected to capture both what teachers say about their teaching and to observe their teaching practices directly. The following section provides detailed descriptions of the approaches taken to capture data for qualitative analysis.

Faculty Interviews

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 & Rallis, 2003). A structured standardized open-ended interview method was utilized. In a standardized open-ended interview, participants were always asked identical questions, but the questions are worded so that responses are open-ended (Gall, Gall, & Borg, 2003). The open-ended interview questions allowed the participants to respond to the questions by reconstructing their own experiences in relationship to the phenomenon. The participants were able to explain their perspective on effective teaching practices, their teaching training experiences, and how teachers impact student learning. The interview protocol was designed for a 60-minute timeframe and all interviews were audio-recorded.
The interview guide consisted of twenty-nine structured open-ended main questions. Sub-questions were asked only if a participant’s response to the initial question did not cover certain topics of interest. All participants were asked identical questions in the same sequence.

For each interview conducted, the researcher first obtained informed consent from each faculty participant. After consent was obtained, a structured standardized open-ended interview protocol was utilized. Each interview was recorded using a digital recording device. The recordings were then transcribed verbatim by the transcription services offered by a Penn State employee. At the end of each interview, the participants were thanked for their time and asked if they were willing to complete a follow-up questionnaire via email. The researcher recorded the participants email address. The researcher also asked permission from participants for future contact if needed during transcription and data analysis.

**Faculty Teaching Video Recording**

Video recordings are increasingly being used as primary field materials that are later treated as “data” for particular research questions (Erickson, 1982; 1986; 2006). An advantage of video compared to other classroom-based research techniques, such as taking observational notes or recording audio, is that it can capture and present teaching and learning behaviors as they occur. Video can be rich with interactional phenomena, including eye gaze, body posture, content of talk, tone of voice, facial expressions, and use of physical artifacts, as well as between-person processes such as the alignment and maintenance of joint attention (Barron, 2003).

Four faculty members at The Swedish University of Agricultural Sciences were video recorded once during an undergraduate class. The nine faculty members within The College of Agricultural Sciences at The Pennsylvania State University were video recorded twice during their regularly scheduled undergraduate class. If the faculty member was teaching more than one
undergraduate class, one class chosen by the faculty member was recorded twice. A digital video camera was used to record and collect the class session.

A high-definition video camera was placed in the rear of the classroom to capture the actions of the teacher for the entire class session. The video recordings were uploaded to the thereNow© software suite for analysis. The thereNow© software allows visual appraisal of the video recordings using user-defined indices. For this research study, the researcher referred to the findings from the in-depth analysis of the interviews to develop the codes for each specific faculty member.

All research is concerned with the rigor in studies to ensure the findings are worthwhile and useful (Morse, Barrett, Mayan, Olson, & Spiers, 2002; Porter, 2007). Readers evaluate rigor based on the validity and reliability of the study (Guba, 1981; Merriam, 2009; Morse et al., 2002). While some advocate the use of the terms validity and reliability in qualitative research (Morse et al., 2002), Guba (1981) argued the terms validity and reliability, which align with rationalistic (quantitative) research, are not appropriate for naturalistic (qualitative) research. Trustworthiness of the study is the appropriate criteria when designing qualitative research studies (Merriam, 2009). Dukes (1984) and Creswell (2013) describe trustworthiness as verification.

Triangulation is another strategy designed to strengthen credibility (Chen et al., 2011; Guba, 1981; Guba & Lincoln, 1982). Triangulation strengthens the overall study and its results (Marshall & Rossman, 2011). For this study, the researcher used multiple data collection methods for triangulation. The faculty structured interviews, class recordings, faculty email questionnaire, and student surveys allowed for checking and cross checking data (Merriam, 2009). Data that participants communicated (interviews) with data observed (classroom observations) and data that was read (instructor email questionnaire) was cross referenced. Multiple data sets provide for multiple perspectives designed to clarify meaning (Bloomberg & Volpe, 2008). For this study, data was collected using structured interviews, class recordings, an email questionnaire, and
student surveys. This provided data from multiple sources as the research questions were investigated.

**Qualitative Analysis**

Bogdan and Biklen (1982) define qualitative data analysis as “working with data, organizing it, breaking it into manageable units, synthesizing it, searching for patterns, discovering what is important and what is to be learned, and deciding what you will tell others” (p. 145). The following section provides details on the qualitative analysis processes and procedures conducted by the researcher for the study.

**Content Analysis of Transcribed Interviews**

The goal of qualitative data analysis is to uncover emerging themes, patterns, concepts, insights, and understandings (Patton, 2002). Content analysis as a research method is a systematic and objective means of describing and quantifying phenomena (Krippendorff, 1980; Downe-Wamboldt, 1992; Sandelowski, 1995). Conducting a content analysis allows the researcher to provide condensed and broad description of the phenomenon, and the outcome of the analysis is categories describing the phenomenon (Elo & Kyngä, 2008). In social science, discourse around the linkages between the terminology of themes and their expressions often are understood to have the same meaning but use different terms to do so. Grounded theorists talk about “categories” (Glaser & Strauss, 1967), “codes” (Miles & Huberman, 1994), or “labels” (Dey, 1993). Opler’s (1945) “expressions” are called “incidents” (Glaser & Strauss, 1967), “segments” (Tesch, 1990), “thematic units” (Krippendorf, 1980), “data-bits” (Dey, 1993), and “chunks” (Miles & Huberman, 1994). Lincoln and Guba (1985) referred to expressions as “units” (p. 345).
Strauss and Corbin (1990) called them “concepts.” The purpose of identifying categories is to build up a model, conceptual system, conceptual map or categories. For Strauss and Corbin (1990), the links between expressions and themes are “conceptual labels placed on discrete happenings, events, and other instances of phenomena.” Themes, or categories, are the classification of more discrete concepts. “This classification is discovered when concepts are compared one against another and appear to pertain to a similar phenomenon. The concepts were grouped together under a higher order, more abstract concept called a category” (Strauss & Corbin, 1990, p.61).

The main form of data analysis was content analysis. Content analysis is a technique that enables researchers to study human behavior in an indirect way, through an analysis of their communications (Fraenkel & Wallen, 2009). Content analysis as a research method is a systematic and objective means of describing and quantifying phenomena known as a method of analyzing documents (Downe-Wamboldt 1992; Krippendorff 1980; Sandelowski 1995).

Data analysis began with the interviews being transcribed verbatim. With the amount of text generated by in-depth interviews, constant comparative data analysis was used. In this method, each occurrence in the data is compared with other incidents for similarities and differences, thus generating as many themes of analysis as possible (Corbin & Strauss, 2008). A conventional qualitative content analysis approach was used while moving backwards and forwards, a constant comparative strategy, between the interview responses. The researcher identified the presence of words and concepts that represent emergent themes within the interview transcripts. Uncovering the regularities or patterns among categories is a process called thematic analysis (Shank, 2006). The uncovered patterns often create a network of themes. The meaningful relations among constructs (presumed qualities, traits, abilities, etc.) develop theory that emerges from the network of themes.
After the coding was completed, the researcher compared similarly coded data to identify each possible dimension of a theme and the relation of a theme to other categories and themes (Corbin & Strauss, 2008). Coding identified different aspects of the same phenomenon and provided elaboration and variation. By using the constant comparative approach, the researcher was 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).

**Ethical concerns and IRB compliance**

Faculty participating in the study signed an informed consent form that was delivered by the principle researcher. Faculty had the opportunity to read the study information and offer their consent. Forms were collected at the interview. This study presented minimal risk to participants. Loss of confidentiality was the main risk associated with participation in this research. However, assigning participants a PIN so that their name or other identifying details were not associated with their data minimized loss of confidentiality in this study. The consent forms can be found in Appendix A and Appendix B.

**Video Recording Analysis**

As part of the research process, analysis is required to make information meaningful. The use of video footage, as an extension of direct observational techniques and the creation of field notes, allows for a more detailed analysis to occur (Gobo, 2008). In particular, the ability to revisit the same event for repeated observation and analysis is a key innovation in video research (Erickson, 1992). Video footage provides researchers with numerous ways of interpreting the events that have been captured. Video as a research tool opens up a multitude of possibilities in
terms of attending to the layers of complexity that are inherent in the acts of teaching and learning. Explicit strategies for focusing the attention of video recording analysis is needed to organize its many complexities, and avoid becoming lost in detail. Strategies are needed for establishing the content of the recordings and making decisions about how to represent the phenomena included within them.

Erickson (2006) provides three sets of guidelines for analyzing video recordings, each reflecting fundamentally different approaches to inquiry. Erickson (2006) describes: 1. a whole-to-part inductive approach, in which social viewing and re-reviewing are used to identify patterns in data for which there are no strong orienting hypotheses, predictions or theories; 2. a part-to-whole deductive approach, which involves looking for specific types of events and is appropriate when research is driven by strong questions, hypotheses or theories about those events; and 3. the manifest content approach, in which interaction focusing on particular pedagogical or subject content is selected out and examined.

The researcher used a part-to-whole deductive approach as defined by Erickson (2006), to identify specific principles of teaching and learning and specific pedagogies as driven by the study’s research questions. Weiss (1994) purports some coding categories exist before ever knowing what the collected data will produce. The researcher used pre-existing categories that were identified from the in-depth analysis of the interviews to code and analyze the video recorded in-class instruction of the teaching faculty.

Observation is a preplanned research tool which is carried out purposefully to serve research questions and objectives. When using this method, the researcher observes the “classroom interactions and events, as they actually occur” (Burns, 1999, p. 80). Flick (2006, p. 219) also contends that observation “is an attempt to observe events as they naturally occur.” Observation enables the researcher to combine it with questionnaires and interviews to collect “relatively objective firsthand information” (Johnson & Turner, 2003, p. 314). Merriam (1998, p.
Fraenkel and Wallen (2003, p. 453) state that the observers “study the subjective factors objectively.” However, Nation (1997, p. 276) asserts that the researchers try to study the “representations of behavior rather than the behavior itself.”

**Reliability and Validity**

An initial definition provided by Denzin and Lincoln (1994) adheres that qualitative research is multi-method in focus, involving an interpretive, naturalistic approach to its subject matters. This means that qualitative research study things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them.

To ensure reliability in qualitative research, examination of trustworthiness is crucial. Lincoln and Guba (1985) argue that sustaining the trustworthiness of a research report depends on the issues, quantitatively, discussed as validity and reliability. The idea of discovering truth through measures of reliability and validity is replaced by the idea of trustworthiness, which is “defensible” and establishing confidence in the findings (Lincoln & Guba, 1985).

Seale (1999), while establishing good quality studies through reliability and validity in qualitative research, states that the “trustworthiness of a research report lies at the heart of issues conventionally discussed as validity and reliability”. When judging qualitative work, Strauss and Corbin (1990) suggest that the "usual canons of ‘good science’...require redefinition in order to fit the realities of qualitative research”.

Reliability and validity are conceptualized as trustworthiness, rigor and quality in qualitative paradigm. Trustworthiness can be achieved by eliminating bias and increasing the researcher’s “truthfulness of a proposition about some social phenomenon using triangulation. The qualitative researchers use combination of strategies from the list of following ten recommended
by (McMillan & Schumacher, 2006). Negative case analysis enhances rigor and is used in the quest for verification (Padgett, 1998; Strauss & Corbin, 1990). In this study, negative case analysis involved a reexamination of every case, after the initial analysis was completed, to see whether the characteristics or properties of the emergent themes were applicable to all cases. When it was determined that there were no negative cases or disconfirming evidence, the analysis was considered complete. Figure 5 lists the strategies to increase validity in qualitative research paradigm. The researcher used strategies 2, 3, 6, and 10 in this research study.

<table>
<thead>
<tr>
<th>Strategy #</th>
<th>Strategy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prolonged and persistent field work</td>
<td>Allows interim data analysis and corroborate to ensure match between findings and participants reality</td>
</tr>
<tr>
<td>2</td>
<td>Multi-method strategies</td>
<td>Allows triangulation in data collection and data analysis</td>
</tr>
<tr>
<td>3</td>
<td>Participant language verbatim accounts</td>
<td>Obtain literal statements of participants and quotations from documents</td>
</tr>
<tr>
<td>4</td>
<td>Low-inference descriptors</td>
<td>Record precise, almost literal, and detailed descriptions of people and situations</td>
</tr>
<tr>
<td>5</td>
<td>Multiple researchers</td>
<td>Agreement on the descriptive data collected by the research team</td>
</tr>
<tr>
<td>6</td>
<td>Mechanically recoded data</td>
<td>Use of tape recorders, photographs, and videotapes</td>
</tr>
<tr>
<td>7</td>
<td>Participant researcher</td>
<td>Use of participants recorded perceptions in diaries or anecdotal records for corroboration Check informally with participants for accuracy during data collection frequently done in participant observation studies</td>
</tr>
<tr>
<td>8</td>
<td>Member checking</td>
<td>Ask participants to review researcher’s synthesis of interviews with person for accuracy of representation frequently done in interview studies</td>
</tr>
<tr>
<td>9</td>
<td>Participant review</td>
<td>Actively search for record, analyze, and report negative or discrepant data that are an exception to patterns or that modify patterns found in data</td>
</tr>
</tbody>
</table>

Figure 5. Strategies to Increase Validity in Qualitative Research paradigm as recommended by McMillan and Schumacher (2006).
Within qualitative research, the researcher must look to themselves and to the participants to address issues with reliability and validity (Creswell, 2007). In the 1980s, Guba and Lincoln substituted the terms reliability and validity with the concept of “trustworthiness” which contains four aspects: (1) credibility, (2) transferability, (3) dependability, and (4) confirmability (Creswell, 2007; Morse, Barrett, Mayan, Olson, & Spiers, 2002). Essentially, trustworthiness relates to how well a study does what it is designed to do (Merriam, 1995). Because qualitative research assumes that realities are constructed and constantly changing, concerns with internal and external validity must be addressed. In this particular study, the researcher used the following methods to establish trustworthiness.

**Generalizability.** The use of rich and thick descriptions within the findings of the qualitative data helped to ensure transferability. By using detailed descriptions of the phenomenon, the researcher was able to enable readers to determine if the findings are transferable because of similar characteristics (Creswell, 2007). The findings of this study are influenced by the use of rich descriptions and authentic participant quotes. Generalizability was strengthened through the use of multiple cases that represent a variation of the phenomenon, which allows the results to be applied to a greater range of similar situations (Merriam, 1995).

**Triangulation.** Triangulation lends credibility to the findings by incorporating multiple sources of data, methods, investigators, or theories (Erlandson, Harris, Skipper, & Allen, 1993). This study utilized qualitative and quantitative data points to strengthen the credibility of the findings. The interviews and class recordings provide rich in-depth data to provide thick description. The quantitative survey administered to the faculty and students provides additional data to support the findings. The faculty survey, Approaches to Teaching Inventory, was used to determine the faculty member’s perceptions regarding their teaching style. A quantitative survey was also administered to the students in the class session recorded of the faculty member.
teaching. The survey was used to determine the students’ perception of the faculty members' teaching style and effectiveness.

Faculty Survey Instrument

A short faculty questionnaire was developed at the conclusion of the interview process. The questionnaire was utilized to provide clarity and deeper understanding of the findings in the interviews. Faculty were asked to confirm their primary instructional pedagogy and provide a personal definition of that pedagogy. The questionnaire consisted of six main questions with additional sub questions. The questions were developed by the researcher after initial analysis of the interview findings and were desired to bring clarity and depth to questions asked during the interview. The questionnaire was reviewed by a panel of experts for face and content validity. Based on the reviewers’ comments the unclear and obscure questions were revised and the complex items reworded. Also, the ineffective and nonfunctioning questions were discarded altogether. The questionnaire was emailed to the nine Penn State faculty members.

All nine faculty members at PSU were sent the survey via email. The non-respondents were contacted with a reminder email which also contained the questionnaire was sent after two weeks. After the first reminder email, only one faculty remained non-respondent. A second reminder email was sent three weeks following the initial reminder email. The questionnaire was not sent to the SLU faculty members.
Quantitative Approaches

The purpose of the quantitative approaches was to identify the students’ perceptions of the award-winning faculty’s teaching effectiveness.

Student Survey Instrument

The student survey utilized for this study was developed by Young and Shaw (1999) in a study addressing how teaching effectiveness is defined. Young and Shaw (1999) proposed six major dimensions of effective teaching: value of the subject; motivating students; a comfortable learning atmosphere; organization of the subject; effective communication; and concern for student learning. The instrument was developed using items from extensive literature on student evaluation and effective teaching (Young & Shaw, 1999). The survey is composed of 25 items established by Young and Shaw (1999). The lead researcher and doctoral committee members developed the remaining seven items. The researcher worked under the assumption that Young and Shaw (1999) pre-established reliability and validity of survey items.

All items were rated on a scale from 1 to 5, where 1 was “strongly disagree”, and 5 was “strongly agree.” The survey was administered to students at the end of the recorded class session. Students were asked to respond to items about the teacher of the class just recorded.

Young and Shaw (1999) results revealed that “value of interest, motivating students to do their best, comfortable learning atmosphere, course organization, effective communication, concern for student learning, and genuine respect for students were highly related to the criterion of teacher effectiveness” (p.682). The most significant finding of this research was that the value of the course for the university students was regarded as the most important predictor of teacher effectiveness.
Quantitative Analysis

Quantitative data was analyzed using the Statistical Package for Social Sciences (SPSS) version 20.0.

The student survey was used to identify the students’ perception of the teacher’s effectiveness. Student ratings can range from 1 to 5 on all 33 items. Item means and standard deviations were calculated for each participating faculty member.

The results collected from the student survey provided researcher with perceived effectiveness as determined of the faculty members by their students. Basic descriptive statistics will be utilized for this study to strengthen the qualitative data garnered.

Quantitative and Qualitative Data Synthesis

“Mixed methods research is defined as the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study (Johnson & Onwuegbuzie, 2004, p. 17). The application of a mixed methods approach is based on the belief that neither quantitative nor qualitative methods are sufficient to fully understand the phenomenon being studied. The use of both methodologies provides a better understanding of the research problem rather than using each approach individually (Creswell & Plano-Clark, 2007; Ivankova et al., 2006; Pole, 2007). Mixed methods research in a single study can help “obtain a fuller picture and a deeper understanding of a phenomenon”(Johnson et al., 2007, p. 119) and also allow for a more robust analysis (Ivankova et al., 2006). Mixed methods research is becoming increasingly articulated and is currently recognized as a third major research paradigm, along with quantitative and qualitative research.
paradigms (Creswell & Plano-Clark, 2007; Johnson & Onwuegbuzie, 2004; Johnson et al., 2007; Mt. Collins & O’Cathain, 2009).

The goal of this study was to further explore and explain the explicit links between purposefully selected faculty espoused teaching theories and their teaching practice. The qualitative data collected first was used to identify the espoused theories in action of the identified excellent teachers. This approach allowed the researcher to perform an in-depth exploration of how teachers believe they teach and the pedagogical practices they use. The recorded class sessions were another form of qualitative data collected to observe the identified excellent teacher actually teaching and identifying their actual theories in use; the actual approaches and pedagogical practices used when teaching. The qualitative data was collected and related to the outcomes from the quantitative strand that was collected after the class recordings. Thus, basic descriptive statistics quantitative data provided a general picture of the espoused teaching practices and perceived effectiveness, while the qualitative data and its analysis further explained if a disconnect exists between the espoused theories in action and the actual theories in use.

Integration refers to the stage or stages in the research process where the mixing of the quantitative and qualitative data occurs (Creswell & Plano-Clark, 2011; Ivankova et al., 2006). In this study, the data connecting occurred after the qualitative data was collected and analyzed to determine if the descriptions of teaching methods espoused, teaching pedagogies used and epistemological beliefs aligned with the outcomes of the quantitative measurement. This connecting point served as a foundation for the larger interpretation discussed in the findings section of the study. The second connecting point occurred with the quantitative results from the student perception survey, which allowed the researcher to determine if the perception of the identified excellent teacher that their teaching practices were perceived as effective to the students enrolled in their respective course.
Participant Description

The following section provides a pseudonym that has replaced the participants’ names and background information to provide the reader with context and more rich detail that can be referred to when reviewing the findings and results. Verbatim statements from the interviews are presented, as the researcher felt this provided the most authentic description of each participant.

SLU Faculty

Professor Ava – “I’m a Danish woman, I’m 52 years old. I teach animal sciences in Copenhagen, since 1986. I have worked for a couple of years in Copenhagen in something called Danish Institute and then after that my husband moved to Sweden, and I had been working at the Agricultural Board in Sweden, and after that in 1994, I got a job at the Swedish University of Agricultural Sciences and I have been employed by the university since then. Two years ago I started my PhD studies at Copenhagen University in Educational Sciences. A couple more things. I’ve done quite a lot of international courses, you could say; smaller courses in different countries and also some exchanges with other universities, for example Colorado University in the States. I’ve done some exchanges like that and I’ve also done, I’ve taught all the PhD or some PhD courses in my first subject you could say which is animal welfare and food science and also in pedagogy, which I’m studying now.”

Professor Cathy – “I’m Swedish by nature, married to an American man, so we have two languages in our family, and I’m teaching in both English and Swedish. I’m approaching 50 with a scary speed, and I’ve been a teacher and researcher for almost twenty years, but I have a science background, not a social science, I have a medical background, and then I kind of ventured into
social sciences at the end of my master’s program. After a few years of working, as a consultant, I
came back to do a PhD…So that’s the background and from there and onwards, I haven’t really
left SLU on a proper post-doc or something, but I’ve been in Canada and in the United States and
this is where I think many of my ideals for good teachers and for strong pedagogics come from so
I’ll mention in detail later on. I went to Technical Gymnasium, which is like a college almost, and
then I went to medical school for three years, and I decided that the medical doctor maybe would
be hard to combine that with all of the other things I wanted to do and be in life. So I continued
instead at the Ag University. So I’m an agronomist with a food science background, but I did my
master’s thesis in management, so that’s where the management came in. After a few years out
working, I came back because we got external funding with my former advisor for my master’s
thesis, he was also my advisor for my PhD. I’ve been abroad, not on my own post-doc but my
husband’s post-doc. We went to Canada, to Waterloo, and we’ve also been in close contact with
his alma mater, Cornell, upstate New York.”

Professor Don – “I’m a master of science. I took my agronomist degree here /SLU/ in 1995, and
then started my PhD, which I finished in 2003. The PhD dissertation was defended in June 2003,
and immediately after that I changed focus from research to, in the beginning both teaching and
administrative duties, and since quite a large number of years now I’ve focused solely on director
of studies issues, which includes planning, some administration, and various aspects related to
teaching and our educational programs. I’m not directly involved in teaching, but I meet students
several times a year and have presentations and so on. That was very short for my background.
My background in academic point of view is in business administration. I have my PhD in
business administration.”
Professor Ellie – “I’m a lecturer to start where I am right now. I’m a lecturer in anatomy, histology, and biology in the Department of Anatomy, Biochemistry and Physiology. And not so much, very little biochemistry, a little bit of physiology, and female reproduction is my main area. But I’m doing a lot of different things I would say. I’m not really a specialist in almost nothing, but doing lots of different things, and I’ve been here for a long time. I’m a veterinarian by training and graduating here from SLU. After that I lived in, Zambia, Southern Africa for a couple of years and was a teacher. When I came back turned out that I was allergic to some animals. I had my first child there and probably it started out then, not so good for a vet. So it emphasized that I continue with teaching activities, and so I’ve been here since then, and I’ve done a PhD and been involved in different things, and education has become the focus more than the research activities due to reasons I can explain later.”

Professor Matt – “I’m an agronomist. I started agronomy in the year 1987 and that education lasted until 1993, with a little interruption for doing some other work during a half a year, and I’ve also done a PhD in the soil science, soil chemistry to be more precise, here at this department. I’ve been abroad one year in France doing a post doc. Eastern France, Northeastern France, and since then I’ve done teaching and research here at this department.”

Professor Roger – “I have an undergrad degree in chemistry from a long time ago, I guess where are we, more than 20 years ago, and then I did various things for quite a few years. Some non-professional traveling and stuff, I also worked in development work. Then about 15, 16 years ago I started to get into economics and that was in Sweden, so I did a kind of crash undergrad to then be able to register for the PhD. I took my PhD ten years ago and since then I’ve been doing a combination of teaching and research, and actually I started teaching straightaway even when I started the PhD, I actually had some lectures to do in the third year course, and I’d only started in
economics about half a year before, which was interesting. I tried to do, I guess, research wise, I do relatively theoretical research or relatively abstract research in the sense that it’s supposed to be, I try to answer quite big questions, which are of broad relevance rather than going and looking at detailed right here, right now, what do we do. I’m thinking more okay, big picture, how do things work, what are the causes of these tendencies we see, nationally or globally, now we know what the causes are, what do we do about it, and I guess I try to teach in the same way trying to give the students a kind of deeper understanding rather than focusing on giving them particular tools.”

**Professor Philip** – Professor Philip received his degrees at Stockholm University in “the department of botany, and I was the department of botany where I had systematics, methodology, physiology, all of them. And then after that I was unemployed when I had my PhD degree, then I worked nearly a year on the Ecology, Natural Environmental Board, and after that I came to SLU…I have no background in agriculture at all.”

**PSU Faculty**

**Professor Bob** – “I grew up in New England, and grew up on a very small farm being that it wasn’t an economically viable farm necessarily; we had a lot of animals -- pigs, horses, chickens, and a lot of other animals on top of that. My family owned, for much of my life, a small feed mill in Massachusetts that was really just a feed store, we didn’t actually mill much food there, but we had that from the mid-80s through the early 2000s, and I went to the University of Richmond and did my undergraduate degree in biology, and then went from the University of Richmond to Virginia Tech, where I did my masters and my PhD in animal science. I’ve always had an interest in really animals so I was certainly one of those students, an undergraduate, that had an
interest in going on to vet school. That didn’t work out for one reason or another, but when I went and did my masters in animal science, it was the first opportunity again, maybe it was bad advising or I don’t know what you want to call it, but I had my eyes opened up to the fact that there was a lot more to do with animals besides veterinary school, which I think happens with a lot of students. So then I’ve always loved science, I’ve always been very curious, I like studying things and figuring things out. I like challenges and problems. I’m very curious about the world around me, and that’s why I kind of like what I do today. Once I’d gone away and done the masters and I actually had a chance to do some undergraduate research, I never really looked back, so I enjoy that and I think today that’s why I still enjoy what I do that the research is still a part of the teaching that I do. To be honest with you, the teaching also offers some interesting challenges that I enjoy on a day-to-day basis.”

Professor Cory – “I have an associate’s degree from Morrisville State College in New York, because when I went to school I wasn’t sure what I wanted to do. From there I went to Cornell where I got my bachelor’s degree. At that point I decided I wanted to go to grad school so I came to Penn State where I got my Master’s degree, and then I got my PhD at Tennessee in animal science with a focus on dairy cow genetics. Then I did teach for one semester, actually it was my last semester of my PhD, while I was at Tennessee, I actually spent the semester at Morrisville teaching and then during that semester I was hired to come to Penn State.”

Professor David – “I’m actually a landscape architect and got my bachelor’s degree here at Penn State, and got a master’s degree from North Carolina State, and my first several jobs were as a landscape architect. I worked for the Department of Transportation in New York, I worked for the U.S. Forest Service in North Carolina, and I worked for a landscape architect contracting company in Boston. Then had my own design-build firm in Boston and was up there for about 9-
1/2 years all before I came back and took this job and began teaching, which is really a career switch. For me it was quite an eye-opener to show up one day and say, now I’m teaching. It was all brand new to me. Of course, one of the thoughts that I had was I have no idea how to do this! I’ve got a lot to learn! I think that having had the work experience that I had really helped me in terms of preparing for that and certainly understanding the domain, and I think that that has helped me be successful in that students understand that I have actually done some of those things and know what I’m talking about. How much of that they believe, I don’t know at this point, but I think that’s really an advantage.”

Professor Gabe – “I went to elementary and high school at a small rural place in southeastern Minnesota. Nineteen were in my graduating class but not all 19 made it. A lot dropped out along the way for various reasons, including jail time, pregnancies, you name it. I think there were only about half of us actually ended up graduating, at least at that time, others may have finished later. I went to Hamlin University in St. Paul, where my degree was in history and that was a dramatic eye opening experience. I went in rather a narrow minded, rural kid. I came out far more open minded and a very curious person. I then went to the Harvard Divinity School where I got a master of divinity. At the time I was hoping to become a Lutheran pastor. The main reason I went there was to do world religions, because I was very interested in Chinese religion, it was part of my history degree in my undergrad was Chinese history and Chinese religion so I went to Harvard to study that with the interest also of becoming a pastor, but while there, I became very interested in old testament studies in particular land tenure in the old testament because it wasn’t that long after the end of the farm crises and I was struck by a couple of texts that I was reading in my old testament class that seemed to suggest that God wasn’t in favor of the farm crises – surprise, surprise – but it was an eye-opener to me at the time. I went and worked at a church for a year and decided I had to get out of that and so that’s how I ended up going to the University of
Missouri to get a PhD in rural sociology. Basically that transformation that took place while studying the old testament I put into practice in rural sociology studying, what would the word be, inequalities in agricultural policy and how the bi-lights and basic ethical principles that many of us assume. That’s perhaps longer than you wanted.”

**Professor Hannah** – “I’m a plant science department faculty member. I’m an associate professor of crop production ecology. I came to Penn State in January of 1998 with a 70 percent teaching appointment and my charge was to develop new courses for at that time it was a new agroecology undergraduate major, so over the past 16 years or so have developed about six new courses and quite a few of them I co-teach. Another course I was asked to teach I’ve significantly revised Agronomy 28, which now someone else just started teaching last fall. I do research. I started in grazing systems and then I sort of have shifted my research area to cropping systems research, and my teaching has helped me be able to do that. I’ve definitely sort of developed courses as new needs and opportunities have arisen. I teach one graduate class now and three undergraduate classes, although I co-teach some of them. I advise for the agronomy minor, which is an undergraduate minor so that might be relevant. I got an undergraduate degree in environmental biology from Yale, and when I was there, I got very interested in learning more about agroecology. I went through forestry school classes and I learned about agroecology in a seminar speaker series. Then I went to Cornell and I got my masters and PhD in agronomy at Cornell, and I took an interdisciplinary approach in that degree with minors in ecology and soil science. Then I did a post-doc at Utah State University before I came to Penn State. Along the way, I studied some international agriculture and spent some time as a TA in Costa Rica and did some other things.”
**Professor Jacob** – “I’m currently an associate professor in the Department of Agricultural Economics, Sociology and Education with my primary focus on teacher education, preparing students who want to be high school Ag educators or Extension educators. I also serve as the undergraduate program coordinator for the AEE major as well as the Ag science major, and in that role, I have advising duties with both Ag science and AEE majors. I completed my graduate work at Ohio State University. I completed both my master’s and my PhD in agricultural and extension education, again with a primary focus on teacher education but also minors or cognates in philosophy as well as higher education. Prior to that, I was a high school Ag teacher for three years in southeastern PA at a rural high school in Chester County, Octorara, PA, and I taught high school agriculture -- mainly Ag mechanics, animal science, and a little bit of plant science in there as well. I am a Penn State alum, I got my undergrad here in 2000.”

**Professor Kaleb** – “I’ve been at Penn State about ten years. I’ve been teaching at the college level for about twelve years and my field is ecosystem ecology and soil nutrient cycling. My undergraduate degree is in chemistry from the University of Virginia, and then I have a master’s degree in forestry from Northern Arizona University, and my PhD is in ecology from Colorado State University.”

**Professor Mark** – “I grew up on a dairy farm. Did not want to go back to the dairy farm for a long time, and then in college, decided that’s not a bad idea, so decided to go back to a dairy farm. I farmed for five years and went broke, and then I went back to school at Ohio State University for a master’s in agronomy and then Minnesota for a PhD in agronomy, and my first teaching position was at the University of Idaho. That was teaching/research, I was interested in Extension. This position here opened up, it not only got my wife and family closer to home, and we’re within eight hours of family now where that was a three day drive. I applied and got this
position, and I had a 75 percent Extension/25 percent teaching for a long time, and then with retirements and shifts in assignments, I took on the forage production class. With more retirements and changing of majors and things like that, redesigning curriculum, I now teach three undergraduate classes and two graduate classes, and still have a 60 percent Extension appointment and a 25 percent teaching appointment. Yeah, once I got to grad school, there was somewhere farming and going broke made a life altering experience for me, so when I got to grad school, I was very observant of how people taught. My undergrad was in education and I taught junior high for a while and then substituted for a while so I had some education background but in undergrad it was more just philosophy that, oh yeah, I have to learn this, big deal. By the time I got to grad school, it was more observing teaching styles, what people did, how they interacted with students, what I found interesting or exciting or what got my attention and made me interested in the subject, and I would constantly see things, I’d say that is not good, this is not good, oh, I like that, and sort of started building up this thing in my head about styles and things that I liked and how to keep the students interested, so that was an education, although my graduate program was strictly in research that was an education I kind of got sort of extra-curricularly, a research education.”

**Professor Nicole** – “I’m an instructor of companion animal science at Penn State, and I teach a bunch of small animal/companion animal classes. I’m actually a veterinarian and I practiced for 13 years before coming back and had that life experience. I’m also a mother with two teenagers, and a wife, and a daughter so making things confusing right now, so I’m balancing all of those things. I had three years of undergraduate study at Cornell in animal science, and then I got into vet school a year early so combined my senior year of animal science and first year of vet school at Cornell, and then continued for three more years after that for the DVM. Then, I came back to Penn State, I don’t know what year that was, and I got a PhD in biobehaviorial health in Health
and Human Development College. In 2007 I think is when I finished that. So ’89 I got the DVM.”

**Summary**

This chapter described the rationale for a two institution case study research design and methodology for examining the links between award-winning faculty espoused teaching beliefs and their instructional pedagogies. The quantitative and qualitative methodologies were explained, including information regarding the population, data collection and analysis procedures. Procedures utilized to ensure the reliability and validity of the qualitative data was also discussed. In addition, methods to synthesize the quantitative and qualitative data to provide a more rich description of the study were described.
Chapter 4

Results and Findings

Chapter 4 presents the study results. A brief review of the research including the purpose and objectives opens the chapter. The data analyzed for each university will be presented by university as well. The results of each research objective follow with a description of the issues and themes which emerged from an analysis of the interview data by university. The interview guide (Appendix C) provides the prompts which were then analyzed and synthesized to formulate the results and findings. Finally, a summary of the results is presented.

Study Overview

The purpose of the research study was to examine the links between purposefully selected faculty members espoused teaching theories and their teaching practice. The research study focused on better understanding how university faculty learn to teach and thus provide a basis for enhancing postsecondary agriculture instruction. The research study compared the approaches to teaching of identified excellent teachers in two agricultural science postsecondary institutions.

The study objectives include:

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.
3. Identify faculty members’ operationalization of their instructional pedagogy.
4. Differentiate between teachers’ beliefs and instructional practice.

5. Describe faculty members’ perceptions of discipline specific pedagogy.

6. Describe students’ perceptions regarding the effectiveness of the teacher to deliver a course as stated in the operationalized epistemological beliefs of faculty.

7. Analyze relationships between identified teaching beliefs, operationalized definitions, and students’ perceptions of utilization of operational definitions of faculty at two colleges of agricultural sciences.

**Swedish University of Agricultural Sciences Results**

The epistemological and pedagogical teaching beliefs of seven faculty members from The Swedish University of Agricultural Sciences who participated in the face-to-face interviews were identified. Four faculty members were video recorded while teaching their respective classes and the students in those classes completed the student survey designed to assess teacher effectiveness (Appendix D).

**Epistemological and Pedagogical Teaching Beliefs (Objective One and Two)**

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, Chai, Lee & Hung, 2008).
The findings regarding the epistemological and pedagogical beliefs are reported in the form of themes supported by quotes from the interview transcripts. Table 1 provides a summary of the epistemological and pedagogical themes of the SLU faculty followed by text containing verbatim quotes.

Table 1. Summary of Epistemological and Pedagogical Themes of SLU Faculty

<table>
<thead>
<tr>
<th>Themes</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The SLU faculty held a range of epistemic attitudes that were contextualistic in orientation.</td>
<td>Contextualists 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 &amp; Olafson, 2002).</td>
</tr>
<tr>
<td>The SLU faculty held a range of pedagogical beliefs that were learner-centered in orientation.</td>
<td>Learner-centered belief emphasizes student responsibility for learning and is focused on knowledge construction and how students are induced to work and learn together.</td>
</tr>
<tr>
<td>The SLU Faculty equally engages in reflection-in-action and retrospective reflection-on-action on their teaching practices.</td>
<td>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.</td>
</tr>
<tr>
<td>The SLU Faculty feel confident in their teaching abilities.</td>
<td>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</td>
</tr>
</tbody>
</table>
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. According to Schraw and Olafson (2002), “teachers' epistemological worldviews influence the ways that they make important instructional decisions related to the curriculum, pedagogy, and assessment.” 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 Ellie: “Facilitator, motivator, resource person. I lecture quite a bit, but I would like to be the resource person in a way that I would never answer a question that they haven’t asked, but of course I do. When I’m in a lecture, it cannot always be where they are asking, so you have to be a bit ahead, but if we had resources and a kind of attitude that it was more acceptable, I would have much less lectures, much more of other activities kind of giving them tasks, working on independently and in groups and actively work on it, but we still have to lecture a bit.”

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.”

Professor Roger: “I think my role is to guide them through the subject and help them also to read the book, and guide them through the part that may be complicated for them and also I think the scientific perspective that we don’t know everything and its still hypothesisism (sic).”
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 the contextualist epistemic belief.

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 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, Meijer, Verloop, & Bergan, 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 & Elliott, 2004; Samuelowicz & Bain, 2001). Thus, teacher beliefs typically encompass teacher-centered and learner-centered pedagogical beliefs (Chai, Hong, & Teo, 2009).

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 events that take place that must make people realize that they don’t know everything. I think that’s one of the biggest problems is if a student thinks that he or she understand everything, but don’t get very high grades on the exam, because they haven’t realized yet what they don’t understand, and I hope to make them realize that the world is more complicated than they first thought, and very often they say to us at the end of the course, they have written exams…and they often say that until the exam or even during the written exam, they were kind of confused about everything. It was loose threads leading in different directions. They wanted to put the things together, but I think that that exercise was very good because it brings things together a nice way.”

Professor Ellie: “[The role of the student is] Actively mostly, so I’m involved in both lectures, practical demonstrations, practical facilitations, they work themselves in small groups with their sections and so on in microscopy, and we move around as teachers facilitating what they do. And PBL [Problem-based Learning] facilitation although we have modified a method now so we are not a teacher in each group all the time, we have a few years to go, we have to decide if we have to continue or stop completely or modify because we didn’t have teachers enough. So now we have teachers just when they start, the first couple of meetings, and then they work and we are teachers moving around between two or three groups, and it works quite well. What is good with that is that they take a bit more responsibility.”

Professor Roger: “Yeah. I’m going to say fundamentally, everything is totally up to the student. All I can do is try to nudge them in the right direction, try to get them thinking about things...”

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 (1983) 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 (1983; 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 & Lederman, 1999). The result of the reflection process is the context-specific pedagogical knowledge that helps guide teachers’ decisions and actions (Gess-Newsome & Lederman, 1999).

**Professor Matt:** “I do it every time I write. I read written answer to my questions in the exam. I start to ask myself how silly the question was in the exam or how confusing my lecturing was and how confusing is the chapter in the book that they have to read also. So I mean what they have understood and what they can express through their writing. I mean that’s a good opportunity to start to reflect when teaching. That’s quite interesting actually. I have now to mark thirty exams, and there’s a wide range, of course, of how well they have understood things and how well they are able to express what they have understood, and of course it’s impossible to know what is well understood but hard to express it and what is well understood and not so well understood, but skillful answering to tricky questions. Also by, of course, discussing with students
individually and there are quite a few, too little opportunities during a course when you have thirty or even sixty students to do that. You don’t get to know them very well, but of course, that’s an opportunity.”

**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, Keogh & Walker, 1985; Sternberg & 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 & Carroll, 2003; Yeung & 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, Woolfolk Hoy, & Hoy, 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.”

Identifying the epistemological beliefs of award winning faculty is the first step in identifying how it is translated into discipline specific pedagogies. Epistemological beliefs factor into teaching philosophies which impacts instructional practices and can lead to the improvement of teaching and learning. Epistemological worldviews are generalized intellectual belief systems about the nature of knowledge, and each has implications on how individuals can know and learn (Schraw & Olafson, 2002). The seven SLU faculty members held a contextualistic epistemological worldview. Contextualists see themselves as facilitators, who along with the learners collaboratively construct shared understanding. The SLU faculty held a contextualist position holding the beliefs that learners construct shared understandings in supportive contexts in which teachers serve as facilitators. Teachers with a contextualist world view are less concerned with the type of knowledge that students construct than the process by which they construct that knowledge, and the degree to which that knowledge has authentic application to the context it is learned in (Mertens, 2005; Schraw & Olafson, 2002).

Every teacher holds a set of beliefs that determine priorities for pedagogical knowledge and how students acquire knowledge. Learner-centered instruction, embodied in a constructivist orientation (Elan, Clarebout, Leonard, & Lowyck, 2007; Harris & Cullen, 2010; Kayler, 2009) is a paradigm shift from how instructors teach to how learners learn (Weimer, 2013; Wohlfarth et al., 2008). The shift is from teacher driven instruction to a new role for learners (Weimer, 2013).
The SLU Faculty held a constructivist teaching approach which attempts to make learning a more self-directed, personally-responsive, and socially-mediated process in which the learner’s own motivation and effort are just as important, if not more central, to the student’s education than the content or facts learned. A constructivism pedagogical stance assigns to systematically created social structures for learning. Debates between students, cooperative group projects, and other activities involving the articulation of students' own ideas in concrete contexts are valued by constructivists for their power to further individual understanding.

**Epistemological Beliefs**

The following verbatim quotations were taken from the interview transcripts. The bolded portions exemplify each SLU professors’ respective epistemological beliefs as provided given the prompt to describe. The quotations were instrumental in theme development.

**Professor Roger:** “I have a relativist theory of knowledge a bit Philistinian area of knowledge...if you think about the philosophy of language you know, words don’t have well defined meanings in the sense of objective meanings. We learn the meaning of words through experience. If I say something, I can’t be sure what you make of that. If that’s my theory of knowledge, and then after you think of the philosophy of science, then my philosophy of sciences would be...science is a debate in all our conversation and the winners are the ones, the direction is determined by what most scientists decide is the best way of looking at things. Its not necessarily who’s right and who’s wrong, but this way of thinking, this way of analyzing, is taking us forwards, helping us to a better understanding in some sense, helping us make better choices when deciding on the medical treatment or what fuel to use to send the thing to the moon or whatever, or what to do about climate change. So I guess could you link that to my philosophy? You could link that to my emphasis on understanding that I’m trying to get the
students to think and develop their own understanding of what’s going on rather than just taking it from me so to speak. That’s as far as we’re going to get.”

Professor Matt: “…I like the concept of constructivism, I think there is a lot in it that is sort of consistent with my own experience of learning simply…I want to confuse them a little bit and try to push them forward little by little, I think, to increase the complexity gradually; perhaps you don’t have to mention the entire truth. You can’t the first time you start to discuss the things. Gradually increasing the complexity. A little bit of confusion. Also, I think language and discussing things, I mean when you talk with other people and not necessarily with a teacher, I mean it’s important that they discuss with each other also in group works and if they do lab exercises, the discussing of things is very important because it sort of makes them put names on things and construct order in the way of thinking about the different concepts.”

Professor Cathy: “Honesty. If I don’t know something, I won’t pretend I do. I will gladly say does anyone know anything about this? I don’t. How do you spell blah, blah, blah if I don’t know how to spell it, and any speaker inevitably will help me in class. So honesty and a sincere interest, things that I teach I am sincerely interested in myself and that, I think, is the one comment that I have high level of engagement, I truly care for both the individuals and for the topics I teach so I’ll write recommendations after classes and I’ll be trying to connect the students with people for doing MFS, minor field studies, or for scholarships or for double degree programs, whatever I think would benefit a person, and I think that the sincere interest in both the topics and the individuals I meet. I think that that’s mine, because I’m not terribly brilliant like “Professor” he’s terribly brilliant, I’m okay, but I’m not a Nobel Prize Winner! Let’s put it that way! So, I think they compensate with a lot of true engagement.”

Professor Ellie: “I think that my own personal experience and both as student myself and as teacher from the feedback from students because I interact a lot with the students wand want to find out how did this work for you – did you like it – and then it comes later on also when I
look at the exam results of course, and so both ways should match... I’m very pragmatic, and I have quite a strong feeling myself, and I’m not sure where it’s routed really but it is probably a combination of my experience from my own learning encounters and from how I see students reacting. So, I kind of feel when things are working.”

Professor Philip: “To succeed with the courses, I have realized that the first most important thing is everything is in good order. They know exactly what will happen.”

Professor Ava: “...Which means that you should learn together, you should be aware of all the cultural dimensions when you teach... It has a lot to do with the experience, it has a lot to do with getting, as being problem-based, I have learned a lot in the teaching programs I have been developing, but also with workplace learning, that’s where we send out students three times, on time each year, in a program where they work with real projects whether it be industries, and not projects that are just test projects or something, but where they do an actual job, and we write, for example, contracts between the industry, the university, and the student through contracts.”

Professor Don: “...You can’t be a good teacher by studying a lot of books. Same thing, if I see myself as a student in the role of teacher and the best way for me to learn is to be the teacher in the classroom, not studying books.”

Role of the Student

The following verbatim quotations were taken from the interview transcripts. The bolded portions exemplify each SLU professors’ respective beliefs of the role of the student in their classroom, as stated when prompted to describe. The quotations were instrumental in theme development.

Professor Roger: “I’m going to say fundamentally, everything is totally up to the student. All I can do is try to nudge them in the right direction, to try to get them thinking about
things…” One of the roles is to actually tell me whether they understand or not, but they do it unconsciously so to speak without necessarily knowing that that’s part of the plan…”

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 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.”

Professor Ellie: “Active mostly, so I’m involved in both lectures, practical demonstrations, practical facilitations, they work themselves in small groups with their sections and so on in microscopy, and we move around as teachers facilitating what they do.”

Professor Philip: “…I think one very important role that I actually see that they’re interested and that they are listening and they ask questions if they don’t understand.”

Professor Ava: “I see the students as consumers and with consumers they are, of course, consumers of education and are definitely also producers of new knowledge, so I always see students as very important for the production of knowledge.”

Professor Don: “…the students must be active. To what you say in English, equal, it should be a partner in the lecture. They are as important as I am. They’re more important than I am, and they are the ones who are responsible for their learning, I can’t learn anyone else
anything, and I should be there to sort of help the students, to once again, give the framework, give the overall picture, but then they have to do the job. I will be there and help them as good as I can, but I’m not helping them just standing talking, talking, talking, talking. The student is there to be responsible for his or her own learning in my classrooms, and I’m not responsible for that.”

Role of the Instructor

The following verbatim quotations were taken from the interview transcripts. The bolded portions exemplify each SLU professors’ respective beliefs of the role of the instructor in their classroom. The quotations were instrumental in theme development.

Professor Roger: “Obviously, the concrete level was pretty straight forward, I stand there and talk and ask them questions. The more abstract level it’s what I talked about, it’s about motivating them and hopefully nudging them in the right direction obviously, try to explain things to them…”

Professor Matt: “The instructor, that’s me, I guess, it could be me or another person. I think it’s one that has to select the items that the students are going to be exposed to or confronted with, and also have a personal relationship both with those items and with the students with some sort of being a road sign to show them the important things. What is important with this, what is surprising with this, and what is perhaps natural, not surprised seeing and coherent with that previous experience. Remind them on what they have learned in previous courses, as far as I know what they have, I should be aware of what they have done before they came to my course.”

Professor Cathy: “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.” … “If the students are the instruments, sometimes I’ll find myself being an instrument as well and the student will take the lead. It could very well be compared to an orchestra where
I’ll be the conductor for some time being, but at the end of the class or at the end of a program, I always try to be on a very equal basis…”

Professor Ellie: “Facilitator, motivator, resource person. I lecture quite a bit, but I would like to be the resource person in a way that I would never answer a question that they haven’t asked, but of course I do.”

Professor Philip: “I think my role is to guide them through the subject and help them also to read the book, and guide them through the part that may be complicated for them and also I think the scientific perspective that we don’t know everything and its still hypothesis.”

Professor Ava: “That is to develop an atmosphere in the learning experience where students can feel free and relaxed and able to be consumers.”

Professor Don: “To give the frame for students since there is of course, I said that we are equal partners and I mean that of course. 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 experienced 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, and of course, I can’t give a lecture in your field because I don’t know that. Then I wouldn’t be any good, so I have to know the topic myself. It’s not a good thing for me to give a lecture in biology or genetics or something else, because I don’t know anything about them, so I have to know the field for their lecture, but then it’s more of a motivator and try to help the student do the job.”

Teacher Beliefs and Instructional Practice (Objective Four)

For educators to increase their knowledge of teaching and of themselves as learners, they first need to make explicit their espoused theories and theories-in-use and discover any
inconsistencies between the two. In other words, professional learning must include opportunities for people to surface what they “say they do and their explanations for their actions” and “what they actually do and the real reasons for their actions” (Robinson & Lai, 2006, page 99).

Several studies have examined the relationship between teacher beliefs and practice. However, findings have not been consistent because it is complex. Some researchers have reported a high degree of agreement between teacher beliefs and the practice of teaching whereas others have identified some inconsistencies. This study will differentiate between the post-secondary agricultural faculty’s beliefs and their preferred instructional practice.

Table 2 presents the teaching philosophy, epistemological beliefs, stated instructional pedagogy, and the observed practices of the SLU faculty. All seven participating SLU faculty members were interviewed, however, only four faculty members were recorded teaching. Three SLU faculty members were not recorded teaching. Professor D had moved into an administrative position within the university and no longer had teaching responsibilities. Professor A had left the university to pursue other career opportunities. Professor P did not respond to communications to set up a day or time to be recorded. After several attempts to connect with Professor P, the researcher concluded Professor P had no interest in being recorded.

The findings reflected in Table 2 indicate that there is agreement between the stated instructional pedagogy and the actual instructional practice. However, the pedagogical practice does not necessarily align with the beliefs of the faculty member. Following Table 2 are statements that illustrate SLU faculty’s view on the factors that affect why a disconnect exists between their teaching beliefs and their classroom teaching practices. Class size, budget and time constraints, resource availability and University rules, regulations, and traditions were identified as the main factors that contribute to the disconnect. Table 3 provides demographic information regarding the seven faculty members.
<table>
<thead>
<tr>
<th>Participant</th>
<th>Teaching Philosophy</th>
<th>Epistemological Beliefs</th>
<th>Stated Instructional Pedagogy</th>
<th>Observed Classroom Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor Ava</td>
<td>Create a conducive learning environment; Believe in students; Active students</td>
<td>Social Cultural Theory/Learning Together; Problem-based Learning; Work Place Learning</td>
<td>Blended Learning; Lecture/ Discussion/ Reflection</td>
<td>N/A – No longer employed at SLU</td>
</tr>
<tr>
<td>Professor Cathy</td>
<td>Fun; engaged students; Personal experience; activate students; positive environment; equality</td>
<td>Active learning strategies; Honesty; Sincere interest</td>
<td>Traditional Lectures</td>
<td>Lecture</td>
</tr>
<tr>
<td>Professor Don</td>
<td>Learning by doing; trial and error</td>
<td>Pragmatism; personal experience and student reactions</td>
<td>Traditional Lecture with questioning</td>
<td>N/A - Entered into an administrative role with no teaching appointment</td>
</tr>
<tr>
<td>Professor Ellie</td>
<td>Meet students where they are/meet their learning needs</td>
<td>Include language and discussion; group work and lab exercise</td>
<td>Traditional Lecture; Modified problem-based learning Traditional Lecture with questioning</td>
<td>Lecture</td>
</tr>
<tr>
<td>Professor Matt</td>
<td>Constructivism; increasing complexity/confusion</td>
<td>Organization; Respect; Time;</td>
<td>Traditional Lecture</td>
<td>Lecture</td>
</tr>
<tr>
<td>Professor Philip</td>
<td>Personal experience</td>
<td></td>
<td>Traditional Lecture</td>
<td>N/A – Did not respond to communications to set up a day and time to record class</td>
</tr>
<tr>
<td>Professor Roger</td>
<td>Challenge students to think and develop their own understanding; Inspire; Facilitate; Explain</td>
<td>Relativist theory of knowledge/ Philistinian</td>
<td>Questioning/ Class Discussion</td>
<td>Lecture with questioning/small group discussions</td>
</tr>
</tbody>
</table>

Note. Three SLU faculty members were not recorded teaching. Professor D moved to administrative role; Professor A had left the institution; Professor P did not respond to communications
**Professor Roger:** “We, like anyone else, we are constrained by a budget. In the old days, like 15 years ago, you weren’t really conscious of the budget in the same way. You just did more or less what felt right, and the budget kind of looked after itself, because we had more money then. The budget was more generous so you could do things that way and still not go in the red. But now we can’t do that. So in the past, we had more kind of one-on-one stuff or group work that we’ve cut out from our first year teaching, because we just can’t afford it. So like doing little research type projects, supervised in small groups, which is great, the brilliant compliment to the lecture/exam based stuff, but we just can’t afford it any more. Or, we’ve made that prior. It’s been cut out anyway, to save money, whether that was the right decision, it’s not a question maybe we should cut some other stuff, cut wages. Other things that affect my choice of pedagogical method, apart from my philosophy and wanting to prepare them for the exam, I guess money is really, plus obviously, conservatism or whatever, the 99 percent, you know I’m sure there’s loads of things I could do within the budget, could do differently, which if I had the time and the energy to start investigating like I’m aware of other possibilities vaguely, but it takes a lot of time to actually apply that for the first time, apply new ideas. I’ve done a few things like I’ve done debating exercises instead of just seminars, where the students work in groups and you then divide up basically you have half the class is supposed to be arguing on one side and the other half is to argue on the other and then you have subgroups with sub-questions and then they present and then you have an open forum. So that’s one example that’s a bit less traditional that I’ve done. But it’s a lot of work, and the you try once and it’s like, yeah it worked quite well maybe, and then the next year it didn’t work and it’s like, okay what went wrong, so then you need to put a lot more thought to make it. So whenever you’re trying something new, it takes a lot more time, so sure, my background, is affecting me in terms of choosing fairly conservative teaching.”
**Professor Ellie:** “University rules, regulations, traditions in the university and the department, in study programs, and resources.”

“...if we had resources and a kind of attitude that it was more acceptable, I would have much less lectures. Much more of other activities kind of giving them tasks, working on independently and in groups and actively work on it, but we still have to lecture a bit.”

**Professor Matt:** “I mean ideally one would be flexible and select pedagogy depending on the learning style or something that could change from one time to another; I mean from year to year depending on the group that you have. We don’t have the resources for doing that. We plan a course, we give the course, are approved or they fail as one, and then there is discussion on how should we do this next year and so on, and we also read the course evaluation that we have at the that may make us change slightly. We don’t change very much because of the course evaluation, we do it gradually we try a little bit now and then to improve things and see if it works better the next time. So other factors, I think that’s experience. How do student like or not like different ways of doing an exercise or lecture. For instance, I introduced a new lab exercise last year and it worked in small groups and they said afterwards, it was too much of time spent on doing the practical work. It’s better than you do it in front of us and we can give us more time for doing the calculation exercises that were part of everything, so I did that this year, and I’m not too happy with it, I want to do more of the practical work as well, but see what they say in the course evaluation about that exercise and see perhaps it was better this year, or better last year, but they should have more time in the schedule. Other factors, course evaluations, experience, students’ opinions, my feeling what is good, what is bad…”

So of course it’s about economy and pedagogy, it’s a compromise always. As we had a very big class, 60 students, this was a new course that we were organizing and we choose to base it quite
a lot on lectures actually because it was cheap, but they also had to go to seminars but not so
much individual feedback except for a written exam actually.”

Professor Ava: “Of course it has to do with the age of the students, the number of the
students, but also, for example, I’ve done quite a lot of teaching to employees at slaughterhouses
and farmers, and they need to see what is for me in a more direct way than higher education
students, so I think you have to remember the auspicious circumstances and to develop the
teaching and theology depending on that.”

Table 3. SLU Faculty Demographic Information

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>3</td>
<td>43</td>
</tr>
<tr>
<td>Male</td>
<td>4</td>
<td>57</td>
</tr>
<tr>
<td><strong>Rank</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate Professor</td>
<td>1</td>
<td>14.2</td>
</tr>
<tr>
<td>Senior Researcher</td>
<td>1</td>
<td>14.2</td>
</tr>
<tr>
<td>Director of Studies</td>
<td>1</td>
<td>14.2</td>
</tr>
<tr>
<td>Assistant Researcher</td>
<td>1</td>
<td>14.2</td>
</tr>
<tr>
<td>Project Leader</td>
<td>1</td>
<td>14.2</td>
</tr>
<tr>
<td>Senior Lecturer</td>
<td>2</td>
<td>29.2</td>
</tr>
<tr>
<td><strong>Department</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economics</td>
<td>3</td>
<td>43.2</td>
</tr>
<tr>
<td>Soil and Environmental</td>
<td>1</td>
<td>14.2</td>
</tr>
<tr>
<td>Sciences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Science</td>
<td>1</td>
<td>14.2</td>
</tr>
<tr>
<td>Ecology</td>
<td>1</td>
<td>14.2</td>
</tr>
<tr>
<td>Anatomy, Physiology,</td>
<td>1</td>
<td>14.2</td>
</tr>
<tr>
<td>and Biochemistry</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Student Perceptions of SLU Teacher Effectiveness (Objective Six)

Students are an important source of information about what happens in college classrooms. Student feedback in colleges and universities presents valid and reliable information on their own engagement, as well as on the quality of the teaching that they experience. Table 4 provides the mean score of the students’ perceptions of the courses overall rating and their teacher’s overall effectiveness. Three classes were surveyed and are presented in the table. Four classes of four SLU faculty were recorded, only three classes were administered the student surveys.

<table>
<thead>
<tr>
<th>Category</th>
<th>Instructor</th>
<th>Cathy (n=26)</th>
<th>Ellie (n=25)</th>
<th>Roger (n=35)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared with other College or University instructors I have had, I would rate this instructor as extremely effective.</td>
<td></td>
<td>4.1 .79</td>
<td>4.2 .81</td>
<td>3.8 .82</td>
</tr>
<tr>
<td>Upon completion of this course, I feel as though it equipped me with knowledge pertinent for my future career in the field.</td>
<td></td>
<td>3.9 1.0</td>
<td>4.2 .99</td>
<td>3.9 .72</td>
</tr>
</tbody>
</table>

*Note: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree*
The SLU students in each of their respective classes, agreed Professor C(4.1) and Professor E(4.2) were extremely effective instructors. However, the SLU students in Professor R’s class were neutral in rating Professor R an extremely effective instructor.

**Relationship between identified teaching beliefs, operationalized definitions, and student perceptions of SLU faculty performance (Objective Seven)**

The following shows the relationship between identified teaching beliefs, operationalized definitions, and student perceptions of utilization of operational definitions of three participating SLU faculty members. Table 5 presents the mean and standard deviation scores to the student surveys collected in three of the participating faculty classes. Following the table are the faculty members’ personal beliefs as stated during the interview process. Table 5 helps to show where agreement between what the faculty members expressed as something he/she believes or actions and how it is perceived by the student. In Table 5, the plain bolded numbers represent the categories where there was agreement between the espoused beliefs of the faculty member and the students, which were ranked high by students. The numbers that are bolded and italicized represent the categories where the faculty member may have expressed their belief or actions that was not perceived in the same way by students. The students provided a score for each statement on the survey using a five point Lykert scale. The scale consisted of 1 equating to *Strongly Disagree* and 5 equating to *Strongly Agree*. The categories are listed in order of highest overall average to lowest.
Professor Cathy

Having a sincere interest in the students and the topic being taught is essential to Professor Cathy.

“So honesty and a sincere interest, things that I teach I am sincerely interested in myself and that I think is the one comment that I have a high level of engagement, I truly care for both the individuals and for the topics I teach.”

The students in Professor Cathy’s class agreed, ranking Enthusiastic (µ =4.769), Creates a Comfortable Environment (µ =4.615), Respectful (µ =4.808), and Warm/Friendly (µ =4.731) fairly high. However, students ranked Professor Cathy fairly low on Appropriate Assignments (µ =3.240).

Professor Ellie

Understanding and knowing where the students are in their learning is important to Professor Ellie. Professor Ellie stated:

“...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 I am in this understanding so where do I start when I need to fill up on this, where I need to learn more...I cannot be on the level where they all are, but I try to influence courses where I’m the course leader or where I’ve been influential on the set up that we have problem-based learning in a modified way but still something like that because that makes them study along with the course not to wait until exam...”

Students agreed that Professor Ellie showed Concern about Student Learning (µ =4.250). However, students ranked Professor E lower on Accessibility Outside of Class (µ =3.619).
Professor Ellie describes the role of instructor in courses as:

“Facilitator, motivator, resource person.”

Students responded positively on the survey to Professor Ellie being Knowledgeable (μ =4.760), Enthusiastic (μ =4.480), and Self-Confident (μ = 4.720). However, students responded with lower scores for Motivated Students (μ =3.917) and Encourage Students to Think (μ =3.773).

Professor Roger

Professor Roger expressed in stated teaching philosophy, “I try to inspire the students I suppose and facilitate and to some extent, explain. Obviously I’m also using my superior knowledge and experience that I’ve learned, I’m kind of using that to try and help me explain things to them, but it’s still more or less facilitating really in the sense even so.”

The findings from the student survey show agreement with Professor Roger being very Knowledgeable (μ =4.914) of the content. However, student scores were lower for Motivation (μ =3.857) and Explain Material Clearly (μ =3.453).

Professor Roger: “I want them to understand rather than memorize if you like to put it simply. I want them to think, and this is a way to try and facilitate that, whereas if I’m just talking to them, to me I’m encouraging them not to think.” The quote provided by Professor Roger was in reference to his primary instructional method. Student responses on the survey show they agree (μ =4.324) that Professor Roger instructional strategies encourage them to think. However, a slightly lower score was assigned (μ =3.971) for Provided opportunities for students to synthesize and Recognizing when students do not understand (μ =3.743).
<table>
<thead>
<tr>
<th>Category</th>
<th>Instructor</th>
<th>Catha</th>
<th></th>
<th>Ellie</th>
<th></th>
<th>Roger</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall Average</td>
<td>μ</td>
<td>σ</td>
<td>μ</td>
<td>σ</td>
<td>μ</td>
<td>σ</td>
</tr>
<tr>
<td>Knowledgeable</td>
<td>4.7</td>
<td>4.5</td>
<td>.57</td>
<td>4.7</td>
<td>.43</td>
<td>4.9</td>
<td>.28</td>
</tr>
<tr>
<td>Enthusiastic</td>
<td>4.6</td>
<td>4.7</td>
<td>.42</td>
<td>4.4</td>
<td>.65</td>
<td>4.7</td>
<td>.66</td>
</tr>
<tr>
<td>Respectful</td>
<td>4.6</td>
<td>4.8</td>
<td>.40</td>
<td>4.6</td>
<td>.53</td>
<td>4.5</td>
<td>.53</td>
</tr>
<tr>
<td>Warm/Friendly</td>
<td>4.6</td>
<td>4.7</td>
<td>.53</td>
<td>4.6</td>
<td>.63</td>
<td>4.6</td>
<td>.63</td>
</tr>
<tr>
<td>Enjoy Teaching</td>
<td>4.6</td>
<td>4.7</td>
<td>.42</td>
<td>4.4</td>
<td>.72</td>
<td>4.6</td>
<td>.68</td>
</tr>
<tr>
<td>Self-Confident</td>
<td>4.4</td>
<td>4.6</td>
<td>.48</td>
<td>4.6</td>
<td>.45</td>
<td>4.0</td>
<td>.98</td>
</tr>
<tr>
<td>Well Prepared</td>
<td>4.3</td>
<td>4.5</td>
<td>.64</td>
<td>4.3</td>
<td>.65</td>
<td>3.9</td>
<td>.92</td>
</tr>
<tr>
<td>Comfortable Learning Environment</td>
<td>4.3</td>
<td>4.6</td>
<td>.57</td>
<td>4.4</td>
<td>.70</td>
<td>3.9</td>
<td>.83</td>
</tr>
<tr>
<td>Increases Interest in Subject</td>
<td>4.3</td>
<td>4.2</td>
<td>1.11</td>
<td>4.3</td>
<td>.97</td>
<td>4.2</td>
<td>.88</td>
</tr>
<tr>
<td>Adapts to Student Needs</td>
<td>4.2</td>
<td>4.4</td>
<td>.75</td>
<td>4.3</td>
<td>.74</td>
<td>3.7</td>
<td>.98</td>
</tr>
<tr>
<td>Tolerant of Others’ Ideas/views</td>
<td>4.2</td>
<td>4.7</td>
<td>.42</td>
<td>4.0</td>
<td>.97</td>
<td>4.3</td>
<td>.93</td>
</tr>
<tr>
<td>Sense of Humor</td>
<td>4.2</td>
<td>4.0</td>
<td>.97</td>
<td>4.2</td>
<td>.33</td>
<td>4.3</td>
<td>.93</td>
</tr>
<tr>
<td>Concerned about Student Learning</td>
<td>4.2</td>
<td>4.3</td>
<td>.63</td>
<td>4.2</td>
<td>.89</td>
<td>3.9</td>
<td>.82</td>
</tr>
<tr>
<td>Uses Good Examples</td>
<td>4.2</td>
<td>4.3</td>
<td>1.08</td>
<td>4.6</td>
<td>.48</td>
<td>4.8</td>
<td>.86</td>
</tr>
<tr>
<td>Well Organized</td>
<td>4.2</td>
<td>4.1</td>
<td>.88</td>
<td>4.6</td>
<td>.57</td>
<td>3.8</td>
<td>1.03</td>
</tr>
<tr>
<td>Improves Understanding</td>
<td>4.2</td>
<td>4.0</td>
<td>.88</td>
<td>4.4</td>
<td>.59</td>
<td>4.1</td>
<td>.85</td>
</tr>
<tr>
<td>Communicates Effectively</td>
<td>4.1</td>
<td>4.3</td>
<td>.93</td>
<td>4.3</td>
<td>.65</td>
<td>3.4</td>
<td>1.03</td>
</tr>
<tr>
<td>Explain Material Clearly</td>
<td>4.1</td>
<td>4.1</td>
<td>.95</td>
<td>4.6</td>
<td>.56</td>
<td>3.3</td>
<td>.88</td>
</tr>
<tr>
<td>Identifies Important Ideas</td>
<td>4.1</td>
<td>4.4</td>
<td>.76</td>
<td>4.1</td>
<td>.61</td>
<td>4.3</td>
<td>.89</td>
</tr>
<tr>
<td>Valuable</td>
<td>4.1</td>
<td>4.0</td>
<td>.82</td>
<td>4.3</td>
<td>.83</td>
<td>4.1</td>
<td>.79</td>
</tr>
<tr>
<td>Encourages Students to Think</td>
<td>4.1</td>
<td>4.3</td>
<td>.70</td>
<td>3.7</td>
<td>.97</td>
<td>4.3</td>
<td>.75</td>
</tr>
<tr>
<td>Materials are Worthwhile</td>
<td>4.0</td>
<td>3.6</td>
<td>.96</td>
<td>4.4</td>
<td>.71</td>
<td>3.2</td>
<td>.98</td>
</tr>
<tr>
<td>Motivates Students</td>
<td>3.9</td>
<td>4.3</td>
<td>.67</td>
<td>3.9</td>
<td>.62</td>
<td>3.3</td>
<td>.97</td>
</tr>
<tr>
<td>Presents Material at Appropriate Pace</td>
<td>3.9</td>
<td>4.0</td>
<td>.84</td>
<td>4.3</td>
<td>.27</td>
<td>3.3</td>
<td>1.20</td>
</tr>
<tr>
<td>Recognizes When Students do not Understand</td>
<td>3.9</td>
<td>4.0</td>
<td>.88</td>
<td>4.1</td>
<td>.36</td>
<td>3.7</td>
<td>.88</td>
</tr>
<tr>
<td>Provides Opportunity for Students to Synthesize</td>
<td>3.9</td>
<td>3.9</td>
<td>.84</td>
<td>3.8</td>
<td>1.03</td>
<td>3.9</td>
<td>.88</td>
</tr>
<tr>
<td>Accessible Outside of Class</td>
<td>3.9</td>
<td>3.9</td>
<td>.84</td>
<td>3.8</td>
<td>1.03</td>
<td>3.9</td>
<td>.88</td>
</tr>
<tr>
<td>Appropriate Assignments</td>
<td>3.7</td>
<td>3.7</td>
<td>1.23</td>
<td>4.3</td>
<td>.22</td>
<td>4.3</td>
<td>.33</td>
</tr>
<tr>
<td>Appropriate Evaluation Methods</td>
<td>3.7</td>
<td>3.6</td>
<td>.83</td>
<td>4.0</td>
<td>.29</td>
<td>4.6</td>
<td>.71</td>
</tr>
<tr>
<td>Communicates Student Expectations</td>
<td>3.7</td>
<td>3.9</td>
<td>.88</td>
<td>3.9</td>
<td>.34</td>
<td>3.2</td>
<td>.98</td>
</tr>
<tr>
<td>Helpful Feedback</td>
<td>3.6</td>
<td>3.5</td>
<td>.81</td>
<td>3.8</td>
<td>.37</td>
<td>3.4</td>
<td>1.01</td>
</tr>
</tbody>
</table>

Note: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree. Categories are organized from highest to lowest overall average. Plain bolded numbers represent categories where there was agreement between the expressed beliefs of the faculty member and the students. Numbers bolded and italicized represent the categories where the faculty member may have expressed their belief or actions that was not perceived in the same way by students.
Penn State University Results

The epistemological and pedagogical teaching beliefs of nine faculty members from the College of Agricultural Sciences at Penn State University who participated in the face-to-face interviews were identified. Nine faculty members were video recorded while teaching their respective classes and the students in those classes completed the student survey designed to assess teacher effectiveness (Appendix D). Eight of the nine participating faculty members completed an email questionnaire.

Epistemological and Pedagogical Teaching Beliefs (Objective One and Two)

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 & Peterson, 1986; Kane, Sandretto, & Heath, 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 6 provides a summary of the epistemological and pedagogical themes of the PSU faculty followed by text containing verbatim quotes.
Table 6. Summary of Epistemological and Pedagogical Themes of PSU Faculty

<table>
<thead>
<tr>
<th>Themes</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The PSU faculty held a range of epistemic</td>
<td>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.</td>
</tr>
<tr>
<td>attitudes that were both contextualistic and</td>
<td></td>
</tr>
<tr>
<td>relativistic in orientation.</td>
<td></td>
</tr>
<tr>
<td>The PSU faculty held a range of pedagogical</td>
<td>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:</td>
</tr>
<tr>
<td>beliefs that were learner-centered in</td>
<td></td>
</tr>
<tr>
<td>orientation.</td>
<td></td>
</tr>
<tr>
<td>The PSU Faculty equally engages in reflection-</td>
<td>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.</td>
</tr>
<tr>
<td>in-action and retrospective reflection-on-action</td>
<td></td>
</tr>
<tr>
<td>on their teaching practices.</td>
<td></td>
</tr>
<tr>
<td>The PSU Faculty feel confident in their</td>
<td>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</td>
</tr>
<tr>
<td>teaching abilities.</td>
<td></td>
</tr>
</tbody>
</table>
Theme 1: The PSU faculty held a range of epistemic attitudes that were both contextualistic and relativistic in orientation.

The researcher 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, and unchanging; known to the teachers as authority; and transmitted by them to the students. According to Schraw and Olafson (2002), teachers who are Relativists see knowledge as self-constructed and highly individualistic, with no opinion considered more valuable than another. 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).

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 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.”

Professor David: “I was thinking knowledge being part science and part morals and personal knowledge of how I teach. Somewhere in the middle is knowledge and I kind of view what we do is kind of like you got science and science is there. Then you have art, and art is all in here [points to head], it’s all the creative part and somewhere in the middle is where we are. So there are certain things we teach. We’re doing grading problems now; that’s the science part. If it’s a two percent grade, it’s a two percent grade, and we know what that means and there’s only one right answer, but when we take that and now we start to say, well okay, now we got our two percent grade, how can we take this land form and make it so that it’s nice to look at? Now we’re bringing in the art side, and there’s not a right and wrong. What do you like and what do you think looks good and so that blend. Then it would go back to okay, there are certain ways that you have to function and you’ve got laws, ordinances, all of these things that say this is how you
have to do things. Then there are these things now are things that you make your choice on, are
you going to treat your employees in a certain way, are you going to pay the taxes that are due or
are you going to try to hide them? It becomes an ethical thing, and I think that that’s an
important part of our teaching program. When our students graduate, we want them to be not
only good at technical aspects of landscape contracting, we want them to be good business
people, we want them to be good human beings, we want them to be able to, obviously,
communicate, and do all those things, but think for themselves and think about their actions and
how their actions are going to affect their business and affect others around them, including
themselves and their families. I think all those things are really important, and I try very hard to
make sure that as a role model, whether I want to be or not, I think anybody who is teaching is
going to be a role model, try to exhibit those things that people will then emulate and hopefully be
good human beings.”

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
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. Teachers’ approaches
to teaching are influenced by their conceptions of teaching. Studies of university teachers’
conceptions of teaching have showed a range of variation (e.g., Kember & Kwan, 2002; Prosser,
Trigwell, & Taylor, 1994; Samuelowicz & Bain, 1992). 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 conceive 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. Teaching is interactive in a way that observes students’ existing conceptions. 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 recognize students’ differing needs and take these as the starting point when planning the course (Biggs, 1999; Kember & Kwan, 2002; Prosser & Trigwell, 1999; Prosser, Trigwell, & Taylor, 1994; Samuelowicz & Bain, 1992, 2001; Trigwell & Prosser, 1996b; Vermunt & Verloop, 1999). Furthermore, student-centered teachers have been found to use a wider repertoire of teaching methods than teachers who adopt a teacher-centered approach to teaching (Coffey & Gibbs, 2002).

**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 Mark:** “It’s mixed together. Believe it or not, I still use overheads, and I find those so much easier to teach from than PowerPoint because I can write on them, I can rip it off and put another one on, and just jump around however I want to do it. So I use overheads, and then blended in I’ve written the course notes, which is the course book, which are my notes with chunks missing out of it so they have to pay attention, and then intermixed with that, I’m writing, they’re writing so that keeps them awake, and they also know they’re not writing everything so they don’t have to focus just on writing, they can kind of, okay, I’ve got to write this down. I’m hoping that’s the way it works. So a lot of the notes are there, but chunks are missing. Then I like to have models or examples in the class when I’m talking about, like today, I was talking about grass identification and I build a model out of PVC pipe of what a grass looks like and how you tell the different little parts and I take it apart and then they can see it, because grasses are really pretty small and you can’t see them, so this is big enough that you can hold it up and show them, okay, these are the oracles, here’s what the ligule is, and then I pass around live plants and they can, oh, yeah, there’s the ligule. So I’m hoping that kind of things helps – the models.”

**Professor Hannah:** “I’m already realizing that it varies with the level of the class, so when it’s introductory you can’t assume that students have as much knowledge and skill base to do the higher level analysis and problem solving. So if we started with the higher level class, I think the higher level class the role of the instructor is to identify the critical material that students need to be familiar with and engage or analyze and interpret and have developed some mastery of, and to provide opportunities for students to analyze, critique, interpret how to use that information to move to some higher level of thinking or knowledge, whether that’s to solve a problem with it or think through what our potential strategies to address the information or apply the information. I think at a higher level class instructors try to facilitate higher level skills, processing critical analysis, using information for problem solving, and getting experience with doing problem
solving in their discipline. Whereas in the more introductory classes, it’s helping still students to understand and master the basic important fundamentals and use that to do some analysis and higher level thinking but not the same degree. So for instance maybe they don’t do as much writing and problem solving and that’s also limited by the number of student show are in the class.”

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 our 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. Each teacher holds a set of beliefs that determine priorities for pedagogical knowledge and how students acquire knowledge. Ertmer (2005), investigated teacher beliefs about teaching and learning, called these beliefs pedagogical. 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, Meijer, Verloop, & Bergan, 2009; Schuh, 2004).
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 “wisdom” or “artistry” 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 Kaleb:** “I do a lot of discussion and assessment with the students of my teaching. I do mid-semester evaluations, which can help me change my approach mid-stream. I don’t really rely on the SRTE’s that much. I usually spend a significant portion of the last day of class reflecting on what went well and what didn’t with the students. I also really engage my TA’s, the good ones,
in giving me perspective on what went well and what didn’t. Then I had a bad year last year and I went to the Schreyer Institute to try and figure out what happened so I used them as well if I really can’t understand why I’m not connecting with my students.”

**Professor Gabe:** “I take student feedback at the end of the semesters very seriously. I watch other people and talk to other people about what they do and what works, what doesn’t work. My graduate assistants have been good over the years. They usually bring innovations into the classroom that I adopt the next year...I’ve been struck by how they bring new things into the class like videos, and I remember this one guy integrated various YouTube videos into his lecture and I thought, wow, that’s really cool, and I started doing that the very next week. So I would say that’s a big thing is learning from my TA’s. I also get alumni magazines from three of my alma maters and they often have things in there about teaching that I’ll learn from. The Harvard one is fantastic. It’s probably the best alumni mag I’ve ever had. That’s one way that I bring in innovations. Hearing colleagues talking about things is helpful. Sometimes students who will just volunteer a new idea that seems to make sense and I’ll give it a shot. I’m usually open to new things. I’m not creative myself. I can’t think of ideas to do myself, but if someone offers it, I’ll think, oh, that’s not a bad idea. I’m very open to trying things; I’m just not creative myself.”

**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. Sometimes I like to tease, and sometimes some kids have taken that wrong, and I’ve gotten at the end of the year the date and that was very rude of you, and I’m thinking, I didn’t mean it that way, so those are the kinds of things that I back-off of. I somehow approach teasing a little differently so that I’m not embarrassing them or something. So those are the kind of comments I get back. Or when you presented this, that made no sense, and then I collect those, since the SRTE’s are all online now, one of the secretaries come in, collects it, holds it ‘til mid-January and then they send it to me, and I use that 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. I view teaching the course in the classroom as just a baby, and sometimes you know that baby just turns out so ugly you can’t hardly stand it, and you just got to go back and rebuild it, and sometimes it’s like, wow, I can’t believe it went that well, it’s great. 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, Woolfolk Hoy, & Hoy, 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, Woolfolk-Hoy, Hoy,
1998). The following statements provide a rich description of the PSU facultys’ 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 Jacob:** “Most days, yes! I say that jokingly. Yes, I do feel confident in them, but I also
know that there are just days where I fail, like I could have taught better, but as a whole, I’m
confident that I’m teaching in a way that connects with students, that they can learn the material,
and that ideally isn’t too overwhelming to them. I know there are days where we talk about a lot
and they walk out of there, whoa, where did we just go, but as far as being able to structure a lesson and being able to teach it and connect with the students that they know the content when they leave, I…I’m confident most days.”

**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 that 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.”

**Epistemological Beliefs**

The following verbatim quotations were taken from the interview transcripts. The bolded portions exemplify each PSU professors’ respective epistemological beliefs. The quotations were instrumental in theme development.

**Professor Gabe:** “Epistemological beliefs? 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 suppose Carl Marx said it best, we make the world but we don’t make it just as we please. I think Marx really got it right there. Ultimately, 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 forth and you begin to establish something that maybe you could point to, that’s not a bad idea, and you have knowledge.”

Professor Jacob: “The one is, I want my students to be successful. I want to make sure that they’re getting the information that they need to be successful. I want my students to be successful in the end, and I think that was probably because other people cared about me, I think, and helped me to get where I’m at so I want to do that for others.”

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.”
Professor Nicole: “I would say that definitely people learn different ways, and I know
that, and I think just in my past knowing people who have learned different ways, whether they
have a disability or whether they are brilliant or whatever and I’m really fortunate, I learn
easily and I love learning so stepping back and realizing that not everybody is good at this or not
everybody is good at that, and then working from there, so that different kind of learning.
Learning is valuable and something they need to do their whole lives, and that it’s not just 50
minutes while we’re together, but kind of helping them enjoy learning and want to do more of it
hopefully.”

Professor David: “I was thinking knowledge being part science and part morals and
personal knowledge of how I teach. Somewhere in the middle is knowledge and I kind of view
what we do is kind of like you got science and science is there. Then you have art, and art is all
in here (points to head), it’s all the creative part and somewhere in the middle is where we are.
So there are certain things we teach. We’re doing grading problems now; that’s the science part.
If it’s a two percent grade, it’s a two percent grade, and we know what that means and there’s
only one right answer, but when we take that and now we start to say, well okay, now we got our
tow percent grade, how can we take this land form and make it so that it’s nice to look at? Now
we’re bringing in the art side, and there’s not a right and wrong. What do you like and what do
you think looks good and so that blend. Then it would go back to okay, there are certain ways
that you have to function and you’ve got laws, ordinances, all of these things that say this is how
you have to do things. Then there are these things now are things that you make your choice on,
are you going to treat your employees in a certain way, are you going to pay the taxes that are
due or are you going to try to hide them? It becomes an ethical thing, and I think that that’s an
important part of our teaching program. When our students graduate, we want them to be not
only good at technical aspects of landscape contracting, we want them to be good business
people, we want them to be good human beings, we want them to be able to, obviously,
communicate, and do all those things, but think for themselves and think about their actions and how their actions are going to affect their business and affect others around them, including themselves and their families. I think all those things are really important, and I try very hard to make sure that as a role model, whether I want to be or not, I think anybody who is teaching is going to be a role model, try to exhibit those things that people will then emulate and hopefully be good human beings.”

**Professor Bob:** “Every day of my life has factored into the way I teach tomorrow. Again, I am very much in belief of lifelong learning. I’d be sad the day that goes by that I can’t sit and talk with somebody and tell you about what I learned today. I think probably it changes every single day as far as the sort of things that I’m doing and I also believe that there’s a certain, this is going to sound cheesy, a spirit of youth that’s a part of that, so in staying young and youthful and excited about all the things that I do, I try to think about all the things that I learn every day and how it’s going to change what I’m going to do tomorrow and when I come into class trying to look at the news, trying to talk to people, trying to see what’s going on and making it a part of what I’m doing every single day so that it’s not just, oh yeah, here’s the exercise physiology slides from last year. Let’s go through those. It’s talking about how that really applies and thinking about that.”

**Professor Cory:** “I guess some of it is that I guess one of my beliefs is that the good students are going to do fairly well regardless of how I present the information because they’re just driven to learn, and so I guess I try to engage students that aren’t necessarily interested in my subject to the best of my ability. In my one class we have current genetic issues readings that sometimes they have nothing to do with animal breeding, but they’re genetics related and hopefully they can understand how the genetic principles that we’re teaching for animals really relates to the culture that they’re surrounded by and so forth. So for some students that gets them a little bit more engaged than they would be otherwise. I guess just trying to help them
understand that they’re influenced by everything they’re learning at Penn State even if it’s not directly related to the career path that they’ve chosen.”

Professor Hannah: “I’ve never thought about it that way. Well, yeah, I think for most people we are trying to seek a higher level of understanding of our environment or how to make our lives or the world a better place or our community a better place, and so I think that that’s perhaps one of my goals in teaching and teaching about sustainable agriculture is helping students who have that interest, and I think many do have some underlying motivation like that or goal.”

Professor Mark: “I believe in fairness, equality, and everybody deserves to be treated like you would want to be treated.”

Role of Student

The following verbatim quotations were taken from the interview transcripts. The bolded portions exemplify each PSU professors’ respective beliefs of the role of the student in their classroom. The quotations were instrumental in theme development.

Professor Gabe: “They have to be an active participant…I hate doing the lectures where they’re just an empty thing that I just kind of spew to. I find that they’re bored, that I’m bored, and I don’t think it’s the most effective way of passing along information, but sometimes you kind of have to do it, too, at least that’s what I experience. There are times when it works, there are times when it works efficiently, and maybe it’s not always the best way to transfer knowledge, it’s the most efficient way or something. Ideally the students are engaged in that we have a good conversation going where we’re debating, deliberating, actively critiquing together – when the students are really participating. A good seminar is really an ideal learning experience where sitting around really picking something apart and thinking collectively and deliberating. I like to have that in my undergrad classes but students aren’t always as engaged.”
Again, I think that peer-to-peer stuff might be a way to get students more engaged, so that’s one of the things I’m intrigued about.”

Professor Jacob: “The role of the student – active participant. I want students to be engaged. Again this depends on the class, but I always want them engaged cognitively. I want them thinking, I want them talking, I want them interacting with their peers. There are lots of times where they’re going to learn more from their peers than from me or through that class discussion they’re going to learn more than just sitting there listening and taking notes on a lecture. I also want them involved kinesthetically as far as moving and that goes back to my mechanics classes mainly because they’re also learning, a lot them, for the first time a specific skill so I want them engaged doing those hands-on activities. I guess the short answer there was active participant and then the way I want them actively engaged is cognitively kinesthetically mainly”

Professor Kaleb: “I’m trying to help the students get to where they want to go. So their role is they have to be engaged to do that, they have to want to get somewhere besides get through my class, that’s not quite enough if they just want to get through they’re not going to do great, but if they have a goal about what they want to learn in the class, then I try to get them there. Now I’m talking about my role. Their role is to have a goal and engage and try to reach it.”

Professor Nicole: “I really like when they ask questions and so having them engaged and paying attention is really important and when they’re dozing or something like that, I change things, it’s like we’re not going to do this again. Not everybody’s going to be alert, but generally, especially the one class I teach is a 9 o’clock class when they come in there, and it’s okay, we’ve got to wake up. I do need that feedback from them and I look at that to make sure, and I don’t know what else they’re doing out there, I know they’re doing lots of other things out there, not paying attention to me, but I don’t get hung up on that. I know that there’s people
paying attention and they do ask question sometimes and I think that’s important. I really hope that they’re engaging with the material.”

Professor David: “They’re the doers. The best students are the ones that go out and chase down all the parts and take it upon themselves to figure out how to do it. I had a student one time that came to me at graduation. I still remember he walked in the door and he said, I just want you to know, I really don’t think I got my money’s worth. I liked this guy, I thought he was a pretty good student, not A plus but he was a good student and he was going to do well, and it kind of shook me for a minute, and I said what are you talking about? Didn’t you learn anything? Oh yeah, I learned lots of stuff, but I don’t think you guys taught us that much, we had to figure it out for ourselves. I was like, yes, good, go graduate, you’re done.”

Professor Bob: “They’ve got to be a participant and that’s one of the hardest parts, right? I’m sure everybody says that – they’ve got to be a participant and struggle, struggle, struggle as many times as you get told you should have done this better, you could have done that better, we don’t like it when you ask us questions, I mean everyone says it, it’s so cliché to say it these days, but I think a part of that is developing a relationship if you can with the students. Letting them know that you’re all on the same page and you’re working at this together and let’s try to figure out these problems we have every single day in class to learn. So the student has to be a participant, and so I have fiddled with some of these different testing techniques, teaching techniques, where students are in a way forced to get involved a little bit more and have to take a more active role. I think that is really important because it’s almost as if they’ve gotten used to not being involved, because a lot of people don’t do that. So it’s like why are you wanting me to be involved if nobody else is wanting me involved and again? So in a way I want to turn that around a little bit and I think they have to be an active participant.”

Professor Cory: “I like them to feel comfortable asking questions, obviously, and that helps me to understand where I’ve not communicated clearly and so I’d rather have them asking
questions while we’re going on rather than after the exam saying, we didn’t cover that very much. 

*Basically I want them to be engaged and also by their questions they’re letting me know what they’re most interested in and so that’s helpful as well and then I can tailor things to their interest a little bit.*”

**Professor Hannah:** “The role of the student would be to come prepared having read some of the course material, and then engage in the classroom with me and the other students and really analyzing it, thinking through it, and doing some kinds of analysis and clarification and interpretation, and sometimes you use that information in the higher level classes then to do kinds of problem solving or critiquing. It depends on the class.”

**Professor Mark:** “The role of the student – *active participants.* It’s tough to do, but I like it. I try to get them to be active participants so that they’re following my train of thought so they’re saying, wait a minute, this doesn’t jive with this, and they say, wait, wait, stop, I want them actively, because I think that’s where the real learning takes place. Just taking the notes and regurgitating for the exam, okay, you know the material maybe, but you don’t really know it well enough that if someone comes from a different angle and asks you a question if you’re out there consulting with a farmer and they say what about this, and you say, I don’t know, because you really didn’t know the material well enough…”

**Role of Instructor**

The following verbatim quotations were taken from the interview transcripts. The bolded portions exemplify each PSU professors’ respective beliefs of the role of the instructor in their classroom. The quotations were instrumental in theme development.

**Professor Gabe:** “I would say it’s to *facilitate learning*…It was this realization that I have to help them kind of unleash their intellect, I need to give them the tools, the resources, and maybe some information, too, that they can really unleash…*I see myself as facilitating their*
learning, but they have to want to learn. I’m not a tester – papers are the way that I’ve always educated. Students write papers and that’s a more active thing than just feeding back on a test."

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 our there and discuss it so I do really see myself as a facilitator of the content rather than just a lecturer of the content.

Professor Kaleb: “…helping to get students to where they want to go, but thinking more about the instructor, like the class I teach now, we have some curricular goals as well, and I take those on, like we want our students in our program to have a certain set of skills and so my role as an instructor is also to assess whether our graduates – I’m teaching a capstone class right now – so to assess whether our graduates have the skills that we set out to give them, and that we feel good about the knowledge capital that they have as they go out into the world, that’s another role.”

Professor Nicole: “So for me, I’m giving them information, but I really want them to be able to process the information, it’s all out there, I don’t teach them anything that they couldn’t find online somewhere, but to have it that this is what I think is important, this is what I think they need to know on a big scale on how to integrate that and not just companion animal nutrition, but I hope when I teach them about as fed to dry med and basis and things like that that maybe I teach it a little different than they’ve heard it somewhere, so hopefully one of us will click with them.”

Professor David: “I think as coach and mentor. You have to give them the opportunity, you have to give them enough information that they don’t get frustrated, that they
get excited about it, and know what to do, but they need to do it. It depends really; I’ve to kinds of classes. I have my studio classes where that fits very well. I also have an estimating and bidding class, which is much more information exchange, and I have them do exercises in there, they put together bids and I try to bring in as much conversation into the course as I can, but it’s still a different kind of course, and I have to approach it differently, and it’s more to the lecture side. I still try to make it as active as I can.”

Professor Bob: “I guess I see it to guide the conversation that we have on a daily basis, or wherever it is, to guide in the area to offer support in learning the particular topic that we are. There’s no reason why a student can’t get it, and I think this is one of the important things that we do offer here that is very difficult. Of course, we had this conversation of online classes and that sort of thing, I think one of the benefits is that we can be together, we can be in a room together and talking to one another about a particular thing. It’s not about reading a book or reading a webpage or watching a video, it’s actually a dynamic conversation that we have on a particular topic. The faculty member or the lecturer or whoever can support that and say, yup, this is the reason, and guide it. Okay, here’s an important area that we want to talk about, but if the student changes that direction a little bit, you can still support that and say, okay, well yeah, this is kind of interesting or maybe that’s not important right now, but we’ll talk about that at another time. I think that that’s important.”

Professor Cory: “Basically I’m just trying to present information to them that will expand their opportunities later on, and for some students, the stuff that I’m teaching is very applied to what they’re going to do, especially dairy problem solving and dairy cattle selection, those are things that they’re actually going to go home and do so it’s very applied to what they’re doing so hopefully I’m giving them information that they can apply directly, but there’s other students that it’s a requirement, a box that they have to check off on the way to their degree so what I hope to do for those students is just give them a background in a subject area that may be
important to them in the future even though they don’t realize it now and just give them kind of a baseline of knowledge in an area that they can build upon later to suit their interests a little bit. I try to come up with some examples that will help them to realize that, yea, genetics does influence their lives, even if they’re not going to be geneticists, per se.”

Professor Hannah: “I’m already realizing that it varies with the level of the class, so when it’s introductory you can’t assume that students have as much knowledge and skill base to do the higher level analysis and problem solving. So if we started with the higher level class, I think the higher level class the role of the instructor is to identify the critical material that students need to be familiar with and engage or analyze and interpret and have developed some mastery of, and to provide opportunities for students to analyze, critique, interpret how to use that information to move to some higher level of thinking or knowledge, whether that’s to solve a problem with it or think through what our potential strategies to address the information or apply the information. I think at a higher level class instructors try to facilitate higher level skills, processing critical analysis, using information for problem solving, and getting experience with doing problem solving in their discipline. Whereas in the more introductory classes, it’s helping still students to understand and master the basic important fundamentals and use that to do some analysis and higher level thinking but not the same degree. So for instance maybe they don’t do as much writing and problem solving and that’s also limited by the number of student show are in the class.”

Professor Mark: “Hopefully, I have some knowledge to depart, but it’s mainly a facilitator.”
Faculty members’ operationalization of their instructional pedagogy (Objective Three)

Only the PSU portion of the study yields findings for objective three. The PSU faculty members responded to an email questionnaire that allowed each participant to articulate their personal operationalization of their instructional pedagogy. Eight of the nine participating faculty members from The College of Agricultural Sciences at Penn State completed the email questionnaire. Professor C was contacted four times after the initial email questionnaire was sent as a reminder to complete. Professor C did not respond to any of the reminder emails and did not complete the email questionnaire. The findings regarding the operationalization of the PSU faculty’s instructional pedagogy are reported in the form of themes supported by quotes from the questionnaire.

Operationalization of instructional pedagogies

Operationalization is the process of defining the concepts of interest into operation or of operating on those concepts in order to “measure” them, both individually and/or in relation to other concepts. It is the process that permits the researcher to compare conceptual definitions to “reality.” Operationalization of the instructional pedagogy of the purposefully selected faculty members produces data upon which the researchers based theory refinement/modification, theory verification or refutation, and ultimately practice.

Table 7 provides a synthesis of the preferred instructional pedagogies and operationalization as provided by the PSU faculty members. Table 8 provides a summary of the operationalization themes of the PSU faculty followed by text containing verbatim quotes.
### Table 7. Synthesis of Operationalized Instructional Pedagogies of PSU Faculty

<table>
<thead>
<tr>
<th>Instructional Pedagogy</th>
<th>Synthesized Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Lecture</td>
<td>Instructor presenting course information verbally and visually through instructional aids</td>
</tr>
<tr>
<td>Active Learning Strategies</td>
<td>Enhances lecture by engaging students through educational activities that allow them to apply gained knowledge</td>
</tr>
<tr>
<td>Hands-On Activities</td>
<td>Engaging students in a project/learning activity that reinforces course information/material</td>
</tr>
<tr>
<td>Laboratory Component</td>
<td>“Hands-on” activities and practice performance tasks or skill acquisition</td>
</tr>
<tr>
<td>Experiential Learning</td>
<td>A combination of active learning, learning by doing, hands-on learning, and engaged scholarship</td>
</tr>
<tr>
<td>Socratic Method</td>
<td>Stating assumptions, questioning and challenging assumptions and encouraging critical thinking</td>
</tr>
<tr>
<td>Class Discussion</td>
<td>Students engaging in dialogue based on gained knowledge and interact with one another to question, critique, defend, challenge topic</td>
</tr>
</tbody>
</table>

### Table 8. Emerged Themes from Operationalization of Instructional Pedagogies by PSU Faculty

<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced Lectures</td>
<td>Lecture is utilized to disseminate course information/materials, however, the lecture is enhanced with active learning strategies to allow students to apply gained knowledge and develop analysis skills, problem solving, and interpersonal skills.</td>
</tr>
<tr>
<td>Experiential Learning</td>
<td>Students are involved in learning content through hands-on, collaborative and reflective learning experiences.</td>
</tr>
<tr>
<td>Encourage critical thinking</td>
<td>Instruction that compels critical thought; actively and skillfully conceptualizing, applying, analyzing, synthesizing, and or evaluating information</td>
</tr>
</tbody>
</table>
Theme 1: Enhanced Lectures.

There are several educational advantages to lectures, particularly if it is seen as more than a method of information delivery. Edwards et al. (2001) note that while poor lectures can leave students bored and frustrated, good lectures can inspire. Dolnicar (2005) claims that effective lectures can provide the excitement of intellectual discovery through the presentation of challenging and provocative ideas. Dolnicar (2005) further adds that the lecturer can relate the lecture content to his/her students’ prior knowledge and relate it to real life examples, thus making the knowledge more meaningful. The lecture can also be seen as a way of opening up a subject to a student helping them to find their way through a large body of complex knowledge and providing the most up to date knowledge in a particular field (Laing, 1968). Moore et al. (2008) note that lectures:

… provide important signposts to students, that explain the rules of engagement that many of them find it otherwise difficult to learn, and that help them to understand the areas and tasks that they need to focus on most in order to navigate their learning experiences more successfully (p. 17).

The University of North Carolina at Charlotte (UNC) Center for Teaching and Learning define enhanced lectures as a “series of short, mini-lectures punctuated by specific active learning events designed to meet the class objectives” (n.d.). Active learning is generally defined as any instructional method that engages students in the learning process (Faust & Paulson, 1998).

Active learning requires students to do meaningful learning activities and think about what they are doing. In practice, active learning refers to activities that are introduced into the classroom. The core elements of active learning are student activity and engagement in the learning process (Faust & Paulson, 1998). Active learning is often used to enhance the traditional lecture (Faust & Paulson, 1998). The following statements were taken directly from the questionnaire responses from the PSU faculty operationalizing their preferred instructional pedagogy.
**Professor Kaleb – Traditional lecture:** “I develop a PowerPoint presentation with information and I deliver it to the students.”

**Active learning:** “One example, done in the small groups is the Jigsaw in which I give students a piece of an intellectual puzzle and I have one person from the group study each part. Then they have to teach that part to the other students, then they examine how the pieces fit together. This is a classroom version, but I also like “field” versions. For example, when we are studying carbon storage in forests we go to the arboretum and measure how much carbon is in that forest.”

**Professor Hannah - Active learning activities:** “This includes students applying their knowledge to analyze and synthesize information to answer questions and solve problems, design proposals, projects and give presentations. In class I might ask students to look at live plants and find the morphological structures we have discussed or ask them to analyze and discuss data or questions in small groups, design solutions to problems (ex. crop rotations and nutrient management plans), develop proposals for case studies and present their summaries, analysis, and interpretation of information. Field trips also often provide more active learning experiences than classroom environments.”

**Traditional lecture:** “An instructor presenting and explaining course material verbally with visual aids. This may include posing questions to the class about the material being discussed.”

**Professor Nicole - Traditional lecture:** “To me, I feel like a traditional lecture is where the instructor stands at the front of the class, and informs the students of content and material. I'm not sure that a “traditional lecture” would include discussion from the class, and feedback as they go along, but I do try to include that in my lectures.”
Active learning: I think active learning is where students are more engaged in the learning process, are asked to contribute to the learning process on their own in some way. For me, discussion, feedback via clickers, working through case-studies, etc. gives students the opportunity to problem solve on their own and in small groups and to engage more in the process."

Lecturing is especially useful to convey knowledge, the basic level of Bloom’s taxonomy (Bloom et al., 1956). As a platform for disseminating ideas and knowledge and for guiding and motivating students, teaching through lectures continue to be a cornerstone of higher education practices today. A further reason that lectures continue to remain important part of the university teaching and learning experience is also the significant growth in student numbers during recent decade. In this situation lecturing to large groups of students seemingly is utility solution for many higher education institutions. The integration of active learning strategies to supplement traditional lectures has been shown to increase student learning (Prather, 2009).

Theme 2: Experiential Learning.

In Teaching for Experiential Learning, Wurdinger and Carlson (2010) found that most college faculty teach by lecturing because few of them learned how to teach otherwise. Although good lecturing should be part of an educator’s teaching repertoire, faculty should also actively involve their students “in the learning process through discussion, group work, hands-on participation, and applying information outside the classroom” (p. 2). This process defines experiential learning where students are involved in learning content in which they have a personal interest, need, or want. Experiential learning involves a number of steps that offer student a hands-on, collaborative and reflective learning experience which helps them to “fully learn new skills and knowledge” (Haynes, 2007). Although learning content is important, learning from the process is at the heart of experiential learning. During each step of the experience, students will engage with the
content, the instructor, each other as well as self–reflect and apply what they have learned in another situation. In experiential learning, the instructor guides rather than directs the learning process where students are naturally interested in learning. The instructor assumes the role of facilitator and is guided by a number of steps crucial to experiential learning (Wurdinger & Carlson, 2010).

**Professor Mark – Hands-on, experiential learning activities:** “Student’s doing a project (lab, greenhouse, computer, worksheet etc....) that reinforces what was presented in lecture or exposes them to a new concept.”

**Professor David – Experiential Learning**

“Experiential learning can be described as active learning, learning by doing, hands-on learning, and of late, engaged scholarship. It is providing students with real life problems and guiding them as they investigate solutions and select the most appropriate solutions. Students have to be allowed to explore, and occasionally go down a wrong path before figuring out how to change course to arrive at an optimal result.”

**Professor Jacob – Hands-on/Project based:** “Hands-on project based learning is providing students with learning opportunities through a select project that students complete based on a set plan. This would be for beginning students. More advanced students can choose their own projects, and aid in developing plans for their projects. Ultimately, the project needs to be completed to the plan, while utilizing psychomotor skills.”

**Professor Bob – Laboratory component:** “In the lab component, I focus on trying to get the students to do “hands on” work that will allow them to apply the knowledge they have learned
Experiential learning theory (as cited in Guthrie & Jones, 2012) defines learning as “the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience” (Kolb, 1984, p.41). Bringing concepts to life, ‘learning by doing,’ and making instruction more meaningful continues to be of interest to educators. Experiential learning in which students have opportunities to apply their knowledge has been identified as a positive aspect of education and leadership development (Guthrie & Jones, 2012). There is a benefit to the student and the learning environment when they are engaged in hands-on opportunities (Peterson, 2009). Because students have opportunities to immediately implement new information, they gain insight and understanding into theoretical concepts, and develop competence in their abilities (Leventhal, 2004). Furthermore, they learn to effectively share their ideas and reflect on their practice. Experiential learning is being integrated throughout various individual courses of the PSU faculty to enhance and apply course material. Students are participating in a variety of interactive experiences inside of the classroom.

**Theme 3: Encourage Critical Thinking.**

Instruction that compels critical thought can be done either of two ways: either imbedded instruction with critical thinking skills woven into the content matter, or explicit instruction with lessons designed specifically to provide guidance in specific critical thinking skills (Marin & Halpern, 2011). Research has indicated that effective critical thinking instruction is structured in a manner that engages students during a period in which a particular skill is introduced, requires deliberate practice, and provides students with the opportunity to transfer their knowledge. Initially, the benefits of the application of the skill should be explained (Baker & Brown, 1984) as...
should its use in other contexts (Feuerstein, 1980; Perkins & Salomon, 1989). Student prior knowledge should be tapped during the introductory phase (Ausubel, 1960; Mayer, 1983). The importance of metacognition should be stressed and both internal and external metacognitive reflection should be encouraged (Beyer, 2001; Costa, 2001; Halpern, 2003; Staib, 2003). Instructors should model reflective thinking during this period (Costa & Kallick, 2000). Staib (2003) found that student real-life role-play, the use of case studies, group discussion and student-instructor interaction are among the most effective means of developing critical thinking skills. Critical thinking can include the thinker’s dispositions and orientations; a range of specific analytical, evaluative, and problem-solving skills; contextual influences; use of multiple perspectives; awareness of one’s own assumptions; capacities for metacognition; or a specific set of thinking processes or tasks (Bean, 1996; Beyer, Gillmore, & Fisher, 2007; Brookfield, 1987; Donald, 2002; Facione, 1990; Foundation for Critical Thinking, 2009; Halx & Reybold, 2005; Kurfiss, 1988; Paul, Binker, Jensen, & Kreklau, 1990). Three PSU faculty members’ preferred instructional pedagogies encouraged critical thinking specifically as presented in their operational definition. However, developing critical thinking skills was espoused throughout the face-to-face interviews by all PSU faculty. The following quotes are taken from the questionnaire only.

**Professor Gabe - Socratic Method**

“I see the Socratic method as starting with the assumption that there are always assumptions, and that those assumptions can always be questioned and challenged. In Theaetetus, Socrates keeps asking more questions of the young man to, as Socrates put it, deliver knowledge the way a midwife delivers a baby. I don’t think of myself as being as wise as Socrates or as being a knowledgeable midwife exactly. But I do think that the developing critical thinking through persistent questioning is an essential element of education.”
**Professor Kaleb – Small group discussions:** “I pose a question or ask for an analysis of some data and then I ask students to first think about answers themselves, and then discuss the answers with a group of 5-6 peers, then I ask each group to share their thought with the whole class.”

**Professor Jacob – Class discussion:** “Class discussion is a method of teaching that requires students to be somewhat knowledgeable in the content. The instructor can prepare the students through lecture or readings that are assigned prior to class. It requires the students and the instructor to be prepared to interact with one another/with the entire class. When students are not fully prepared, or as well versed in the topic, then the instructor has to be prepared to approach the discussion in a way that will still meet the objectives for the class session, while engaging all students in the class session. This could entail provided more instruction/readings, during the class session, to get the students up to speed.”

Critical thinking is an important learning outcome for higher education. Since the ability to think critically is traditionally viewed as a fundamental characteristic of an educated person and is also seen by educational reformers as an essential outcome of contemporary education, necessary to meet the demands of citizenship in a democracy and of successful employment in a rapidly changing, highly competitive economy.

**Questionnaire responses**

The following verbatim statements were produced from the email questionnaire. The statements were instrumental in theme development. The statements provide each faculty members operational definition of their respective instructional pedagogies identified.
Professor Hannah - Combination of traditional lecture and active learning activities.

Active learning activities: “This includes students applying their knowledge to analyze and synthesize information to answer questions and solve problems, design proposals, projects and give presentations. In class I might ask students to look at live plants and find the morphological structures we have discussed or ask them to analyze and discuss data or questions in small groups, design solutions to problems (ex. crop rotations and nutrient management plans), develop proposals for case studies and present their summaries, analysis, and interpretation of information. Field trips also often provide more active learning experiences than classroom environments.”

Traditional lecture: “An instructor presenting and explaining course material verbally with visual aids. This may include posing questions to the class about the material being discussed.”

Professor David – Experiential Learning

“Experiential learning can be described as active learning, learning by doing, hands-on learning, and of late, engaged scholarship. It is providing students with real life problems and guiding them as they investigate solutions and select the most appropriate solutions. Students have to be allowed to explore, and occasionally go down a wrong path before figuring out how to change course to arrive at an optimal result.”

Professor Mark – A Mix of Traditional lecture and hands-on, experiential learning student centered activities

Traditional lecture: “Teacher standing in front of students disseminating information with the aid of a chalkboard, transparency or PowerPoint.”
**Hands-on, experiential learning activities:** “Student’s doing a project (lab, greenhouse, computer, worksheet etc...) that reinforces what was presented in lecture or exposes them to a new concept.”

**Professor Jacob – Class Discussion and Hands-on/Project based**

**Class discussion:** “Class discussion is a method of teaching that requires students to be somewhat knowledgeable in the content. The instructor can prepare the students through lecture or readings that are assigned prior to class. It requires the students and the instructor to be prepared to interact with one another/with the entire class. When students are not fully prepared, or as well versed in the topic, then the instructor has to be prepared to approach the discussion in a way that will still meet the objectives for the class session, while engaging all students in the class session. This could entail provided more instruction/readings, during the class session, to get the students up to speed.”

**Hands-on/Project based:** “Hands-on project based learning is providing students with learning opportunities through a select project that students complete based on a set plan. This would be for beginning students. More advanced students can choose their own projects, and aid in developing plans for their projects. Ultimately, the project needs to be completed to the plan, while utilizing psychomotor skills.”

**Professor Gabe - Socratic Method**

“I see the Socratic method as starting with the assumption that there are always assumptions, and that those assumptions can always be questioned and challenged. In Theaetetus, Socrates keeps asking more questions of the young man to, as Socrates put it, deliver knowledge the way a midwife delivers a baby. I don’t think of myself as being as wise as Socrates or as being a
knowledgeable midwife exactly. But I do think that the developing critical thinking through persistent questioning is an essential element of education.”

Professor Nicole - Traditional Lecture with Active Learning Components

Traditional lecture: “To me, I feel like a traditional lecture is where the instructor stands at the front of the class, and informs the students of content and material. I'm not sure that a "traditional lecture" would include discussion from the class, and feedback as they go along, but I do try to include that in my lectures.”

Active learning: I think active learning is where students are more engaged in the learning process, are asked to contribute to the learning process on their own in some way. For me, discussion, feedback via clickers, working through case-studies, etc. gives students the opportunity to problem solve on their own and in small groups and to engage more in the process.”

Professor Bob – Traditional lecture with Laboratory Components

Traditional lecture: “Standing in front of a classroom of students and leading/guiding a discussion about a topic area. Often there is limited participation from the students and I find myself describing the topic or "lecturing" to them on particular topics”.

Laboratory component: “In the lab component, I focus on trying to get the students to do "hands on" work that will allow them to apply the knowledge they have learned during lecture, but also to practice performing tasks they may find valuable in careers related to the subject that I am teaching.”
Professor Kaleb – Combination of traditional lecture, small group discussions, and hands-on, active learning activities

“I would add Socratic method to the list though.”

**Traditional lecture:** “I develop a PowerPoint presentation with information and I deliver it to the students.”

**Small group discussions:** “I pose a question or ask for an analysis of some data and then I ask students to first think about answers themselves, and then discuss the answers with a group of 5-6 peers, then I ask each group to share their thought with the whole class.”

**Active learning:** “One example, done in the small groups is the Jigsaw in which I give students a piece of an intellectual puzzle and I have one person from the group study each part. Then they have to teach that part to the other students, then they examine how the pieces fit together. This is a classroom version, but I also like “field” versions. For example, when we are studying carbon storage in forests we go to the arboretum and measure how much carbon is in that forest.”

Teacher Beliefs and Instructional Practice (Objective Four)

Teachers’ beliefs have a profound influence on their classroom practices. Previous research has shown teachers’ practices are framed by their beliefs about the nature of knowledge, the disciplines they teach, and the processes and outcomes involved in teaching and learning (Pajeres, 1992; Richardson, 1996; Thompson, 1992). Overwhelming evidence in the literature indicates that teachers’ beliefs about teaching and learning is one of the most important
psychological constructs (Pajares, 1992) that help researchers understand the critical role that it plays in teachers’ effectiveness and their choice of instructional practices (Leder, Pehkonen, & Torner, 2002; van de Schaaf, Stokking, & Verloop, 2008; Wilkins, 2008).

Table 9 presents the teaching philosophy, epistemological beliefs, stated instructional pedagogy, and the observed practices of the PSU faculty. All nine participating PSU faculty members were interviewed and recorded teaching. The findings reflected in Table 9 indicate that there is agreement between the stated instructional pedagogy and the actual instructional practice. Table 10 provides demographic information regarding the seven faculty members.
Table 9. Faculty Beliefs and Instructional Practice Comparison of PSU faculty

<table>
<thead>
<tr>
<th>Participant</th>
<th>Teaching Philosophy</th>
<th>Epistemological Beliefs</th>
<th>Stated Instructional Pedagogy</th>
<th>Observed Classroom Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor David</td>
<td>Mentor; one-on-one interaction; develop student rapport; organized; knowledgeable; provide valuable opportunities</td>
<td>Knowledge is part science, morals, and art; job preparedness; role model</td>
<td>Process oriented; experiential learning; hands-on; project based</td>
<td>Instruction; student engaged in projects; individual guidance; questioning; class discussion; practical exercises</td>
</tr>
<tr>
<td>Professor Gabe</td>
<td>Socratic method; cultivate inquisitive component; encouraging students to challenge and investigate</td>
<td>Knowledge is constructed collectively; Pragmatist; Knowledge emerges when it is discussed/challenged</td>
<td>Socratic method</td>
<td>Facilitates class discussion through questioning/allows students to pose questions/challenge information; provides valuable information; utilizes short videos to encourage deep thought of class topic</td>
</tr>
<tr>
<td>Professor Jacob</td>
<td>Comfortable learning environment; stated student expectations; student-centered; student success; create excitement and be enthusiastic; scaffolding; equip students with useful knowledge and skills</td>
<td>Successful students; Care for students</td>
<td>Class discussion; Hands-on project-based</td>
<td>Lecture; Class discussion; practical exercises/hands-on activities; questioning</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Participant</th>
<th>Teaching Philosophy</th>
<th>Epistemological Beliefs</th>
<th>Stated Instructional Pedagogy</th>
<th>Observed Classroom Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor Bob</td>
<td>Provide tools and lessons for success; student success; oral and written communication; problem solving and critical thinking skills; provide opportunity</td>
<td>Lifelong learning; spirit of youth; excited; student interaction/rapport</td>
<td>Lecture; discussion/conversation; Laboratory exercises</td>
<td>Lecture; questioning; discussion; hands-on/practical exercises</td>
</tr>
<tr>
<td>Professor Hannah</td>
<td>Loves learning; make learning fun; creative; provide opportunity to student to analyze, interpret, and problem solve</td>
<td>Seek a higher level of understanding; make our lives and world a better place; help students</td>
<td>Lecture with active learning strategies; field trips; lab components; case studies</td>
<td>Skit/role-playing; Lecture; questioning; discussion</td>
</tr>
<tr>
<td>Professor Kaleb</td>
<td>Strong student/teacher relationship; student success; career success</td>
<td>Students engaging with one another; creating a learning environment that encourages discussion/challenge/co-learning</td>
<td>Short lectures; class discussions; in-class work; active learning strategies</td>
<td>20 minute lecture; questioning; student group discussion; whole-class discussion; role-playing</td>
</tr>
<tr>
<td>Professor Nicole</td>
<td>Equip students with practical information, practices and application</td>
<td>People learn in different ways; Learning is valuable; enjoy learning</td>
<td>Lecture with PowerPoint slides and hand-outs; case studies; short videos</td>
<td>Lecture with PowerPoint and hand-outs</td>
</tr>
</tbody>
</table>
Table 9 (continued)

<table>
<thead>
<tr>
<th>Participant</th>
<th>Teaching Philosophy</th>
<th>Epistemological Beliefs</th>
<th>Stated Instructional Pedagogy</th>
<th>Observed Classroom Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor Cory</td>
<td>Previous experience; provide student opportunities; practical application of information; student success</td>
<td>Engage all students; foster an understanding of and application for the knowledge they gain</td>
<td>Lecture with PowerPoint; Laboratory components; case studies</td>
<td>Lecture; case study</td>
</tr>
<tr>
<td>Professor Mark</td>
<td>Treat students with respect and dignity; create student rapport; mentor; advisor;</td>
<td>Fairness; equality; Treat others like one would want to be treated</td>
<td>Lecture; discussion; questioning; hands-on activities</td>
<td>Lecture; questioning; discussion</td>
</tr>
</tbody>
</table>

Although a variety of factors were expressed by the PSU faculty including class size, class time, personal time, assessment methods, facilities, classroom environment, student readiness, student learning styles, and lack of budgetary resources as factors that can impact their teaching methods, this did not impact the alignment of their teaching philosophy, epistemological beliefs, stated instructional pedagogy, and the observed classroom practices. There was agreement across all four areas studied, which evidences the epistemological beliefs guide the pedagogical practices of the PSU faculty and the pedagogical practices are exhibited in the classroom.
Table 10. *PSU Faculty Demographic Information (n=9)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Male</td>
<td>7</td>
<td>78</td>
</tr>
<tr>
<td><strong>Rank</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructor</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>6</td>
<td>67</td>
</tr>
<tr>
<td>Professor</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td><strong>Discipline</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural and Extension</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agroecology</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Agronomy</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Dairy Cattle Genetics/Dairy</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equine Science</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Landscape Architecture</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Rural Sociology and</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Science, Technology, and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Society</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Animal Sciences</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Soil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biochemistry/Environmental</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Faculty Members’ Perceptions of Discipline Specific Pedagogy (Objective Five)

Shulman’s (2005) notion of “signature pedagogies” is that different communities of teaching practice (e.g., those teaching in K-12 or college, in medical school, in law school, in colleges of engineering) have developed particular, internally consistent forms of pedagogy. Members of these communities of teaching practice teach in certain ways. In efforts to understand the signature pedagogy of post-secondary agriculture education among the different disciplines in Colleges of Agriculture, the PSU faculty were asked to identify the discipline-specific pedagogy of the discipline in which they are associated. The following verbatim quotes were collected through the email questionnaire and provide the perceived discipline specific pedagogy as presented by the respective faculty member. Key words and phrases are bolded and presented in Table 11. Eight PSU faculty completed the email questionnaire.
Table 11. Perceived Discipline Specific Pedagogies by PSU Faculty

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Discipline Specific Pedagogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural and Extension Education</td>
<td>Problem-based Learning</td>
</tr>
<tr>
<td>Agroecology</td>
<td>Hands-on/Active Learning</td>
</tr>
<tr>
<td>Agronomy</td>
<td>Experiential</td>
</tr>
<tr>
<td>Equine Science</td>
<td>None</td>
</tr>
<tr>
<td>Landscape Architecture</td>
<td>Project-based; problem-based; Experiential</td>
</tr>
<tr>
<td>Rural Sociology</td>
<td>Promote critical thinking</td>
</tr>
<tr>
<td>Small Animal Science</td>
<td>Active Learning; Lecture; Laboratory/Hands-on experiences</td>
</tr>
<tr>
<td>Soil Biogeochemistry/Environmental Science</td>
<td>Field methods, case studies, virtual field experience</td>
</tr>
</tbody>
</table>

The PSU faculty’s perceptions of their discipline specific pedagogy included both subject-specific strategies and topic-specific strategies.

Rural Sociology – “I’ve never thought about this question before. And I’m not sure that there is a unique pedagogy. Rural Soc tends to promote more critical thinking that biophysical sciences and economics. But it’s not so different from some of the other social sciences or even humanities in terms of critical thinking. One thing that might set sociology apart from other disciplines is what C. Wright Mills referred to as “the sociological imagination.” Those with a sociological imagination do not look only at the individual or social structures and institutions. Rather, they consider the individual as nested within institutions and social structures. As a result, when there is a problem, a sociologist does not look at it as a personal problem, but as a potentially social problem. Rural sociologists tend to try to instill this way of thinking in their students”
Agroecology – “Today, I think agroecological teaching should help students understand science, develop their understanding of systems (or agroecosystem interactions and complexity) and should include hands-on or active learning”.

Landscape Architecture – “Landscape architecture is, by nature, a project-based field of study. The majority of assignments are problem-solving exercises. The goal is to develop a solution to a problem that is functional, aesthetically pleasing, and appropriate to the needs of a client or end user. My background in landscape architecture made it easy for me to incorporate experiential learning into my curriculum.”

Agronomy – “Experiential. Reading it in a book or hearing it in a lecture is a good start but I believe the students have to experience it to really understand and retain it”.

Agricultural and Extension Education – “I believe that Problem-based learning is the discipline-specific pedagogy for agricultural education.”

Small Animal Science – “Small animal sciences is a newer field within the animal science department framework. From what I’ve discussed with other instructors, a combination of active learning and traditional lecture seem pretty typical. There are some that include more of a laboratory component, but due to the difficulty of IACUC approval, and lack of having a ready supply of dogs and cats that can be worked with, there isn't a lot of hands-on laboratory components in the small animal science field. On the other hand, in the veterinary technology field (which also focuses on small animal science) there is a great deal of hands-on work with live animals, as that generally takes place at technical schools preparing students for a profession in veterinary technology.”
Soil Biogeochemistry (Environmental Science) – “If there is anything it would be field measurements of the processes that link element cycling to society. However, I would not teach in this discipline-specific way to undergraduates. At the undergraduate level, I would define the discipline as environmental science. Again, the specific pedagogy would be field methods. Interestingly, I have never had the opportunity to teach undergraduates in field measurements. I suppose that the case studies I use in ERM 423W would be considered discipline specific pedagogy. I am asking the students to address a problem that they might see in a future job. They do this by gathering data about a specific problem in a specific place and then using those data and the context to develop an environmental management plan. So it is like a virtual field experience (which really isn’t as good).”

Equine Science – “I would say that there is no mode of teaching that has become inextricably identified with preparing people for a profession in the horse industry.”

Student Perceptions of Teacher Effectiveness of PSU Faculty (Objective Six)

Student evaluations have become routine at most colleges and universities. Evidence from many studies indicates that most universities and colleges throughout the world use student ratings of instruction as part of their evaluation of teaching effectiveness (Seldin, 1985; Abrami, 1989; Wagenaar, 1995; Abrami et al., 2001; Hobson & Talbot, 2001). Table 12 provides the mean score of the students’ perceptions of the courses overall rating and their teacher’s overall effectiveness at PSU. All nine classes were surveyed and are presented in the table.
Table 12. *Mean Scores of Student Perceptions of Teacher Effectiveness of PSU Faculty*

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Category</th>
<th>( \mu )</th>
<th>( \sigma )</th>
<th>( \mu )</th>
<th>( \sigma )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor Bob</td>
<td>Compared with other College or University instructors I have had, I would rate this instructor as extremely effective.</td>
<td>4.3</td>
<td>.99</td>
<td>4.5</td>
<td>.91</td>
</tr>
<tr>
<td>Professor Cory</td>
<td>Upon completion of this course, I feel as though it has equipped me with knowledge pertinent for my future career in the field.</td>
<td>4.6</td>
<td>.67</td>
<td>4.7</td>
<td>.48</td>
</tr>
<tr>
<td>Professor David</td>
<td></td>
<td>4.9</td>
<td>.28</td>
<td>4.7</td>
<td>.48</td>
</tr>
<tr>
<td>Professor Gabe</td>
<td></td>
<td>4.7</td>
<td>.58</td>
<td>4.4</td>
<td>.96</td>
</tr>
<tr>
<td>Professor Hannah</td>
<td></td>
<td>4.0</td>
<td>.98</td>
<td>3.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Professor Jacob</td>
<td></td>
<td>4.6</td>
<td>.49</td>
<td>4.4</td>
<td>.69</td>
</tr>
<tr>
<td>Professor Kaleb</td>
<td></td>
<td>4.0</td>
<td>1.0</td>
<td>4.0</td>
<td>.95</td>
</tr>
<tr>
<td>Professor Mark</td>
<td></td>
<td>4.9</td>
<td>.32</td>
<td>4.71</td>
<td>.53</td>
</tr>
<tr>
<td>Professor Nicole</td>
<td></td>
<td>4.8</td>
<td>.49</td>
<td>4.8</td>
<td>.49</td>
</tr>
</tbody>
</table>

*Note: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree*

All students in the classes recorded for this study agreed that the instructor of their respective course was an extremely effective instructor. Students in all but one class agreed the course was equipping them with the knowledge pertinent for their future career. The students in Professor Hannah’s class were neutral with a mean score of 3.9.
Relationship between identified teaching beliefs, operationalized definitions, and student perceptions of PSU faculty performance (Objective Seven)

The following shows the relationship between identified teaching beliefs, operationalized definitions, and student perceptions of utilization of operational definitions of all nine participating PSU faculty members. Tables 13 presents the mean and standard deviation scores to the student surveys collected in three of the participating faculty classes. Following the table are the faculty members’ personal beliefs as stated during the interview process. Table 13 helps to show where agreement between what the faculty member expressed as something he/she believes or actions and how it is perceived by the student. In Table 13, the plain bolded numbers represent the categories where there was agreement between the espoused beliefs of the faculty member and the students, which were ranked high by students. The numbers that are bolded and italicized represent the categories where the faculty member may have expressed their belief or actions that was not perceived in the same way by students. The students provided a score for each statement on the survey using a five point Lykert scale. The scale consisted of 1 equating to Strongly Disagree and 5 equating to Strongly Agree. The categories are listed in order of highest overall average to lowest.
## Table 13. PSU Student Survey Mean Scores and Standard Deviations

<table>
<thead>
<tr>
<th>Category</th>
<th>Overall Average</th>
<th>Instructor Bob</th>
<th>Cory</th>
<th>David</th>
<th>Gale</th>
<th>Hannah</th>
<th>Jacob</th>
<th>Kaleb</th>
<th>Mark</th>
<th>Nicole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledgeable</td>
<td>4.8</td>
<td>4.8</td>
<td>4.9</td>
<td>4.9</td>
<td>4.9</td>
<td>4.9</td>
<td>4.9</td>
<td>4.8</td>
<td>4.9</td>
<td>4.9</td>
</tr>
<tr>
<td>Enthusiastic</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
</tr>
<tr>
<td>Respectful</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
</tr>
<tr>
<td>Warm/Friendly</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
</tr>
<tr>
<td>Self-Confident</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
</tr>
<tr>
<td>Enjoy Teaching</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
</tr>
<tr>
<td>Well Prepared</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Comfortable Learning Environment</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Sense of Humor</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Concerned about Student Learning</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Identifies Important Ideas</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Uses Good Examples</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Encourages Students to Think</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Communicates Effectively</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Adapts to Student Needs</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Tolerant of others’ ideas/views</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Motivates Students</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Appropriate Evaluation Methods</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Improves Understanding</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Provides Opportunity for Students to Synthesize</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Explains Material Clearly</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Accessible Outside of Class</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Appropriate Assignments</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Increases Interaction in Subject</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Well Organized</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Valuable</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Communicates Student Expectations</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Presents Material at Appropriate Pace</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Recognizes When Students do Not Understand</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Helpful Feedback</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Materials are Workable</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Mean Overall</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
</tbody>
</table>

*Note: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree. Categories are organized from highest to lowest overall average. Plain bolded numbers represent categories where there was agreement between the expressed beliefs of the faculty member and the students. Numbers bolded and shadowed represent the categories where the faculty member may have expressed their belief or actions that was not perceived in the same way by students.*
Professor Bob

“I want my students to go out there and be on that cutting edge.”

“I certainly hope they get some of the basic equine specific skills that I’m teaching or nutrition related skills that I’m teaching. That would be a very low level. Beyond that, some of the communication skills, the group interaction skills, there’s a lot of that in all the classes that I teach so I want them to be, it sounds so cheesy, better members of society.”

“…at least they see that I’m putting the effort in, that I’m trying to be a good teacher, and that they try to be a good person based on that as well, or a good whatever it is, because I think in any job we have, there is a certain amount of teaching that we have to do, and I guess looking back the influences that have been important to me, I never would have expected that I would be a teacher if you had asked me when I was an undergrad, but now that I look back on the way that I live my life, the way that I live my life as a lot to do with some of the best teacher that I had so the type of person that I am, because those people influenced, they were there, they care for you, they support you, in their own way.”

The above statements capture statements of Professor Bob that express his beliefs about teaching and learning. The items on the student survey that show agreement with students include: Valuable to me (µ=4.5), Encouraged students to think (µ=4.4), Provided opportunities for students to synthesize (µ=4.5), Materials were worthwhile (µ=4.3), Used good examples (µ=4.6), Warm/Friendly (µ=4.5), Enjoyed teaching (µ=4.8), and Knowledgeable (µ=4.8).

The items Appropriate Assignments (µ=3.9), Recognized when students did not understand (µ=3.7), and Helpful Feedback (µ=3.8) were ranked lower by the students on the survey.
Professor Cory

Professor Cory expressed “…my goal is to just give students opportunities to go back and apply something or to build on some basic knowledge that will enable them in the future to expand what they understand about the world around us a little bit.”

Students agree with the above statement, ranking Encouraged students to think (µ=4.7) and Provided opportunities for students to synthesize (µ=4.5) fairly high on the survey.

“I think by just being open to them, asking me questions outside of the classroom that helps the students that are really interested in a topic. If they feel like they can approach you and discuss something that maybe builds on something that you started in class, I think that really helps them, and I also have had several students that have participated in research projects after having taken my class I’ll ask is there an opportunity to do some research and I’ve incorporated them into our research program a little bit and so that’s for the students that are really interested in a subject so those opportunities are available, and it’s nice to have a student that you didn’t know at all at the beginning of class and then a year later they’re working in your research group because they enjoyed what they learned in your class and wanted to learn more.”

The student surveys reflected student agreement for Knowledgeable (µ=4.9), Concerned about student learning (µ=4.6), Accessible outside of class (µ=4.6), and Increased interest in subject (µ=4.7).

“Sometimes I don’t know (if students understand) and you present the information, there aren’t any questions so you have to make the assumption that they are at least grasping some of it…”
Student responses agree with the sentiments of the above statement showing a lower level of agreement for items Tolerant of others ideas/views (µ=3.8), Adapted to student needs (µ=4.1), Explain material clearly (µ=4.2), and Recognized when students did not understand (µ=4.2).

**Professor David**

Professor David stated, “Basically I see myself as a mentor, someone who is there to partner with the student. I don’t like the hierarch goal...I like to give and take. I think there’s a real value to having a program like we do where we can work one-on-one with students, because I can develop a relationship there. I know who you are and I know your name and you know my name, but I think we can develop a situation where the students want to do things that are going to make me happy...I think we have a rapport that they know my expectations, and I let them know what my expectations of them are, and then what I expect that they should have is an expectation from me. I’m trying to uphold that, I think they should expect me to be organized and knowledgeable and willing to work with them and to provide them with opportunities, which is here’s your project. If I do that, then I think that they appreciate it.”

The student survey results were high across all categories for Professor David. The following items reflected agreement from students of Professor David’s above statement: Knowledgeable (µ=4.9), Communicated effectively (µ=4.8), Well prepared (µ=4.9), Created comfortable learning environment (µ=4.8), Respectful (µ=4.8), Enjoyed teaching (µ=4.8), Accessible outside of class (µ=4.7), Well organized (µ=4.6), Encouraged students to think (µ=4.8), and Provided opportunities for students to synthesize (µ=4.5).
Professor Gabe

“I encourage them to think strategically about something that they really enjoy…We’re just preparing students to do good work”, was stated by Professor Gabe in the one-on-one interview.

Students in Professor Gabe’s class agreed they were encouraged to think (µ=4.8). However, Materials were worthwhile (µ=4.1) and Valuable to me (µ=4.1) were ranked lower by students.

“I have fun teaching so I want to have fun doing it. I want my students to have fun so I tend to tell a lot of jokes.”

Student scores agreed by ranking Professor Gabe high for items Enthusiastic (µ=4.9), Created comfortable learning environment (µ =4.7), and Good sense of humor (µ=4.9).

“The goal is to have the student learn something and so I do try to pass along information and critical thinking.”

Concerned about student learning (µ=4.8), Encouraged students to think (µ=4.8), and provided opportunities for students to synthesize (µ=4.6) reflected agreement with the students.
**Professor Hannah**

“...I think it’s important to make learning fun and an opportunity to be creative and to think in a new way about material or do some analysis and interpretation in your own problem solving...”

“I try to then, when they come to class, engage them in helping to make sure they understand the fundamentals by asking them questions and asking them to participate in discussing the material.”

Student survey results present Encouraged students to think (µ=4.2) and Provided opportunities for students to synthesize (µ=4.2) as two items with a lower agreement. Professor Hannah was ranked highest in on the Knowledgeable item (µ=4.6).
**Professor Jacob**

“I’m a student centered instructor, I mean that’s what I’m really all about, like focusing on the student and making certain that they’re not only getting the content that they need to be successful, but trying to teach in ways that is focused on them and helping them learn in ways that helps them build off of their previous knowledge. The first thing I should have said was that I look at being student centered and making sure that they are the most important part of the class and then that leads into building rapport.”

“...I want my students to be successful. I want to make sure that they’re getting the information that they need to be successful. I want my students to be successful in the end…”

Students agreed, Concerned about student learning (µ=4.8), Respectful (µ=4.9), Warm/Friendly (µ =4.9) Knowledgeable (µ=4.9), Adapted to student needs (µ=4.8), Good sense of humor (µ =5.0) and Enjoyed teaching (µ=4.9) were all ranked high.

“Scaffolding is another piece – I know that I have to make sure that they have the prerequisite knowledge so finding out what the students already know and then building on that and being able to scaffold their learning is important.”

The students results show agreement with the above statement, however, Communicated effectively (µ=4.2), Explain material clearly (µ=4.2), Well organized (µ=4.2), Materials were worthwhile (µ=4.2), and Present material at appropriate pace (µ=4.2) were the survey items with the lowest scores, yet still in agreement.
Professor Kaleb

“...I talk to the students all the time, that’s how I know they understand, and feedback during class, and I make sure it’s from a variety of students, not just the extroverts...”

“I really like students to become more critical of their own ideas.”

“I’m trying to help the students get to where they want to go...to assess whether our graduates have the skills that we set out to give them, and that we feel good about the knowledge capital that they have as they go out into the world...”

Students agreed Professor Kaleb pays close attention to student comprehension, as presented by the Recognized when students did not understand (µ=4.5) item on the survey. Encouraged students to think (µ=4.6) and Provided opportunities for students to synthesize (µ=4.5) also reflect students agreement of Professor Kaleb’s effectiveness in these areas.
Professor Mark

Professor Mark was ranked high in all categories by students. Professor Mark stated, “I hope my role is a facilitator, a mentor, an advisor, because a lot of what goes on in the classroom doesn’t have anything to do with what you’re presenting in the classroom. The students are going through a lot of other social stresses out there, and sometimes they just need an ear or they’re thinking about something and need somebody to bounce it off of, so I try to make myself available for that. To me, I think I said this in my email, I want to treat the students exactly like how I would like to be treated—with respect, dignity—and I think that opens it up that they feel if I respect them, then maybe they will feel a little more comfortable confiding in me or saying, maybe this is somebody I can ask this. I’ve had students come in and talk about buying pieces of property, what do you think, can I financially make this work, and I don’t know if they’re asking other, but they feel confident or comfortable enough to come to me and ask, and I feel that’s part of my role. It’s not in the job description, but if I were them, I would want someone to help me. It goes both ways, though. I expect them to treat me with respect and dignity, and if that works, we have a great class.”

Students strongly agreed ($\mu=5.0$) that Professor Mark was Knowledgeable, Enthusiastic, Warm/Friendly, and Good sense of humor. As evidenced above, Professor Mark wants to create a comfortable learning environment and mutual respect. Students agreed Professor M Created comfortable learning environment ($\mu=4.9$) and was Respectful ($\mu=4.9$). However, although Professor Mark still received a mean score of 4.5 for Accessible outside of class, it was his lowest score; and as stated above, Professor Mark tries to be available to students outside of class.
Professor Nicole

Professor Nicole stated, “...I want the students to be able to use something that they learned in my class, even if it’s not going to be what they do for the rest of their lives, but I hope that something that I teach them is going to be useful to them.”

“I don’t teach a lot of minutia, I try to teach more broad concepts.”

“I try to get them doing hands-on stuff there, and I try to bring them opportunities that if you really want to know how to do this, this is where you can go and learn how to do that.”

“I want them to have some, and I don’t know if you can teach common sense, but having them realize that there’s basics that they can learn and they should learn and whether I teach them or they just need to pick that up, they need that.”

Students agreed and ranked Professor Nicole high in Knowledgeable (µ=4.9), Well prepared (µ=4.9), Used good examples (µ=4.7), and Improved my understanding (µ=4.7). However, students ranked Materials were worthwhile (µ=4.1) the lowest item on the survey.
Summary

The intent of the research study was to examine the links between purposefully selected faculty members espoused teaching theories and their teaching practice. The research study focused on better understanding how university faculty learn to teach and thus provide a basis for enhancing postsecondary agriculture instruction. The research study compared the approaches to teaching of identified excellent teachers in two agricultural science postsecondary institutions.

The examination of the epistemological and pedagogical beliefs focused on that of award-winning post-secondary agriculture education teachers at two agricultural universities. 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 analysis for rich description expressing the faculty member’s beliefs they hold about their teaching. Findings revealed lecture as the dominant teaching method currently in use by SLU Faculty. Lecture with integrated active learning techniques was the dominant teaching method by PSU Faculty. Data revealed current teaching strategies were influenced by prior educational experiences; however, there was very little exposure to instruction in teaching methods.

Although faculty at both institutions had received very little training in teaching, all felt confident in their ability to teach. Findings revealed the teaching beliefs and philosophies of interviewed faculty were well established, however, SLU faculty were aware the practices used in the classroom did not necessarily align. The teaching practices of the PSU faculty aligned with their teaching beliefs and stated philosophies. Faculty interviewed agreed class size, time, and budgetary constraints affect the teaching method employed; because of different constraints the are limited to employing some of their philosophical beliefs in the classroom.
Chapter 5

Discussion

Chapter five contains the summary, conclusions, implications, and recommendations for the study, as well as recommendations for future research.

Purpose and Objectives

The intent of the research study was to examine the links between purposefully selected faculty members espoused teaching theories and their teaching practice. The research study focused on better understanding how university faculty learn to teach and thus provide a basis for enhancing postsecondary agriculture instruction. The research study compared the approaches to teaching of identified excellent teachers in two agricultural science postsecondary institutions.

The study objectives include:

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.
3. Identify faculty members’ operationalization of their instructional pedagogy.
4. Differentiate between teachers’ beliefs and instructional practice.
5. Describe faculty members’ perceptions of discipline specific pedagogy.
6. Describe students’ perceptions regarding the effectiveness of the teacher to deliver a course as stated in the operationalized epistemological beliefs of faculty.
7. Analyze relationships between identified teaching beliefs, operationalized definitions, and students’ perceptions of utilization of operational definitions of faculty at two colleges of agricultural sciences.

This study employed a case–study approach (Gall, Gall, & Borg, 2003) for each institution involved. The instructors selected to participate within each case were deemed to be excellent teachers according to their receipt of an award honoring their teaching. 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 postsecondary agricultural education. The analysis of the research study consisted of illustrating the beliefs, knowledge, and practices of the participating teachers. Data from the following sources were analyzed: video footage, transcripts of the interviews with the teachers, questionnaire completed by the faculty, and a student survey. The triangulation of the multiple data sources used in this research helps to ensure the credibility, transferability, dependability, confirmability, and authenticity of the data (Lincoln & Guba, 1985).

**Objective One - Epistemological Teaching Beliefs**

Educators form beliefs. By examining the basis on which they form beliefs, the researchers may identify their epistemological commitments or epistemic practices. The beliefs held by teachers about the nature of knowledge and learning, epistemological beliefs, appear to be those which may most influence teachers’ choices and decisions in the classroom. The instructional methods a teacher uses, how the teacher manages the class, and what to focus on in teaching and learning are all influenced by the beliefs the teachers holds about knowledge and knowledge acquisition. 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. 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.

**Conclusions for epistemological teaching beliefs**

The SLU faculty held contextualist epistemological teaching beliefs. The PSU faculty held both contextualist and relativist epistemological teaching beliefs. Both the SLU and PSU faculty held beliefs that learners must construct shared understandings in supportive contexts in which they serve as facilitators. The SLU and PSU faculty are less concerned with the type of knowledge that students construct, than the process by which they construct that knowledge. The PSU faculty also held a strong relativist belief that each learner constructs a unique knowledge base that is different but equal to other learners and teachers. The PSU faculty also emphasized their role in creating an environment where students can learn to think independently. Each of these world views includes finer-grained beliefs about knowledge, curriculum, pedagogy, assessment, reality and truth, and the role of the teacher, parent, student, and peers.
Implications

This study suggests developing an understanding of how knowledge is developed within disciplines is a fundamental part of teaching. A significant relationship exists between teachers’ beliefs about intelligence and their beliefs about knowing, it is important to further clarify the relationship and how each type of belief affects teaching practices (Luft & Roehrig, 2007). The development of a university supported learning environment for faculty that focuses explicitly on identifying epistemological views and on examining the relationship between epistemological views and teaching practices will assist in the development of a more sophisticated world view and scholarly teacher.

Recommendations

Personal epistemologies are usually unexamined, implied assumptions about the nature of knowledge and how it is acquired. Most faculty members have never consciously considered their assumptions about knowledge. They are unaware that they even have a personal epistemology, much less whether their assumptions about knowledge are logical or useful for the reality of their worlds. These unexamined assumptions have an influence over the expectations of students and instructors in post-secondary settings. University supported efforts to provide opportunities that encourage educators to reflect and formulate their personal epistemology is recommended. Another recommendation would be for graduate level courses offered to potentially future faculty focused on effective post-secondary teaching practices employ learning activities that allow graduate students to formulate their beliefs and articulate on paper.
Further research is needed that investigates the relationship between personal epistemology and teaching, with a focus on how teachers’ personal epistemologies are influenced by broader social and cultural contexts. Such beliefs are important to consider in the context of post-secondary agricultural education as we work toward the support of quality teaching outcomes for students. A longitudinal study that focuses on graduate students and early career faculty on through their tenured faculty career is recommended to gain more understanding of the epistemological development of post-secondary agricultural education teaching faculty. A longitudinal study would also provide more empirical data on belief acquisition and belief change. More empirical evidence is also needed that clarifies the relation between methods and types of instruction and personal epistemology.

Objective Two - Pedagogical Teaching Beliefs

Each teacher holds a set of beliefs that determine priorities for pedagogical knowledge and how students acquire knowledge. Ertmer (2005), who investigated teacher beliefs about teaching and learning, called these beliefs pedagogical. 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, Meijer, Verloop, & Bergan, 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, 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 &
Teacher beliefs typically encompass teacher-centered and learner-centered pedagogical beliefs (Chai, Hong, & Teo, 2009).

**Conclusion for pedagogical teaching beliefs**

The SLU and PSU faculty both held learner-centered/student-centered pedagogical beliefs.

**Implications**

Learner-centered instruction, embodied in a constructivist orientation (Elan, Clarebout, Leonard, & Lowyck, 2007; Harris & Cullen, 2010; Kayler, 2009; Murphy & Rodriguez-Manzanares, 2008) is a paradigm shift from how instructors teach to how learners learn (Weimer, 2013; Wohlfarth et al., 2008). The shift is from teacher driven instruction to a new role for learners (Weimer, 2013). Learners use all their resources, including prior knowledge and experiences, to participate in making learning meaningful to them. McCombs and Whisler (1997) define learner-centered instruction as:

[A] perspective that couples a focus on individual learners and their needs as central to decisions about teaching and learning at both the school and classroom levels and in understanding of the research on the learning process, as it interacts with, informs, and is informed by teachers’ understanding and experience of the process, how the process occurs, and how the learning process can be enhanced for all learners. (p. 34)

Learner-centered instruction focuses attention on what the student is learning, how the student is learning and applying new information, and the implications for future learning
Learner-centered practices influence various dimensions of instruction including the function of the content, the role of the instructor, the role of the student, assessment, and power (Blumberg, 2009). Learner-centered instruction provides a strong knowledge and skill foundation, provides opportunities for application of knowledge and skills, and develops independent learning skills in students. The function of the content moves from defining what will be learned to a resource to promote learning (Harris & Cullen, 2010). Instructors do not cover the content, but rather learners actively engage in the content by making connections between the topics and their prior knowledge and experiences (Saulnier, 2009). Content is learned at a deep level as learners interact, experience, and apply it.

Each teacher holds a set of beliefs that determine priorities for pedagogical knowledge and how students acquire knowledge. The beliefs of the participating faculty are that of, 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.

Understanding teachers’ beliefs requires making inferences based on what teachers say, plan, and do. If teachers are unable, or unwilling, to accurately represent their beliefs, this can lead to misjudging or misrepresenting that which truly motivates their behavior. Training courses for teachers related to how to translate the pedagogical beliefs into practices in the classroom should be offered.

**Recommendations**

Postareff et al. (2008) found that college professors who participated in at least one year of pedagogical training practiced more student centered teaching and had a greater sense of self efficacy than those who did not participate. Individuals who are confident of their capabilities
will select higher goals and deploy their skills and efforts more effectively than those affected by self-doubt (Acebo, 2008). Faculty development should be offered in pedagogical training to further develop instructional capacity. The establishment of a professional learning community that discusses new materials, methods, and strategies, and that supports the risk taking and struggle involved in transforming practice is recommend for Colleges of Agriculture. A recommendation would be for administrative bodies eliminate barriers which prevent the teacher from translating his/her pedagogical beliefs into practices in the classroom. Faculty should be supported in engaging in ongoing conversations clarifying stakeholders (peers, college/university administrators, students, parents) pedagogical beliefs, including explicit discussion about the way in which their beliefs can be supported. Opportunities for faculty to observe classroom practices that are supported by different pedagogical beliefs are also recommended.

Future research should occur regarding the differences among the level of courses taught, class size, teaching loads, and the selectivity of the focal faculty member's current institutional affiliation as variables of analytical interest due to their contextual influence on teaching beliefs and instructional behavior.

**Objective Three - Operationalization of instructional pedagogy**

The PSU faculty members responded to an email questionnaire that allowed each participant to articulate their personal operationalization of their instructional pedagogy. Moje (2008) purports disciplines can be viewed as spaces in which knowledge is constructed and each discipline has its own terminology, ways of interacting, ways of thinking, and ways of writing. Zahorik (1986) points out, “a view of good teaching is developed through logical reasoning and previous research; good teaching is defined in terms of specific acts” (p. 21). The
operationalization of the instructional pedagogy aligned with existing literature of what each respective pedagogy should “look like.”

**Conclusion for Operationalization of Instructional pedagogy**

Operationalization is the process of defining the concepts of interest into operation or of operating on those concepts in order to “measure” them, both individually and/or in relation to other concepts. Operationalizing permits the researcher to compare conceptual definitions to “reality.” Operationalization of the instructional pedagogy of the purposefully selected faculty members produces data upon which the researchers based theory refinement/modification, theory verification or refutation, and ultimately practice. Three themes emerged from the operationalization of the instructional pedagogies that emerged as the overall faculty operationalization of their approaches to teaching: Enhanced Lectures, Experiential Learning, and Encourage Critical Thinking.

**Implications**

For educators to increase their knowledge of teaching and of themselves as learners, they first need to make explicit their espoused theories and theories-in-use and discover any inconsistencies between the two. Professional learning must include opportunities for people to surface what they “say they do and their explanations for their actions” and “what they actually do and the real reasons for their actions” (Robinson and Lai, 2006, 99). The findings reported also raise additional questions about the appropriate amount of innovative instruction that is needed within courses. Although courses are designed to be innovative and develop necessary skills for industry, lecture was still a dominant pedagogical practice.
Recommendations

The statements provided by the PSU participants from the email questionnaire present the finding that faculty have a good understanding of instructional pedagogies. However, the findings also show limited breadth of different pedagogical applications used by the faculty. By operationalizing the pedagogical practices, researchers and practitioners can begin to have discussions about the appropriate amount of and the types of innovative pedagogy needed to achieve outcomes within courses across a variety of contexts. Further research is recommended on developing direct observation instruments that explore constructs based upon pedagogical theories and practices of interest.

Objective Four - Differentiation between teachers’ beliefs and instructional practice

Several studies have examined the relationship between teacher beliefs and practice. The complex nature of this relationship has led to inconsistent findings. Some researchers have reported a high degree of agreement between teacher beliefs and the practice of teaching whereas others have identified some inconsistencies. This study will differentiate between the post-secondary agricultural faculty’s beliefs and their preferred instructional practice.

Conclusion for differentiation between teachers’ beliefs and instructional practice

The findings presented the teaching philosophy, epistemological beliefs, stated instructional pedagogy, and the observed practices of the SLU and PSU faculty. The findings indicate that there is agreement between the stated instructional pedagogy and the actual instructional practice for both the SLU and PSU faculty. The pedagogical practice does not align with the beliefs of the SLU faculty members. There was complete agreement for the PSU faculty
of their teaching philosophy, epistemological beliefs, stated instructional pedagogy, and the observed practices. The SLU faculty provided explicit reasons as to why and what factors affect why a disconnect exists between their teaching beliefs and their classroom teaching practices. Class size, budget and time constraints, resource availability and University rules, regulations, and traditions were identified as the main factors that contribute to the disconnect. Although a variety of factors were expressed by the PSU faculty including class size, class time, personal time, assessment methods, facilities, classroom environment, student readiness, student learning styles, and lack of budgetary resources as factors that can impact their teaching methods, this did not impact the alignment of their teaching philosophy, epistemological beliefs, stated instructional pedagogy, and the observed classroom practices.

**Implications**

Faculty face various factors that impact and affect their teaching approaches. To meet the demands of the types of learners and to meet societal demands, faculty must be provided more support to meet their instructional needs.

Researchers have purported the relationships between teachers’ beliefs and classroom practices are not direct (Fang, 1996; Kane, Sandretto & Heath, 2002). At research universities, academics are expected to produce and to disseminate knowledge. For academics trained as researchers, usually they have had little or no formal teacher education to prepare them for the teaching role. Often times research studies in improving teaching and learning recommends the implementation of professional development focused on teaching beliefs and conceptions and transferring them into classroom practice. However, literature lacks empirical evidence that professional development in beliefs and conceptions of teaching will accordingly and promptly bring about improvement in teaching practice. The issue of transition between changes in
conceptions of teaching to a change in teaching practices has not been studied in a systematic way either. It seems logical to suggest that newly developed conceptions will exist only as espoused conceptions. It will take some time before new conceptions are put into procedures in actual practice. Current research only informs of the fixed relationship between existing conceptions and teaching practice, but lacks findings relating to the dynamics of the way changes in teaching conceptions are transferred to changes in teaching practices and at what rate.

**Recommendations**

More empirical studies are therefore 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). Efforts to improve faculty support in teaching that consider the faculty’s individual beliefs, characteristics and competences and the features of individual classes is recommended. Improvement is also needed in improving strategies aiming at enhancing teacher self-efficacy beliefs and job satisfaction, as these variables have been shown to be strongly influenced by a teachers’ individual beliefs.

**Objective Five - Discipline Specific Pedagogies**

Research studies have focused on disciplinary ways of thinking and the effect of discipline on teaching, learning and doing research (Smeby, 1996; Neumann et al, 2001). Knowledge of instructional strategies and representations for teaching consists of two categories: subject-specific strategies and topic-specific strategies (Magnusson et al. 1999). Subject-specific strategies are general approaches to instruction that are consistent with the goals of teaching in teachers’ minds such as learning cycles, conceptual change strategies, and inquiry-oriented
instruction. Topic-specific strategies refer to specific strategies that apply to teaching particular topics within a domain of the specific discipline.

**Conclusion for Discipline Specific Pedagogies**

The PSU faculty provided their perception of their discipline specific pedagogy, which included both subject-specific strategies and topic-specific strategies.

**Implications**

The participants were able to articulate clearly the instructional practices they use within their classrooms; however, there is insufficient description from the faculty to label the strategies a discipline-specific pedagogy. Shulman (2005) defines the types of teaching that organize the fundamental ways in which future practitioners are educated for their new profession as ‘signature pedagogies.’ Shulman discusses the three dimensions of signature pedagogy, which include a surface structure, a deep structure, and an implicit structure. Although this study has definitely identified the three structures used to formulate a signature pedagogy, it was the opinion of one individual within each respective field.

**Recommendations**

Disciplines should recognize their discipline specific or signature pedagogies. Identifying these pedagogies will lend itself to more purposeful designed and offered rigorous coursework for students. The creation of professional development opportunities to faculty with limited teaching
experience would then be able to focus and research more on the specific pedagogies to their discipline for implementation in their respective classes.

Future research is recommended to continue along this line of inquiry to examine deeper into each discipline and connect with more faculty to further define each respective discipline specific or signature pedagogy. Further research should also move beyond looking at the individual professor, but at the degree level to see specific subject pedagogies. A final recommendation for further research would be to measure the discipline specific pedagogies against industry demands and if students are graduating with the knowledge, skills, and dispositions required for careers in their respective discipline. Developing the scholarship of teaching through the disciplines should encourage more discipline-based pedagogic research to be undertaken.

**Objective Six - Students’ Perceptions of Teacher Effectiveness**

Marsh and Roche (1993) examined students’ evaluations of teaching effectiveness as a means of enhancing university teaching. Ryan and Harrison (1995) investigated how students weight various teaching components in arriving at their overall evaluation of teaching effectiveness. The final stages of the study presented students’ perceptions of each respective faculty members effectiveness and the relationship between identified teaching beliefs, operationalized definitions, and student perceptions of the participating faculty members’ respective performance.
Conclusion for students’ perceptions of teacher effectiveness

The award-winning faculty were ranked overall as effective instructors as perceived by students.

Implications

The participants of this study were recognized for their effective teaching through established teaching awards at their respective university. The student surveys revealed students viewed the faculty as effective teachers. Although both the SLU and PSU faculty teach multiple classes, only one class was identified by the instructor to be recorded. This provided very limited exposure to the faculty members teaching. The class recorded was selected by the faculty member. Although the findings support that the stated instructional pedagogy of faculty members from both universities aligned with the observed classroom practices, there is potential for the findings to be skewed. Marsh (2001) suggested that effective teaching is contextual, and therefore, must be studied in different settings with different criteria.

Recommendations

These results may be useful to researchers investigating the gap between students’ and faculty perceptions of effective teaching; the change over time of students’ perceptions of effective teaching, and the influence of the amount of university experience on students’ beliefs regarding effective instruction. Future research should refer to student ratings of teaching effectiveness to compare longitudinally to help understand the learners needs and provide a more concrete definition of what effective teaching ‘looks’ like for the ever changing student populations.
Objective Seven - Relationship between identified teaching beliefs, operationalized definitions, and student perceptions of faculty performance

Martin and Lueckkenhausen (2005) found that the more sophisticated one’s understanding of teaching and learning is, the more likely an individual is to adjust their teaching strategies based on evidence of effectiveness. Perhaps this is because one is better able to assess effectiveness, if the process of learning is truly understood. The final stage of the study was to examine the links between the espoused beliefs of the educators and student perceptions.

Conclusion

Findings revealed that there was some positive relationship between the each faculty’s espoused beliefs and practices and the students perception of their respective professors’ performance. However, there were some disagreement between what the faculty member was espousing as a classroom practice, belief, or action and what the students perception.

Implications

If academic faculty can identify and articulate their personal teaching beliefs it will positively impact their classroom teaching and learning for both faculty and students. This then is directly connected to both student and teacher success in academic settings. The study supports the idea that teachers’ instructional practices are more apt to shift to a more student-centered approach if teachers engage in activities that influence their teaching beliefs about their specific discipline and how students learn. The findings from this study, however, also suggest that faculty espoused beliefs and practices are not necessarily perceived by students in the same way.
Faculty need to be purposeful in assessing students on their effectiveness. Faculty need to be made aware of what and how students are feeling/perceiving their classes. Appropriate measurements can provide faculty with valuable information to enact change and pay more attention to areas that students perceive as areas of weaknesses.

**Recommendations**

The nature of good teaching needs to be better understood, more open to scrutiny, and better communicated (Boyer, 1990; Ramsden & Martin, 1996). Teachers’ professional knowledge and actual practices may differ not only among countries but also among teachers within a country. To gain an understanding of the prevalence of certain beliefs and practices, it is important to examine how they relate to the characteristics of teachers and classrooms. Further research should be conducted to explore how teachers’ epistemological beliefs and their instructional practices influence the students’ approaches to learning and learning outcomes. Such research will enhance the understanding of the domains of epistemological and pedagogical beliefs, which would be useful in the development and the improvement of teaching and learning.

**Reflections of the Researcher**

At the time of conducting this study, the researcher was pursuing a doctorate of philosophy at The Pennsylvania State University in Agricultural and Extension Education. Additionally, the researcher was employed by the Agricultural and Extension Education/Teacher Preparation program as an instructor. The researcher had received a Bachelor’s of Science and a Master’s of Science in Agricultural and Extension Education. The researcher’s previous schooling and teaching experience provided confidence a thorough understanding of educational
literature. In reflecting upon this research study, the researcher’s intent in conducting this study was to contribute to a better understanding of teacher beliefs and practices to inform those who intend to teach at a post-secondary institution in agriculture.

The qualitative nature of this study allowed the researcher to discover, understand, and describe the in-depth perspective of the participants. Collecting data through interview methods allowed the researcher to interact with the participants one on one. The participants often expressed their lack of training in teaching and exhibited apprehension towards answering questions regarding their teaching beliefs. The participants shared their lack of full understanding of educational theories and were not formally trained in teaching. The researcher assured the participants that the interview was to collect information regarding their personal beliefs and teaching practices. Although the intent was to help calm the participants nerves, the researcher still felt a sense of hesitation from the participants. The researcher also insisted the participants feel free to ask any questions during the interview if a question needed any explanation or more clarity was needed.

The researcher was asked on several occasions to define epistemological/epistemology to the participants when prompted to share their epistemological teaching beliefs. Pedagogy was also another educational term that was defined on several occasions for the participant. The researcher was able to provide a definition for the terms and in some cases provided examples for the participants. The researcher would also select words that were less complicated to explain the terminology.

The researcher did not feel as though the participants responses were affected by the educational jargon. If the researcher felt the participant was still confused as to what was being asked, the question was broken down and asked in another manner.
Summary

The intent of the research study was to examine the links between purposefully selected faculty members espoused teaching theories and their teaching practice. The research study focused on better understanding how university faculty learn to teach and thus provide a basis for enhancing postsecondary agriculture instruction. The research study compared the approaches to teaching of identified excellent teachers in two agricultural science postsecondary institutions.

The findings indicate there is a positive relationship between the faculty members’ espoused epistemological and pedagogical beliefs and their actual instructional practice. The research supports the claim that teachers’ epistemological and pedagogical beliefs may influence their teaching practices. The researcher acknowledges that teachers possess a variety of beliefs, and no matter the nature of the belief, a teachers’ beliefs do in fact influence how teachers view how they teach. The research also indicates there are specific pedagogies the participants defined as discipline-specific. While the direct relationship between the identified discipline specific pedagogies and student career success cannot be addressed through this research, the evidence indicates there are specific pedagogical practices utilized in each discipline that is directly related to the development of the knowledge, skills, and dispositions sought by careers within each respective discipline.

That being said, this study provided recommendations for both practice and future research. The researcher recommends that faculty attempt to identify their epistemological and pedagogical beliefs as they begin their career as a faculty member at a post-secondary agricultural institution. By doing so, instructional practices can be guided by their beliefs. The researcher also provides recommendations for future research that investigates the relationship between personal beliefs and teaching, with a focus on how teachers’ personal beliefs are influenced by broader social and cultural contexts. Such beliefs are important to consider in the context of post-
secondary agricultural education as we work toward the support of quality teaching outcomes for students. A longitudinal study that focuses on graduate students and early career faculty on through their tenured faculty career was also recommended to gain more understanding of the epistemological development of post-secondary agricultural education teaching faculty. A longitudinal study would also provide more empirical data on belief acquisition and belief change. More empirical evidence is also needed that clarifies the relation between methods and types of instruction and personal beliefs. Research conducted in colleges of agriculture is also recommended to identify the preferred teaching styles of the current generation of learners. Research should also be conducted to examine the dynamics of the way changes in teaching conceptions are transferred to changes in teaching practices and at what rate.

The challenges facing education systems and teachers continue to intensify. Quality postsecondary education becomes more and more critical to the success of both students and faculty. There is a continual need for productive research on effective teaching. Effective teaching has benefits for all undergraduate students. 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 (National Research Council, 2009).

Current research must pay more attention to the complexity of teaching when attempting to further understanding of university-level teaching. Researching discipline specific pedagogies holds exciting potential for developing more complex understandings of university academics as teachers, which in turn has implications for the improvement of university-level teaching. Research into this would require linkages to be made between teacher conceptions, strategies and methods of teaching and the student experience to identify if there are preferred conceptions of teaching to enhance the student learning experience. College learning environments possess a multitude of interactions that ultimately influence student learning, and research will further
clarify how teachers’ beliefs influence their pedagogical decisions (Schuh, 2004). Educational researchers continue to “advocate the need for closer examination and direct study of the relationship between teacher beliefs and educational practices” (Savasci-Acikalin, 2009, p. 5).

The increasing demand to improve post-secondary education, specifically in agriculture education, should be pushing educational researchers to identify the ‘ways of thinking and practicing’ characteristics of particular disciplines and identify how students be supported in becoming participants of particular disciplinary discourse communities. Effective teaching is ultimately and primarily centered on effective learning. A teacher is effective if the students master and learn the intended outcomes. Exemplary teachers focus on learning and learning outcomes by having a strong understanding of the content and pedagogical content knowledge. Rather than focusing on what teachers need to teach and how they should teach it; teachers need to subtly shift their paradigm to what it is that students need to learn and how they will best learn (Biggs & Tang, 2007, Biggs, 1996; McMahon & Thakore, 2006; Tagg, 2004). Studies that consider faculty confidence across disciplines may provide information that can assist in determining best practices to empower faculty to sustain or improve their teaching, and potentially aid in the design of degree programs.
References


Marsh, H.W., & Roche, L. (1993). The use of students’ evaluations and an individually-structured intervention to enhance university teaching


Appendix A: *Request for Research Study Participation (SLU)*

Dear __________,

My name is Laura Sankey. I am a PhD Candidate at The Pennsylvania State University, within the College of Agricultural Sciences. I work within the Department of Agricultural Economics, Sociology, and Education.

My studies and research focus on teacher preparation and improving the teaching and learning process. I am currently visiting SLU to conduct the first part of my doctoral research. I am interested in learning more about identified award winning teachers. From this study, I hope to improve my understanding of effective teaching in Colleges of Agriculture and how identified award winning teachers define their own personal teaching style and effectiveness. I also hope this study will help to understand the espoused philosophy of identified award winning teachers and the pedagogies selected for their discipline.

As an award winner of the Pedagogical Award at SLU and being highly recommended by your SLU peers, I was wondering if you would be willing to participate in my research study. Your participation would include a one-on-one confidential interview, recording one of your classes while you teach, and completion of an online survey in the fall. I would also have the students of the class I would record complete a paper survey at the end of your class session.

Attached you will find an informed consent form that provides information on confidentiality and the study procedures as well as the interview questions. If you would consent to participation in the study, you may review these articles before the actual interview in case you would want to prepare anything.

I hope you considered this opportunity!

I look forward to hearing back from you!

Have a wonderful day!

Laura L. Sankey

PhD Candidate – Department of Agricultural Economics, Sociology, and Education
Agriculture Education/Teacher preparation
College of Agricultural Sciences
The Pennsylvania State University

Office: 012 Ferguson Building
     012 Ferguson Building
     University Park, PA 16802

Phone: 814.553.0324

Home Address: 3830 Goshen Road, Clearfield, PA 16830
Appendix B: Faculty Informed Consent Form

Informed Consent Form for Social Science Research
The Pennsylvania State University

Title of Project: Identifying Excellent Postsecondary Agriculture Educators At Two Leading Agricultural Science Institutions

Principal Investigator: Laura Sankey Rice, Graduate Student
012 Ferguson Building
University Park, PA 16802
(814) 553-0324; sankey@psu.edu

Advisor: Dr. Daniel D. Foster
211 Ferguson Building
University Park, PA 16802
(814) 863-0192; foster@psu.edu

Other Investigator(s): Dr. Melanie Foster

1. **Purpose of the Study:** The purpose of this research study is to explore identified excellent agriculture educators at The Swedish University of Agricultural Sciences’ and The Pennsylvania State University, College of Agricultural Sciences and their skills, knowledge, and dispositions on effective postsecondary agriculture education. The main focuses will surround teaching practices, personal epistemological and pedagogical knowledge of teaching, and methods of professional development and improvement.

2. **Procedures to be followed:** As a participant, you will be asked to permit the researcher to video tape your regularly scheduled undergraduate class and schedule a one-on-one interview. You will also be asked to answer a short on-line survey. The recordings will be stored in a locked filing cabinet in a locked office on Penn State Campus, 211 Ferguson Building. The recordings will be held for five years and then destroyed.

3. **Duration:** It will take the duration of your regularly scheduled class to capture the session on video. The in-depth one-on-one interviews will take approximately 1-2 hours. The survey should take approximately 15 minutes to complete.

4. **Statement of Confidentiality:** Your participation in this research is confidential. The data will be stored and secured at Ferguson Building at The Pennsylvania State University in a locked file. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared.

5. **Right to Ask Questions:** Please contact Laura Sankey Rice at (814) 553-0324 or sankey@psu.edu with questions or concerns about this study.
6. **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer.

You must be 18 years of age or older to take part in this research study. If you agree to take part in this research study and the information outlined above, please sign your name and indicate the date below.

You will be given a copy of this form for your records.

<table>
<thead>
<tr>
<th>Participant Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Person Obtaining Consent</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C: Interview Guide

Interview Guide

Overall topic: Motivations, experiences, philosophies, and pedagogies in effective teaching within institutes of higher education/Colleges of Agriculture

Subject: L. Sankey Rice – Dissertation Research

Opening

Thank participant for participating today.

Purpose of the interview: twofold 1) to improve our understanding of effective teaching in Colleges of Agriculture and how participants define their own personal teaching style and effectiveness; and 2) to understand the espoused philosophy of identified excellent teachers and the pedagogies selected for their discipline.

Confidentiality of data. Anything you say here will not be shared with anyone outside the research team, and will only be used in the context of this research study. With your permission, I would like to tape the interview. It will be transcribed to produce a written transcript that will not have your name or department on it. That transcript will only be used for this research study. The tape will be destroyed once it is transcribed.

Do you have any questions before we begin?

Faculty Interview Questions

http://www.isetl.org/iitlhe/pdf/IJTLHE2.pdf

1. Please share a brief introduction on yourself.
2. Share your educational background.
3. What primary teaching methods were you exposed to during your graduate studies?
4. What other exposures to teaching methods have you had, e.g., undergraduate work, professor/school teacher parents, coursework, professional experiences?
5. Which of these were the most influential in affect the way you teach?
6. What is your primary instructional pedagogy?
7. Why did you choose this primary method of instruction?
8. What is the role of the student in your preferred instructional methodology?
9. What is the role of the instructor in your preferred instructional methodology?
10. What influence (if any) did the means of assessment contribute to your decision to use this particular method?
11. What might be other factors that affect the choice of a particular pedagogy?
12. Does class size affect your choice of methods? How or why?
13. Describe your teaching philosophy. Is there a theory or reasoning as to why you teach like you do?
14. What epistemological beliefs factor into your philosophy of teaching?
15. Do you have a written teaching philosophy statement? If yes, may I have a copy?
16. What training or education have you had in teaching?
17. How do you reflect and improve on your teaching?
18. How do you measure your effectiveness?
19. Do you measure student outcomes at the completion of your course?
20. How do you measure your students’ preparedness for job placement in industry?
21. Do you feel confident in your teaching abilities?
22. How do you maximize student learning in your classroom?
23. How do you know when your students understand?
24. How do you decide what to teach and what not to teach?
25. How do you decide when to move on to a new topic in your classroom?
26. How do your students learn best?
27. What skills and experiences do you hope students gain from your teaching?
28. Can I contact you to complete an online survey?
29. Can I contact you in the future if questions arise during transcription and coding?
Appendix D: *Student Survey*
### Instructor Name:

**Instructions:** Please indicate your personal opinion about each statement by circling the appropriate response at the right of each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The instructor was knowledgeable about subject matter.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. The instructor communicated effectively.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. The instructor was enthusiastic about teaching.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. The instructor was well prepared for each class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. The instructor created a comfortable learning atmosphere.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. The instructor adapted to student needs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. The instructor was tolerant of others' ideas and views.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. The instructor was genuinely respectful of students.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. The instructor was warm and friendly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. The instructor had a good sense of humor.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. The instructor motivated students to do their best.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. The instructor was self-confident.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. The instructor genuinely enjoyed teaching.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. The instructor was concerned about student learning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. The instructor was able to explain material clearly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. The instructor identified important ideas.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17. The instructor used good examples to explain concepts.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18. The instructor was accessible outside of class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19. The assignments were appropriate in amount and level.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20. The evaluation methods were appropriate.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>21. The course increased my interest in the subject matter.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
1. What is the average grade you attain in courses? 

2. How old are you? 

3. Gender  M  or  F 

4. What is your ethnic background? 

5. What is your major/main area of study? 

22. The course was well organized. 
23. The course materials (text, readings, etc.) were worthwhile. 
24. The course improved my understanding of concepts in the field. 
25. The course was valuable to me. 
26. Teacher communicated what the student expectations were. 
27. Teacher presented material at an appropriate pace. 
28. Teacher recognized when students did not understand concepts and reviewed as necessary. 
29. Teacher encouraged students to think and question. 
30. Teacher provided opportunities for students to synthesize and make application of the content. 
31. Feedback provided by teacher on assignments was helpful to student learning. 
32. Compared with other college or university instructors I have had, I would rate this instructor as extremely effective. 
33. Upon completion of this course, I feel as though I it has equipped me with knowledge pertinent for my future career in the field.
VITA

Laura L. Rice
Instructor of Agricultural and Extension Education
Department of Agricultural Economics, Sociology, and Education
The Pennsylvania State University
204A Ferguson Building
University Park, PA 16802

Phone: 814.553.0324
Fax: 814.863.4753
Email: laurarice@psu.edu

EDUCATION

2015
Doctorate of Philosophy, The Pennsylvania State University, University Park, PA
Major: Agricultural and Extension Education
Dual Degree: International Agricultural and Development
Certification: Institutional Research Professional
Support Areas: Teacher Education, International Agriculture and Development, Institutional Research and Statistics
Dissertation title: Teaching Beliefs and Instructional Practices of Award-Winning Faculty at Two Agricultural Universities

2011
Masters of Science, The Pennsylvania State University, University Park, PA
Major: Agricultural and Extension Education
Thesis title: A Content Analysis of the Teaching Philosophy Statements of Award Winning Colleges of Agriculture Professors

2007
Bachelor of Science, The Pennsylvania State University, University Park, PA
Major: Agricultural and Extension Education
Minor: Dairy and Animal Science