

Perspectives on Professional Learning
at the University of Tennessee Institute of Agriculture

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Degree

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Dedication

I dedicate this thesis to Patricia for her endless love and belief in my abilities.

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Abstract

Professional learning in higher education is changing from a workshop approach to long-term interactive learning. According to the Western Governor's University (2017), this new form of professional development known as "professional learning" incorporates collaboration among educators to improve their teaching and development at work. The University of Tennessee (UT), Herbert College of Agriculture (Herbert) is incorporating new approaches to improve employee professional learning. To explore this learning environment two methods of professional learning were investigated including peer mentoring and faculty development in teaching higher order thinking. The Tennessee Extension Peer Mentoring Program was established to orient and mentor new extension agents at UT (Tennessee Mentoring Toolkit, 2015). The first study in this thesis contains a comprehensive literature review for this new program on employee confidence, competence, and job satisfaction. The review suggests that mentoring is beneficial to new employee orientation and has been found to increase employee confidence, competence, and job satisfaction. The second study in this thesis is a literature review and analysis of focus group data from faculty interviews. A team of Herbert researchers is seeking to create an environment of higher-order learning in accordance with the best management practices of the National Collegiate Honors Council. Herbert faculty participated in focus groups to identify strengths of the current program and to determine future needs to implement higher-ordered learning into curricula. The results suggested that faculty perceived problem solving as the greatest strength of the college and identified the need to improve students' abilities in critical evaluation. The students' fear of failure was identified as an impediment to teaching higher order thinking. Faculty realized a need to teach higher order thinking that builds upon each year in college and emphasizes a curricula wide approach. The faculty reported a need for professional development in teaching critical thinking and student assessment, preferably in a hands-on workshop with a group discussion format.

Table of Contents

<i>Introduction.....</i>	<i>1</i>
 <i>Chapter I: A Comprehensive Literature Review Summary for Mentoring in the</i>	
<i>Context of Cooperative Extension</i>	<i>3</i>
 Abstract	5
 Introduction	6
Mentoring as a Method of Professional Learning in CES	7
Background of CES in Tennessee.....	10
 Literature Review	12
Defining the Construct of Confidence.....	13
Defining the Construct of Job Satisfaction	21
 Conclusions.....	30
Summary of Mentoring, Confidence, and Self-efficacy in the Literature	32
Summary of Job Satisfaction in the Literature.....	36
 Discussion	36
 References	39
 <i>Chapter II: What does our faculty need to enhance student’s higher-order thinking?</i>	
<i>Perceptions from a College of Agricultural Sciences and Natural Resources.....</i>	<i>48</i>
 Abstract	50
 Introduction	51
Foundations of Higher-Order Thinking.....	52

Methods	61
Results	63
Discussion	67
References	71
Appendix	77
<i>Conclusion</i>	81
Overview of the Research	81
References	82
<i>Vita</i>.....	83

List of Tables

<i>Chapter 1: Table 1.1: Literature Summary of Mentoring, Confidence, and Self efficacy.....</i>	<i>32</i>
<i>Table 1.2: Literature Summary of Mentoring and Job Satisfaction.....</i>	<i>33</i>
<i>Chapter 2: Table 2.1. Major Themes, Focus Group Questions, and Findings.....</i>	<i>65</i>

Introduction

This thesis contains two studies presented for the partial fulfillment of the Master of Science Degree in Agricultural Leadership, Education, and Communications. These studies encompass different approaches to investigate professional learning at the University of Tennessee, Institute of Agriculture and the Herbert College of Agriculture (Herbert).

Organizations that wish to engage their employees often offer opportunities for professional learning. These opportunities allow employees to remain engaged in continuous learning and to keep current with new technologies and information in their field of expertise. Elder (2017) writes that quality professional development is based on foundational insights that evolve and change, therefore learning must be ongoing. Mentoring is a form of professional learning in which a new employee can be introduced to their new role in an organization by an experienced senior member. Place and Bailey define mentoring as career development that helps new educators understand their roles and responsibilities. This support can be beneficial in helping new hires become competent in their new jobs (Place & Bailey, 2010). Mentoring may shift from rote information about policies and duties to job related learning as mentors and mentees discuss teaching and programming. Kram (1985) noted that mentoring can produce learning through the acquisition of new competencies related to the job context and may enhance a mentee's sense of self-identity as a professional. This learning of new skills can also build employee's confidence in their competencies at work.

Personal learning is achieved through interactions with experienced individuals in the context of a learning organization. Lankau and Scandura (2015) explain that personal learning consists of relational job learning and personal skill development. Mentoring is a successful way to influence learning that provides opportunities for role modeling of expected behaviors from mentors to mentees. The first study in this thesis is a review of literature for the Tennessee Extension Peer Mentoring Program (TEPMP). The mentoring program was designed to increase new employees' confidence and competence in their first year in cooperative Extension at UT (University of Tennessee Extension, 2015). This review provides background information that may prove useful in future assessment of the mentoring program.

The second research project explores Herbert faculty perceptions of higher-order learning in their curricula. This research was conducted using focus groups to identify the current strengths and needs of Herbert faculty.

Chapter I:
A Comprehensive Literature Review Summary for Mentoring in the
Context of Cooperative Extension

This review of literature was created by Edward C. Yost and was conducted in partial fulfillment of a master's degree in Agricultural Leadership, Education, Communications Program at the University of Tennessee, Knoxville.

Abstract

Mentoring is a successful way to provide professional learning opportunities for new employees during their first year of orientation in the Cooperative Extension Program (CES). This comprehensive literature review was compiled to establish a background of the known effects of peer mentoring on employee confidence, competence, and jobs satisfaction and within the CES. This review of literature established that mentoring is positively related to increases in self-efficacy (Lejonberg & Tiplic, 2016; Roya et. al, 2011). People with high self-efficacy are often more optimistic and creative which in turn leads to increased motivation and job satisfaction (Akomolafe & Ogunmakin, 2014; Skaalvik & Skaalvik, 2014). Increased job satisfaction has been found to increase job retention and organizational commitment (Martin & Kaufman, 2013). Newby and Heide (1992) found that competence is enhanced by mentoring and the acquisition of skills which increases self-efficacy and job satisfaction. Mentoring provides opportunities for professional learning within the context of a learning organization and provides younger employees with the benefit of learning from experienced employees. This professional learning can increase self-efficacy and lead to greater career and job satisfaction (Allen et al., 2004; Gong et al., 2011; Lankau & Scandura, 2002). Successful mentoring relationships provide both psycho-social and career related support that lead to increased satisfaction in a person's career (Eastman and Williams, 1993; Kram, 1983) and may lead to increased employee retention and job performance (Day & Allen, 2004; Harder et al., 2014; Wiggins & Moody, 1983).

Introduction

This comprehensive literature review of mentoring addresses the effects of mentoring on employee confidence, competence, and job satisfaction in the context of workplace mentoring and more specifically within the context of the Cooperative Extension Program (CES). The recruiting, orienting, and training of an Extension agent requires a large commitment of time and resources. Therefore, understanding impediments to retention can improve productivity of CES Programs. The American Association for Agricultural Education (AAAE) has stated that further research is needed to understand what is effective in successful mentoring programs (Graham, Arnold, & Jayaratne, 2016).

Land Grant Universities are located in every state in the United States and provide education and current research findings to the public through the CES. The CES provides non-formal education and learning activities to people throughout the country including farmers and other residents of rural communities as well as to people living in urban areas. CES emphasizes taking knowledge gained through research and education and bringing it directly to the people to create positive changes (USDA, 2016). Extension agents serve as an informational resource and deliver educational programming and assistance to their constituents in their designated county (Brown, 2016).

Mentoring as a Method of Professional Learning in CES

Mentoring is a centuries old method of teaching provided by a more experienced person to a younger person. A mentor is defined as an influential, established, knowledgeable member of an organization who supports and commits to the upward mobility of a protégé's professional career (Mincemoyer & Thomson, 1998). The term "mentoring" originated in Greek mythology. In the epic poem, "The Odyssey" by Homer, Mentor is a male character and alternative form of the goddess Athena. When Odysseus leaves to fight in the Trojan War, he leaves Mentor, a wise and trusted friend, to serve as guardian of his son Telemachus. The term mentor came to mean wise and trusted teacher and guardian (Wharton School, 2007). Mentoring has occurred informally for years and has recently become more formalized in training and orientation programs. Mentoring programs are commonly used in religious and youth organizations, business, nursing, education, technical industries, and media (Eby, Allen, Evans, Ng, & DuBois, 2008).

Mentoring is a form of social learning and for the purpose of this literature review is grounded in Social Cognitive Theory which contends that people learn from their instructors and peers in a social environment (Bandura, 2010). Self-efficacy lies at the center of this theory which emphasizes the role of observational learning and social experience. Bandura's theory of self-efficacy states that as a person accomplishes and masters a new activity or task successfully, they develop self-confidence and build upon that confidence and experience to try new things. "Self-efficacy is a belief in one's

capability to organize and execute the courses of action required to manage prospective situations" (Bandura, 1997, p. 2). Self-efficacy is therefore a belief or perception in one's ability to succeed that is strengthened by the successful accomplishment of tasks in new situations.

Mentoring is therefore a provision of guidance and the sharing of one's own self-efficacy with others to help them build confidence in themselves. Eastman and Williams (1993) determined that mentoring is not significantly related to job performance, but that it is in fact significantly correlated to a feeling of satisfaction in one's career. They found that mentoring provided both psychological and social benefits that lead to increased job satisfaction. Vroom (1964) defines job satisfaction as "affective orientations on the part of individuals toward work roles which they are presently occupying" (p. 99). Job satisfaction is a worker's sense of achievement and success on the job. It is generally perceived to be linked directly to productivity as well as to personal well-being. Job satisfaction implies doing a job one enjoys, doing it well, and being rewarded for one's efforts. Job satisfaction further implies enthusiasm and happiness with one's work is the key ingredient that leads to recognition, income, promotion, and the achievement of other goals that lead to a feeling of fulfillment (Kaliski, 2007).

Today, in corporate America, employees are less likely to stay with their employers until retirement than in previous generations. The Wharton School at the University of Pennsylvania claims that the prototypical career employee is rapidly disappearing. People no longer work 30-40 years and retire from the same company

(Wharton School, 2007). This transition in business environments has changed since the inception of the world-wide internet and the globalization of the world economy.

According to Higgins, Dobrow, and Roloff (2011), the nature of the business environment has undergone a transition from a once stable to a less stable environment. The global workplace is more responsive to economic trends, terrorism, and catastrophic weather events. This instability has driven employees to take on more control over their own career paths since the mid-1990s. Employees can no longer rely on the career stabilities that companies used to offer. Employees must continue to learn new skills and technology throughout their careers (Castellano, 2014).

As companies strive to maintain talent in their staff, mentoring has become popular as a method of retaining human capital. Mentoring is used by 71 percent of Fortune 500 companies; 77 percent of these companies claim that mentoring has helped to increase retention and improve employee performance (Garrett, 2014; Moore, 2015).

Background of CES in Tennessee

The University of Tennessee (UT) was established in 1794 as Blount College and later became East Tennessee College in 1807. The land grant University system was established by the Morrill Act of 1862 which provided federal funding to states to develop institutions to teach agriculture and mechanical arts (Tennessee Today, 2012). In 1869, the college received land grant status and was named the University of Tennessee (<http://tennessee.edu/history/2015>). UT provides Extension education in all 95 counties of Tennessee. UT is one of two land grant institutions in the State of Tennessee; the second is Tennessee State University.

The Tennessee State University (TSU) was founded in 1912. Previously in 1909, the university was as one of the three normal schools founded by the Tennessee State General Assembly to provide agricultural and industrial education for African American students. In 1957, TSU merged with UT Nashville and gained land grant status in 1958. TSU provides cooperative extension programs to 50 counties in the state (Tennessee State University, 2017).

Mentoring and the Tennessee CES. Mentoring has been associated with successful results in business and has been in practice as a method to increase employee retention in CES since the early 1980s. The loss of CES agents through employee turnover can create inconsistency or shortages in programs that require stability, such as 4-H. The 4-H program is a youth development program that provides educational

programs for youth in health and agriculture in rural and urban areas (UT Extension, 2017).

UT provides extension education in 95 Tennessee counties. Program areas include 4-H Youth Development, Agriculture, Natural Resources and Community Economic Development, and Family and Consumer Sciences (University of Tennessee Institute of Agriculture, 2017).

According to Sortor (2003), the Tennessee CES did not have a standardized formal or informal mentoring program in effect to mentor new employees at the time of her research. The new employees were sporadically paired with experienced supervisors for their training and mentoring in Extension.

A strategy of the 2010-2020 Extension Strategic Plan, Advancing Tennessee is to invest in human capital by supporting and encouraging employees to enhance their commitment and engagement (UT Extension, 2010). A recommendation of this plan is to develop a Peer Mentoring Program for Tennessee CES to increase new extension agent job satisfaction and retention.

Literature Review

This literature review explores the effects of mentoring on employee confidence, competence, and job satisfaction. A review of the literature was conducted to search for articles referring to mentoring, confidence, competence, or job satisfaction. The methods included a search using the search words mentor, mentoring, job satisfaction, confidence, competence, and self-efficacy. This consisted of a review of all mentoring articles related to the search words in cognate disciplines including business and academia. As the volume of literature on mentoring in cognate areas is large and ranges over a thirty-year period, only articles that included specific mentions of confidence, competence, and job satisfaction were reviewed. All mentoring articles in CES were reviewed for relevance.

This literature review made use of the following resources and databases: University of Tennessee Library database, the digital library of Theses and Dissertations, EBSCOhost Academic Search Complete, EBSCOhost Arts & Sciences IV, EBSCOhost Business, EBSCOhost Education Source, Elsevier Science Direct, ERIC, Google, Google Learn, JSTOR Business, *Journal of Extension*, Google Scholar, Psychnet, Springer Link, and books on the related subjects.

Defining the Construct of Confidence

Confidence is often defined as an attribute of a person's perception of their decision-making abilities and a belief or self-assessment of their level of correctness. Confidence has many meanings when used in different contexts.

Trow (1923) conducted an early study on confidence. The researcher introduced the "perception of confidence" and described the feeling of confidence as subjective, introspective and related to correctness in one's judgments. The experiment surveyed 42 subjects using a 320-question survey to assess the correctness of the response to a question and a self-judgment of the degree of confidence in the correctness of each response. The scale was designed as follows; A-perfectly confident, B-fairly-confident, C-slightly confident, and D-a mere guess. Trow concluded that individuals who tended to be most confident as judged by their overall weighted confidence scores were no more apt to be right or wrong than the other participants in answering the questions. However, for both sets of participants, the correctness of the answers varied directly with the perceived degree of confidence, such that answers judged by the participant to be correct were more apt to be correct than the other answers (Trow, 1923).

Stankov and Lee (2015) explained that confidence is its own construct, separate from self-confidence and self-efficacy. They state that confidence implies "done well" and "I am sure I have done this correctly" in contrast to self-efficacy which is defined as a person's belief that they can complete a task and that it can be attained using their

abilities and with increased effort (Bandura, 1986). Stankov and Lee (2015) posited that the theoretical foundation of confidence is grounded in psycho-physics and cognitive psychology and is thus considered decision making. Gist and Mitchell (1992) expanded on this definition to include a person's realization of their abilities in addition to their perceptions of correctness. The authors contended that self-efficacy is about abilities, whereas confidence comprises abilities and certainty based on knowledge.

Holland, Middleton and Uys introduced the term professional confidence which they defined as “a dynamic, maturing personal belief held by a professional or student.” This included an understanding of and a belief in the role, scope of practice, and significance of the profession, and is based on their capacity to competently fulfill these expectations, fostered through a process of affirming experiences” (Holland, Middleton, & Uys, 2012, p. 222). Therefore, personal confidence is based on the premise that the framework of a profession motivates a young professional. A student or professional seeks training for a profession and accepts the responsibility of the ethics, accepted practices, standards, and roles of the profession. They develop a belief in their abilities through learning and practice by striving to fulfill personal and professional expectations. They achieve motivation through affirming experiences as they strive to attain competence.

Another facet of confidence is job related context. Stajkovic (2006) conducted reviewed thirty theories of job confidence and found no definition of confidence related to work motivation. The definition he found was that confidence was a certainty about

handling something a person needs to do at work or at a social event, or in a relationship. He developed a definition of confidence as a higher order construct that he termed “core confidence.” The researcher states that core confidence influences four manifestations that portray a person who figures out what is to be done and how to do it (hope), develops a belief that he or she can do specific tasks (self-efficacy), forms a positive outcome outlook on the entire undertaking (optimism), and works on the belief that he or she can bounce back if things go awry (resilience)” (Stajkovic, 2006, p. 1209). According to Stajkovic mentions that to perform a job people must possess a desire to do a job, the skill or competence to do the job, coupled with confidence or a belief that they can do a job.

Based on the definitions discussed above, confidence is occasionally defined as its own construct, separate from self and professional confidence and self-efficacy. Other researchers often use confidence and self-efficacy somewhat interchangeably or with overlapping or similar definitions. Because both terms are relevant to this study and the exploration of the mentoring process, both will be discussed further.

Confidence and Self-Efficacy. Bandura (1997) defines self-efficacy as a belief in one’s ability to execute a task. Perceived self-efficacy is concerned with judgments of personal capabilities. Therefore, a person needs to perceive their self-efficacy to assess their abilities to fulfill a task. Perceived self-efficacy is a cognitive process through which a person develops a belief in their abilities. These beliefs allow a person to assess how much effort they must expend by assessing their capabilities to complete a task.

They also measure their progress and strive to attain goals, endure setbacks, cope with stress, and persist toward the attainment of the task. Bandura uses the term confidence to refer to peoples' need to affirm their efficacy. He states that "people need firm confidence in their efficacy to mount and sustain the effort required to succeed" (Bandura, 1997, p. 11).

Gist and Mitchell (1992) explored two theoretical issues that held implications for self-efficacy by performing an analysis of how individuals formed self-efficacy judgements and the malleability of self-efficacy and how it can be changed through training. The authors contend that empirical studies of self-efficacy yield consistent findings that increased self-efficacy leads to increased performance. The use of modeling, learning experiences, and feedback influence changes in self-efficacy. Self-efficacy is linked to expectations and motivations and influences an individual's goals and persistence.

Gist and Mitchell explained that the formation of an efficacy judgment is an individual's analysis of their experiences, abilities, situations, and constraints. A person recalls past performance and infers ability and performance predictions to the new task. The assessment of one's accumulated experience and knowledge of one's capabilities lead to confidence and competence in new task situations. The authors' state that an increase in positive beliefs or a reduction in negative beliefs may lead to increased performance in work situations. This has been consistent in the literature, but there may be limitations to how much change can be affected. Intervention strategies that may lead

to increased performance are:

- Providing the individual with a greater understanding of task attributes, complexity and environment by modeling.
- Providing training to directly improve the individual's abilities.
- Providing information that improves the individual's understanding of performance and effort strategies needed to accomplish the task.

These strategies can be accomplished through modeling, training, and feedback which in turn may lead to increased self-efficacy and job satisfaction.

Confidence and self-efficacy in cognate related mentoring programs. Douglas (1997) explains that informal mentoring relationships were the precursors to formal mentoring programs later established by many large corporations to enhance job skills of new employees. Formal mentoring programs have become commonplace in business, academia, medical, and youth programs over the past several decades.

In a meta-analysis on mentoring in business, Douglas (1997) conducted a literature review based on descriptive accounts of mentoring programs. The author includes “increased confidence” as a major benefit of mentoring for both mentors and mentees.

Lejonberg and Tiplic (2016) conducted education-based research in two areas that were challenging to new teachers. The areas included instructional and discipline skills and how two distinct styles of mentoring influenced job satisfaction based on teachers'

self-efficacy and a desire to stay in their job. The researchers conducted an online Likert scale survey based on the Norwegian Self-Efficacy Scale. The instrument measured clear mentoring in contrast to developmental mentoring. It also included a scale that measured teachers' turn-over intentions in their job. The results demonstrated that mentoring style had no effect on self-efficacy. Mentoring that was based on trust, loyal mentors, and an approach to reflect and assess progress was beneficial to self-efficacy. Mentees need to have clear direction, advice, and feedback on performance. Mentoring was not found to be related to a mentee's intention to leave or to remain in their job.

Newby and Heide (1992) wrote a descriptive evaluation about the value of a mentoring program. They contended that people enjoy working on tasks that they feel competent doing. They feel increased motivation and effort because they are confident that they can complete the task. Mentoring increased confidence for both mentors and mentees. Mentors gain confidence by exercising their skills and abilities and as they observe the mentees learn and succeed. The mentee has increased guidance and a sense of accomplishment and support. As one becomes more competent, self-confidence is strengthened, leading to a feeling of increased satisfaction.

In a review of women and mentoring programs, Noe (1988) described the individual and organizational factors that affect, and results of, mentoring for women. A survey of female executives and academicians indicated that participation in mentorships resulted in greater self-confidence and an enhanced awareness of skills and how to use them (Reich, 1986). The use of positive performance feedback improved women's lack of self-

confidence (McCarthy, 1986). Noe concluded that mentors can help to increase self-confidence by providing psychological support, reinforcement for achievement-oriented behavior, and specific task feedback.

Schwarzer and Jerusalem (1995; 2014) developed the General Self-Efficacy Scale (GSE) to assess perceived self-efficacy. The authors state that the construct of self-efficacy is an optimistic belief in one's abilities and how they perform in adverse situations. Self-efficacy enables a person to set goals, persist under adverse conditions and to endure setbacks. The self-administered scale consists of ten questions on a four-point scale where 1=Not at all true, 2 = Hardly true, 3 = Moderately true and 4 = Exactly true. The scores for each of the questions are added to provide a total score which reflects the strength of a participant's self-efficacy belief. The German researchers collected data from 1,660 adults and the mean of the sample was 29.28 with a standard deviation of 4.6. The scale is unidimensional and has Cronbach's alphas ranging from 0.82 to 0.93. The re-test reliability from a sample of 991 people is 0.47 for men and 0.63 for women. The scale has been tested for validity in numerous correlation studies and has positive coefficients with favorable emotions, optimism and work satisfaction.

Confidence and self-efficacy in mentoring programs in CES. Roya, Ismail, Abdul Wahat, and Omar (2011) studied the influence of mentoring on extension agents in Iran. The study examined the effect of mentoring on achievement motivation in leadership roles using self-efficacy as a mediator. The three dimensions used to measure achievement motivation were aspiration, mastery, and salience. The researchers used the

General Self-Efficacy Scale of Burke (1995) and an adaptation of the Mentoring Functions scale from Noe (1988). They also used scales to measure career aspiration and orientation to work and family. A random sample of 100 agents were used for the study. The sample size was determined by the number of 5 variables that required 10-20 individuals per variable. Self-efficacy was used as a mediator between the mentoring and achievement motivation in this study. Based on factor analysis, the researchers determined that there was a significant relationship between mentoring, self-efficacy, and achievement motivation and that self-efficacy was increased through mentoring.

Strong and Harder (2011) conducted research on 613 women from a Master Gardeners program that taught master gardeners to be effective educators. The objectives of the study were to describe self-efficacy of the volunteers and to determine significant differences between efficacy and instructional strategies using a teacher self-efficacy scale. The study concluded that the higher a person's education level, the higher their self-efficacy. When participants have low self-efficacy, they are more apt to leave their position than those with high self-efficacy. The results of the research conclude that extension workers' self-efficacy is significantly increased by mentoring. The agents' self-efficacy is positively related to achievement motivation. Therefore, self-efficacy had a mediating effect on the relationship between mentoring and achievement motivation of the extension workers.

Defining the Construct of Job Satisfaction

Gkolia, Belias, and Koustelios (2014) noted that although numerous definitions have been given to job satisfaction, there was no consensus. However, they agreed that there were different meanings that could be given to job satisfaction, depending on the research subjects. Lawler (1973) referred to overall job satisfaction as a term encompassing all those things a person expects to get from his/her job and all those things he/she receives. In an article describing the development of a job satisfaction survey (the JSS), Spector discussed nine aspects of job satisfaction, derived from a review of the literature (Spector, 1985). Spector took the position that job satisfaction represented an affective or attitudinal reaction to a job, or aspects of a job. Locke (1976) distinguished three causes of job attitudes: discrepancies between what the job offers and what the person expects; the degree to which jobs fulfill individual needs; and the degree to which individual values are fulfilled. Smith, Kendall and Hulin (1969) theorized that satisfaction with various job aspects are derived from a comparison of the existing job aspect with an individual's frame of reference.

Skaalvik and Skaalvik (2014) conducted research on primary and middle school teachers' self-efficacy and found that a teacher's job satisfaction had a strong positive relationship to self-efficacy. This was confirmed by Akomolafe and Ogunmakin (2014) who found a significant relationship between job satisfaction and self-efficacy in teachers. Their theory was that individuals with high self-efficacy behave more

positively, and think more creatively, which causes them to be motivated. As a result, teachers were more satisfied with their jobs.

Job satisfaction in cognate related mentoring programs. Eby, Allen, Evans, Ng, and DuBois (2008) conducted a meta-analysis to compare mentored and non-mentored individuals. They focused on youth, academic, and workplace mentoring programs to determine effects of mentoring with an emphasis placed on health, behavior, attitudes, motivation, and career outcomes. The researchers screened existing literature on mentoring and derived six broad categories of mentoring. They then used statistics to correlate the findings. Three of the categories were situational satisfaction and attachment (job satisfaction), career attitudes (career satisfaction), and self-perceptions (self-efficacy). Eby, et al. found that workplace mentoring was significantly correlated to career attitudes, work attitudes, and some career outcomes, such as situational satisfaction and attachment.

Chao, Walz, and Gardner (1992) conducted research on the outcomes of mentoring relationships. They surveyed 212 mentees involved in traditional, informal mentoring, 53 individuals in formal mentoring programs, and 284 individuals that had not been mentored using the dimensions of career related and psycho-social mentoring functions (Kram, 1983). The authors found the key difference between formal and informal mentoring was the formation of relationships. The study focused on the relationships between mentors and individual job outcomes and the comparison of outcomes among mentored and non-mentored individuals. The study was a longitudinal

survey using a 5-point Likert scale. The respondents were divided into three groups including informal (n=212), formal (n=53) and non-mentored (n=284). Mentees in informal mentorships reported significantly greater career-related support than mentees in formal mentoring groups. Informal mentees reported slightly higher organizational socialization, job satisfaction, and salary than formally mentored individuals. Non-mentored individuals received less psycho-social support and the outcomes in socialization, satisfaction and salary were lower.

Allen, Eby, Poteet, Lentz, and Lima (2004) conducted a meta-analysis of mentoring literature. They designed the search criteria on factors of mentoring as defined by Kram (1983). Psycho-social benefits included role modeling, acceptance-confirmation, counseling, and friendship. For the study, psycho-social benefits were compared to career related benefits. Career related benefits included sponsorship, exposure, coaching, and protection. They concluded that both psycho-social and career related benefits were related to a feeling of job satisfaction. They mentioned that one reason may be that the provided information and support may lead to a feeling of confidence in their career related efficacy and career choice. This leads to a feeling of greater career satisfaction. Studies of mentored versus non-mentored results revealed strong associations to career specific variables including career commitment and career satisfaction. They felt that it may take longer periods of mentoring to achieve affective job satisfaction than most programs provide.

Eastman and Williams (1993) researched Agricultural Education faculty at all four-year colleges in the United States. They surveyed 279 educators to explore the extent that the educators had been influenced by a mentor and to examine the relationship between mentoring and indicators of career development. They determined that mentoring was not significantly related to job performance, but that it is in fact significantly correlated to a feeling of satisfaction in one's career. They found that mentoring provided psycho-social benefits that lead to increased emotional support and job satisfaction.

Lankau and Scandura (2002) conducted research on personal learning in a medium-sized not-for-profit hospital located in the south-eastern United States. The researchers studied 440 employees to determine the antecedents and consequences of learning in mentoring and developed a new measure of personal learning as a mediating factor. They found that mentored individuals had increased relational job learning but no increase in the development of work related skills. Learning associated with career-related and psycho-social support from mentors led to greater job satisfaction. The learning opportunities provided by the organization also increased the chances that an employee would become loyal to the organization thus increasing retention.

In 1985, Spector noted that job satisfaction had only been formally studied in industrial organizations (Spector, 1985). Although there was an increasing interest in human service organizations, formal measurement tools were lacking or inadequate. He did not formally define human services (except for nurses) but one can assume he meant

non-industrial occupations. Spector wrote that in industrial organizations, job satisfaction was not consistently associated with job performance. However, he quoted Wiggins and Moody (1983) who stated that in human services, there was evidence that satisfaction is associated with employee performance. For this reason, he speculated that findings with other variables would also differ with human services. To fill the need for an instrument for human services, he described the development of a new job satisfaction instrument, the Job Satisfaction Survey (JSS), which measures nine aspects of job satisfaction. These were developed from a review of the literature on job satisfaction dimensions. Based on the literature reviewed and the dimensions of job satisfaction incorporated, he believed that the scale was specifically useful for human service, public, and nonprofit sector organizations, although it may be applicable to others also.

In the development of JSS, job satisfaction was assumed to represent a cluster of feelings about the job. The JSS was designed to measure them individually and to give an overall attitude score. The primary data summarized in this paper were collected from 3,148 respondents across 19 human service organizations. By comparison to literature and other simultaneously administered surveys, Spector provided evidence for reliability and validity, and summarized correlations of job satisfaction with other variables. In most cases, findings were consistent with literature reports of findings in non-human service employees.

In a review of women and mentoring programs, Noe (1988) described the individual and organizational factors that affect, and results of, mentoring for women. He

noted that a lack of mentorships for female employees probably has adverse consequences for both the employee and the organization. In addition, women who had one or more mentors reported greater job success and job satisfaction than women who did not have a mentor (Riley & Wrench, 1985).

Day and Allen (2004) conducted a study of 125 participants to determine the relationship between career motivation and self-efficacy to determine how they affected career success. They were interested in studying why mentoring had positive effects on career success. According to Bandura (1986), self-efficacy is dynamic and changeable, and it is based on personal accomplishments, vicarious experiences or modeling, verbal persuasion, and physiological states. Day and Allen (2004) tested a hypothesis that mentored individuals would have a higher self-efficacy than non-mentored individuals. They determined that 48 percent of the 125 participants polled had been mentored. The mentored individuals were then surveyed on a mentor functions scale adapted from Noe (1988). The researchers found that there was no correlation of significance between psycho-social mentoring and self-efficacy. They found that self-efficacy was correlated with career success, current salary, and performance effectiveness. Self-efficacy was only marginal as a mediator between mentoring and performance. Psycho-social mentoring was not related to any career motivation or career success factors. Career mentoring was in fact only related to performance and not any of the other career related factors. These findings were contrary to other research that has found positive associations between mentoring and career success.

Gong, Chen, and Lee (2011) conducted a survey of 316 employees from Chinese enterprises. The purpose of the study was to measure the mediating effect of mentoring on the relationship between employees' personal learning and career development. Career development included factors of job promotion and job satisfaction. Job promotion was measured using a job promotion scale and job satisfaction was measured using the Minnesota Satisfaction Questionnaire. The results showed that the relationship between personal learning, mentoring, and career development were positive and significant. Personal learning was positively and significantly related to career development but not to protection or relational job learning. The role of mentoring was important in enhancing personal learning and career development, including Chinese employees' job satisfaction.

Job satisfaction in CES mentoring programs. Place and Bailey (2010) stated that Extension needs new employees to develop skills and competencies quickly to meet job demands. New skills lead to increased job satisfaction, productivity, and greater career competencies. The researchers conducted a pilot study of an extension mentoring program. The sample population consisted of 15 mentors paired with 15 mentees that were new agents, 13 County Extension Directors who had a mentor or mentee in their office, and four District Extension Directors that had a mentor or mentee in their District. The research was qualitative and was based on focus group interviews during and after the program. Mentees gained knowledge of how to manage key aspects of their

programs including volunteers and community networks. The mentors gained satisfaction and new perspectives on extension programs.

Harder, Gouldthorpe, and Goodwin (2014) conducted a study to assess Extension professionals' level of job satisfaction. They surveyed 140 participants to determine if any significant motivators existed between satisfied and dissatisfied professionals. They used an ex post facto questionnaire (five-point Likert scale) and a focus group. The results showed that 80 percent of agents were very satisfied or somewhat satisfied, five percent neither agreed, nor disagreed, and 15 percent were somewhat dissatisfied or dissatisfied. The participants were motivated by the opportunity to make a difference in people's lives, benefits of employment, working with youth, friendships and coworker relations, and teamwork. They conclude that motivation from positive client responses and administrator feedback could be used to improve job satisfaction and retention.

Riggs and Beus (1993) conducted research on job satisfaction, attitudes toward Extension, and stress and coping strategies. They studied 301 Extension agents and had a response rate of 214 agents. The researchers used a five-point Likert scale and used the Family Crises Oriented Personal Evaluation Scale to assess coping strategies. The findings were that female agents were more satisfied with their jobs as areas of responsibility increased while the satisfaction of male agents decreased. Agents with fewer children at home were more satisfied with CES. The researchers concluded that the agents in this study found that reframing (finding a positive alternative way of doing things) was useful in reducing stress and increasing job satisfaction. The researchers also

concluded that reframing is significantly related to an agent's satisfaction with job opportunities and challenges as well as to their overall job satisfaction.

Martin and Kaufman (2013) conducted research on 480 cooperative extension agents from 12 southern states in the United States to determine the levels of relationships between job satisfaction, organizational commitment, and intention to quit. The researchers used an online questionnaire, developed in part from Spector's JSS. The instrument was tested for content validity by a panel of experts and a pilot test. Reliability was tested using Chronbach's alpha and Organizational Commitment was 0.914. Job Satisfaction was 0.848, and Intent to Quit was .910. The data collected from a seven-point Likert scale revealed that respondents were slightly satisfied with their jobs and the intent to quit was moderate. When the independent variables were paired with the dependent variable (intent to quit) there was a strong positive relationship between the independent variables (job satisfaction and organizational commitment). This revealed that there was a positive attitude among extension agents regarding their organizational commitment and that low job satisfaction is a predictor of an agent's intention to quit.

Conclusions

Table 1.1 Summarizes all literature reviewed in the subjects of mentoring and confidence and self-efficacy.

Table 1.1
Literature Summary of Mentoring and Confidence, Self-Efficacy

Authors	Article Focus	Key Elements Related to this Study
Stankov and Lee (2015)	Confidence as a construct	Confidence is grounded in psycho-physics and cognitive psychology and is defined as decision making
Bandura (1986)	Self-efficacy as a construct	Self-efficacy is a person's belief that they can complete a task and that it can be attained using their abilities and with increased effort
Bandura (1997)	Self-efficacy	Confidence refers to peoples' need to affirm their belief in their abilities to accomplish goals
Gist and Mitchell (1992)	Confidence is a person realization of their abilities	Self-efficacy is about abilities, whereas confidence comprises abilities and certainty based on knowledge
Holland, Middleton, and Uys (2012)	Concept of Personal Confidence	Personal confidence is a dynamic, maturing personal belief held by a professional or student
Stajkovic (2006)	Confidence is a higher order construct.	Core confidence influences four manifestations that portray a person who figures out what is to be done and how to do it: hope, self-efficacy, optimism, and resilience

Table 1.1 continued

Authors	Article Focus	Key Elements Related to this Study
Trow (1923)	Perception of confidence	Confidence is subjective, introspective, and related to the correctness of as person's judgments
Douglas (1997)	Meta-Analysis on mentoring	Increased confidence is a major benefit of mentoring for both mentors and mentees
Lejonberg and Tiplic (2016)	Clear versus Developmental Mentoring	Mentoring that was based on trust, loyal mentors, and an approach to reflect and assess progress was beneficial to self-efficacy
Newby and Heide (1992)	Value of Mentoring	As one becomes more competent, their self-confidence is strengthened, leading to a feeling of increased satisfaction
Noe (1988)	Women and Mentoring	Mentors can help to increase self-confidence by providing psychological support, reinforcement for achievement-oriented behavior, and specific task feedback
Schwarzer and Jerusalem (1995)	General Self-Efficacy Scale	Developed the General Self-Efficacy Scale (GSE) to assess perceived self-efficacy
Roya, Ismail, Abdul Wahat, and Omar (2011)	Cooperative Extension Mentoring Research in Iran	Self-efficacy was increased through mentoring
Strong and Harder (2011)	Mentoring in Master Gardener Program	Extension workers' self-efficacy is significantly increased by mentoring

Summary of Mentoring, Confidence, and Self-efficacy in the Literature

Confidence is defined as a person's ability to assess their level of correctness in decisions (Trow, 1923) and knowing what to do in situations related to work, social, and relationship contexts (Stajkovic, 2006). The review of literature revealed that even though confidence and self-efficacy are often used interchangeably, they are in fact distinct constructs. Stajkovic established that core confidence is a higher order construct that is related to self-efficacy (Stajkovic, 2006). Self-efficacy is a clearly defined construct that defines a person's belief that they can complete a task by using their abilities and increased effort (Bandura, 1986). Self-efficacy is measurable using established scales that are designed to measure perceived self-efficacy and is recommended for the purpose of mentoring evaluation and research. Mentoring helps to develop skills and increase competencies which leads to increased confidence and satisfaction (Newby & Heide 1992; Place & Bailey 2010; Ragins & Kram, 2007). Psycho-social support has been found to increase self-efficacy in mentoring relationships (Noe, 1998) and in CES mentoring (Strong & Harder, 2011) and mentoring had a mediating effect on the motivation to achieve in cooperative extension (Roya, et al., 2011). Feedback helped to increase self-efficacy and provide psycho-social support during the mentoring process (Gist & Mitchell, 1992; Lejonberg & Tiplic, 2016; Noe, 1988). A summary of literature reviewed in the subjects of mentoring and job satisfaction is in Table 1.2 below.

Table 1.2

Literature Summary of Mentoring and Job Satisfaction

Authors	Article Focus	Key Elements Related to this Study
Gkolia, Belias, and Koustelios (2014)	Meta-Analysis on Definition of Job Satisfaction	Different meanings could be given to job satisfaction, depending on the research subjects
Lawler (1973)	Definition of Job Satisfaction	Job satisfaction is all those things a person expects to get from his/her job and all those things he/she receives
Locke (1976)	Distinguished three causes of job attitudes	What the job offers and what the person expects; the degree to which jobs fulfill individual needs; and the degree to which individual values are fulfilled
Spector (1985)	Job Satisfaction Survey	Job satisfaction represented an affective or attitudinal reaction to a job, or aspects of a job
Smith, Kendall and Hulin (1969)	Aspects of Job Satisfaction	Satisfaction with various job aspects were derived from a comparison of the existing job aspect with an individual's frame of reference
Skaalvik and Skaalvik (2014)	Teacher's Self-Efficacy and Satisfaction Research	Job satisfaction had a strong positive relationship to self-efficacy
Akomolafe and Ogunmakin (2014)	Teacher's Job Satisfaction Research	There was a significant relationship between job satisfaction and self-efficacy in teachers
Eby, Allen, Evans, Ng, and DuBois (2008)	Meta-Analysis on Job Satisfaction of mentored and non-mentored Individuals	Mentoring was significantly correlated to career attitudes, work attitudes, and some career outcomes, such as situational satisfaction and attachment

Table 1.2 continued

Authors	Article Focus	Key Elements Related to this Study
Chao, Walz, and Gardner (1992)	Mentored versus Non-mentored	Informal mentees reported slightly higher organizational socialization, job satisfaction and salary than formally mentored individuals
Allen, Eby, Poteet, Lentz, and Lima (2004)	Meta-Analysis of Mentoring Literature	Information and support during mentoring may lead to a feeling of confidence in career related efficacy and career choice which led to a feeling of greater career satisfaction
Kram (1983)	Seminal study on Mentoring	Psycho-social and career related benefits were benefits of mentoring programs
Eastman and Williams (1993)	Research on mentoring of Agricultural Education Faculty	Mentoring provided psycho-social benefits that lead to increased emotional support and job satisfaction
Lankau and Scandura (2002)	Study of mentoring relationships in Junior Business University	Job satisfaction was related to personal learning associated with mentoring
Wiggins and Moody (1983)	Work place Job Satisfaction Research	Satisfaction was associated with employee performance
Noe (1988)	Research on Women in Mentoring Programs	Lack of mentorships for female employees probably has adverse consequences for both the employee and the organization
Riley and Wrench (1985)	Women and Mentoring	Women who had one or more mentors reported greater job success and job satisfaction than women who did not have a mentor
Day and Allen (2004)	Research on the relationship between career motivation and self-efficacy	Career mentoring was only related to performance and not any of the other career related factors

Table 1.2 continued

Authors	Article Focus	Key Elements Related to this Study
Gong, Chen, and Lee (2011)	Mentoring effect on personal learning and career development	Mentoring was important in enhancing the personal learning and career development including Chinese employees job satisfaction
Place and Bailey (2010)	Research on Mentoring Pilot Program in CES	Mentees gained knowledge of how to manage key aspects of their programs including volunteers and community networks
Harder, Gouldthorpe and Goodwin (2014)	Study of Extension professionals' level of job satisfaction	Motivation from positive client responses and administrator feedback could be used to improve job satisfaction and retention
Riggs and Beus (1993)	Job Satisfaction and CES	Reframing is significantly related to an agents' satisfaction with job opportunities and challenges as well as to their overall job satisfaction
Martin and Kaufman (2013)	Research on Organizational Commitment in CES	There is a strong positive relationship between job satisfaction and organizational commitment

Summary of Job Satisfaction in the Literature

Job satisfaction is an encompassing term that exemplifies a persons' expectations about their job and how the job meets their individual values and needs (Lawler, 1973; Locke, 1976; Spector, 1985). Mentoring has been found to increase job satisfaction (Riley & Wrench, 1985) through increased psycho-social and career related support (Allen et al., 2000; Kram, 1985; Eastman & Williams, 1993;). The support offered by mentors led to increased job performance (Day & Allen, 2004; Wiggins & Moody 1983). The influences of mentoring facilitated a mentee's personal learning and the acquisition of new skills. This in turn increased competence and job satisfaction (Gong et al., 2011; Lankau & Scandura, 2002). The literature established that there is a strong relationship between job satisfaction and self-efficacy. People with high self-efficacy are often more optimistic and creative which in turn leads to increased motivation and job satisfaction (Akomolafe & Ogunmakin, 2014; Skaalvik & Skaalvik, 2014). The use of feedback helped to increase job satisfaction through psycho-social and career related support during the mentoring process (Harder et al., 2014; Noe, 1988). Increased job satisfaction has been found to positively influence job retention and organizational commitment (Martin & Kaufman, 2013).

Discussion

This review of mentoring literature suggests that mentoring is positively related to increases in self-efficacy (Lejonberg & Tiplic, 2016; Roya et. al, 2011) and that increased

self-efficacy has a strong positive relationship to job satisfaction (Akomolafe & Ogunmakin, 2014; Skaalvik & Skaalvik, 2014). Newby and Heide (1992) found that competence is enhanced by mentoring and this leads to increased self-efficacy and satisfaction.

Mentoring provides opportunities for professional learning within the context of a learning organization and provides younger employees with the benefit of learning from experienced employees. This professional learning can increase self-efficacy and lead to greater career satisfaction and satisfaction with the job itself (Allen et al., 2004; Gong et al., 2011; Lankau & Scandura, 2002).

Successful mentoring relationships provide both psycho-social and career related support that lead to increased satisfaction in a person's career (Eastman and Williams, 1993; Kram, 1983) and may influence to increased employee retention and job performance (Day & Allen, 2004; Harder et al., 2014; Wiggins & Moody, 1983).

Based on the relationships between self-efficacy, confidence, and job satisfaction, found in this research, it is recommended that the GSE and JSS instruments be used to evaluate the TEPMP program and other CES mentoring programs. The GSE is used to measure self-efficacy and the JSS to assess job satisfaction.

The review of literature supports the design of the TEPMP. The implementation of a peer mentoring program for new extension agents has proven to be a successful method of professional learning that provides increased support during their first year of a CES agents' service, and as a strategy to increase retention (Zimmer & Smith, 1992).

The process of mentoring has proven successful when used to orient new CES agents and to enhance their understanding of procedures and policies. Eastman and Williams (1993) claimed that mentoring is significantly correlated to a feeling of satisfaction in one's career. If an agent develops satisfaction in their work, it may lead to a desire to stay engaged in their professional roles and foster increased job commitment.

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Chapter II:

What does our faculty need to enhance student's higher-order thinking?

**Perceptions from a College of Agricultural Sciences and Natural
Resources**

This research paper was created from coded transcripts of a focus groups. The focus groups and coding were conducted by Dr. Joseph L. Donaldson, Dr. Kimberly D. Gwinn, Dr. Christopher T. Stripling, and Dr. Carrie Ann Stephens. The remainder of the paper was prepared by Edward C. Yost in partial fulfillment of a master's degree in Agricultural Leadership, Education, Communications Program at the University of Tennessee, Knoxville.

Abstract

Thinking is more than just a random activity when it is used to understand things that are not known to us. The ability to use our knowledge to make judgments, reason, and solve problems was defined by Brookhart (2010) as transfer (analysis, evaluation, and creation), critical thinking (CT), judgement, and problem solving. Faculty of the Herbert College of Agriculture the University of Tennessee (UT) participated in focus groups to identify strengths of current undergraduate program and to determine their needs to implement higher-ordered thinking skills. Faculty perceived problem solving as the greatest strength of the Herbert and identified students' fear of failure as a barrier to teaching higher order thinking skills. Faculty reported a need for professional development in teaching and assessing higher-order thinking, preferably in a hands-on workshop with a group discussion format.

Introduction

The premise that college students lack the ability to think critically has received national attention in the United States during recent decades. According to Arum and Roska (2011), stakeholders in the educational system, including federal and state governments, educational agencies, business organizations, and parents, are concerned about the quality of education provided by higher educational institutions and are raising expectations for improvement. Many of these concerns stem from the deficiencies in college graduates' soft skills including written and verbal communication, problem solving, and the ability to think critically (Crawford, Lang, Fink, Dalton, & Fielitz 2011).

Bloom (1994) defined thinking as a cognitive process in which learners develop educational behaviors and advance from lower-order thinking to higher-order thinking. As knowledge is learned and comprehended, the learner can apply this new knowledge to solve problems (application), analyze information (analysis), use information to construct new concepts (synthesis), and to reason and make judgements (evaluation).

Brookhart (2010) explained that higher-order thinking involves transfer, (analysis, evaluation, and creation), critical thinking (CT), judgement, and problem solving. Brookhart contended that students achieve higher-order thinking as they learn to use knowledge out of context and apply it to new contexts not associated with the initial learning of the information.

Brookhart's definition of higher order thinking served as the conceptual model for this research. The purpose of this research was to collect faculty perceptions of the

strengths and the limitations of the Herbert program and to assess professional developmental needs to embed the teaching of higher-order thinking skills into the curricula.

Foundations of Higher-Order Thinking

Thinking is defined as a purposeful mental activity over which a person has some control (Ruggiero, 1988). The use of thinking to achieve problem solving is considered a deeper mental process than random thought. Dewey (1933) defined this thought process as reflective thinking that is comprised of a series of judgements people use when they are presented with a problem or unknown situation. Dewey contended that most problems can be solved through a reflective process, including suggestion or ideas, intellectualization, hypothesis, reasoning, and testing the hypothesis through action. Thinking therefore requires a person to be inquisitive and observant and to reflect on previous knowledge in order to form ideas about what is not understood. As reflective thinking is not an attribute that people innately possess, it must be developed over time, as people seek to find solutions to problems of their daily lives (Dewey, 1933).

Higher-order thinking was defined by Bloom, Englehart, Furst, Hill, and Krathwohl (1956) as a result of research on the self-reported thinking processes of college students, the operationalization of educational objectives, and an early understanding of cognitive processes in education (Bloom et al., 1956). The researchers developed Bloom's Taxonomy that identified dimensions of thinking as knowledge, comprehension, application, analysis, synthesis, and evaluation. The researchers

theorized that students achieved lower level thinking when they memorized and comprehended new knowledge. Students achieved higher order thinking as they learned to analyze and synthesize this knowledge to solve problems. Evaluation is the judgement of the value or accuracy of ideas and information based upon the previous steps in the taxonomy (Bloom et al., 1956).

King and Kitchener (1994) developed a reflective judgement model that describes stages of reflective judgement that people use to reason through “ill-structured problems,” which are complex problems (such as climate change) that may not be solved without some uncertainty. Initially, people believe that problems are concrete and knowledge is assumed to be true or that only experts can solve problems. As they advance, people learn to identify problems or controversies and actively engage in solving them through evaluation and judgement (King & Kitchner, 1994). Brookhart (2010) also posited that solving unstructured problems requires higher order thinking as the solution may not be apparent.

The term “critical thinking” is used in various contexts and is often used synonymously with higher-order thinking. Facione (1990) conducted research to develop a consensus on the role and assessment of CT in education. The researcher interviewed CT experts and developed a working definition of CT that included interpretation, analysis, evaluation, inference, explanation, and self-regulation. Halpern (1998) defined CT as a purposeful, reasoned, and goal-oriented thinking process based in higher order thinking which requires judgement, analysis, and synthesis of information. It is the type

of thinking that people use for problem solving and dealing with ill-structured or complex issues. Halpern mentioned that CT skills are often referred to as higher order thinking skills to differentiate them from lower order thinking skills and that higher order thinking is reflective, based in context, and self-monitored.

Higher order thinking requires a person to develop the ability to analyze information. Based on interviews with faculty in health care education programs Rowles, Morgan, Burns, and Merchant (2013) defined CT as the ability to make decisions based on reasoning and to solve complex problems using critical analysis based on available evidence.

Teaching higher-order thinking skills. The teaching of higher order thinking skills may prove difficult if taught using conventional methods of teaching. Abrami, Bernard, Borokhovski, Waddington, Wade, and Persson (2015) conducted a meta-analysis to determine what strategies were beneficial, which students benefited, and in what curricula CT instruction worked best. The research revealed that a variety of CT skills were positively influenced by instruction and could be developed in students of all educational levels by using effective strategies including discussion, authentic instruction in applied problem solving, role-playing, and mentorship. Beyer (1988) explained that thinking skills are an advanced skill that must be learned through structured academic tasks and explicit instruction which included systematic guidance in steps toward mastery, practice, and appropriate assessment. He stated that CT skills must be taught in the context of a subject and are not easily transferable. Instructors that interacted and

challenged students by using questioning and discussion increased the development of CT skills. Halpern (1998) proposed a model for teaching critical or higher order thinking that consists of four parts: (a) a dispositional or attitudinal component; (b) instruction in and practice with critical-thinking skills; (c) structure-training activities designed to facilitate transfer across contexts; and (d) a metacognitive component used to direct and assess thinking.

Tsui (2002) conducted student focus group interviews and found that respondents self-reported greater CT when emphasis was placed on writing assignments that required analysis and feedback. Students benefited from class discussions as they interacted, tested their knowledge, and reflected on peers' responses and ideas. The researcher explained that faculty may benefit by adding writing assignments, discussion opportunities, and providing feedback and encouragement. Student confidence was raised by arranging classrooms for group discussions (Tsui, 2002).

Shim and Walczak (2012) investigated the effect of instructor-driven teaching practices on the development of students' CT skills. The researchers found that students enrolled in liberal arts colleges and research universities scored higher in CT skills than other universities. Institutions that challenged first year students by presenting abstract concepts, compare-and-contrast writing assignments, and opportunities to present different perspectives increased CT. This was enhanced by instructor-student feedback and peer group situations. Student satisfaction was driven by a perception of learning and engagement in classes where instructors incorporated challenging questioning, well

designed presentations, and provided different perspectives in interpreting abstract concepts.

Mandernach, Forrest, Babutzke, and Manker (2009) compared college classroom instruction, online instruction, and instructor led online courses. Students in non-interactive classes had lower CT than in face to face or instructor interactive online courses (Mandernach et al., 2009). The researchers concluded that to increase student CT instructors need to interact with students to facilitate higher order thinking.

Resnick (1987) explained that integration of CT skills into coursework is practical as it provided an environment and a knowledge base for inquiry and practice. Each discipline can provide a framework for writing, reasoning, and problem solving. Paul, Elder, and Bartell (2003) contended that college courses need to be redesigned to incorporate CT.

McCormick and Whittington (2000) conducted research to understand cognitive levels of teaching and to assess how students were being academically challenged. Eleven faculty members from nine departments in a College of Agricultural Sciences provided a list of academic challenges from their courses. The courses were categorized and assessed for the level of cognitive challenges. The researchers used Bloom's taxonomy and developed a method of assessment. The researchers found that 28.4 % of teaching corresponded with Bloom's Taxonomy of lower order thinking (knowledge and comprehension) and 71.6% was at levels of higher order thinking (application, analysis, synthesis, and evaluation). The students' grades were weighted to midterms and finals

and were not weighted to measure success in cognitive challenges. The researchers mentioned that examinations that periodically assess higher order thinking challenges may enhance coursework. The researchers recommended periodic assessment to develop and maintain appropriate levels of cognitive challenges in coursework.

Studies of college students' cognitive development has revealed that there is a change that occurs during their college years (Beyer, 1988; Burbach, Matkin, Quinn, and Searle (2012). Burbach et al. (2012) found that a student's grade point average (GPA) and year in college were consistent predictors of increased CT. Overall, students in all years of college had an incremental increase in CT skills as students advanced. Freshmen and sophomores had a lower rate of increase in CT than juniors and seniors. Age and gender were not found to be related to an increase in CT (Burbach et al., 2012). This research supports Beyer (1988), who contended that students must be in a phase of formal abstract reasoning within their cognitive development to apply reasoning and problem solving successfully.

Barriers to faculty teaching of higher order thinking skills in colleges of agriculture and life sciences. Research on the ability of agricultural faculty to foster higher order thinking skills in students enrolled in agricultural and life sciences has led to a realization that faculty perceptions may differ from reality. Harder., Roberts, Stedman, Thoron, and Myers (2009) conducted research to describe agricultural college faculty members' perceived levels of knowledge compared to their perceived level of relevance for selected teaching topics. Faculty reported their perceived knowledge as higher than

their perceived relevance in engaging students in learning, teaching CT, effective lecturing, questioning techniques, and active learning strategies. Stedman and Adams (2012) found that respondents lacked basic knowledge about CT and may have had no formal training in teaching CT skills.

Agricultural college faculty may aspire to teach higher order thinking but often lack training and experience in principles and instruction. Blickenstaff, Wolf, Falk., and Foltz (2015) found that faculty valued getting students engaged but they rated their competence in teaching higher-order thinking skills as low. Whittington (1995) found that faculty taught at lower cognitive levels even though they aspired to reach higher levels. Foster and Pikkert (1991) explained that faculty may not know how to teach CT skills and that they possess more experience in research and technology than in teaching.

In contrast, Dube (2014) conducted research to understand what level of cognitive engagement and experience faculty actually provided, and how familiar the faculty were with high impact learning strategies. Faculty had a positive attitude about instruction at higher levels and provided an array of learning opportunities for students in their classrooms. Burbach et al. (2012) found that faculty trained in teaching CT had a positive influence on agricultural students CT disposition.

Wardlow and Johnson (1999) conducted a survey of faculty from land grant colleges to measure the level of interest in learning about teaching activities and education technologies. The respondents perceived that they had a high level of interest in teaching CT, problem solving, and assessing student learning. The respondents

reported having a low interest in learning about non-traditional teaching in case studies, discovery learning, and peer observation. Blickenstaff et al. (2015) reported that respondents reported a lack of motivation or desire to participate in professional development. Foster and Pikkert (1991) found that respondents perceived that they taught CT, but they agreed with statements in their survey that they still teach lecture style and just the basic facts, and therefore were not committed to teaching CT.

Foster and Pikkert (1991) reported that faculty perceived that the integration of CT in their classrooms was important, but they did not have adequate time, materials, or administrative support. Blickenstaff et al. (2015) noted that respondents' self-reported barriers to teaching were lack of time and resources, lack of emphasis on teaching, and little recognition for teaching in tenure and promotion policies. Dube (2014) found that respondents needed greater support from administration to implement high impact learning, classroom assessments, and instruction in how to use Bloom's taxonomy to increase the impact of their teaching.

Faculty professional learning: What works! A majority of the research reviewed included recommendations that faculty in agriculture and life sciences need to receive developmental opportunities to advance their abilities in student engagement and the teaching of higher order thinking skills (Blickenstaff et al., 2015; Harder et al., 2009; Paul et al., 1997; Rowles et al., 2013;). Faculty need to have specific training in higher order learning and student engagement. Paul et al. (1997) recommended that professional development should provide faculty with the core concepts of CT, mode of thinking, and

the unification of instruction around the basic organization of ideas. Rowles et al. (2013) concluded that the most important step in fostering CT skills is that faculty must have a clear understanding of CT.

Behar-Horenstein, Schneider-Mitchell, and Graff (2009) contended that when faculty development is based in grounded theory such as andragogy, the participants' instructional practices changed beyond the confines of their seminar. Faculty in the Behar-Horenstein et al. study reported satisfaction with taking risks, showing vulnerability to their peers, learning collaboratively, and having a hands-on approach. In an exploratory study, Boyd, Dooly, and Kurten (2017) examined the professional development of faculty based on the eight elements of CT. Participants reported that peer to peer discussion, exchange of ideas, and development of a visual tool of the elements of CT proved helpful in improving classes. The researchers emphasized that focus must be given to instructing educators on teaching CT skills. Faculty development should include opportunities for group discussion, collaboration, regular seminars, training sessions, and workshops (Tsui, 2002). Shim and Walczak (2012) recommended that faculty learn to organize presentations and challenge students in their classes and across disciplines.

Methods

This study was motivated by a need to understand faculty perceptions of higher order thinking in agricultural sciences and natural resources curricula, and the resources faculty need to incorporate higher order thinking into their undergraduate courses. This qualitative study was comprised of three focus groups and was approved by the UT Institutional Review Board (study number 17-03492-XP). The central question was “What does our faculty need to enhance students’ higher order thinking skills?” The focus group method is useful to understand experiences, viewpoints, and to assess the needs of a particular audience (Krueger and Casey, 2009).

Focus group questions were written to address the central question using guidance for Bradburn, Sudman, and Wansink (2004) and Krueger and Casey (2009) for open-ended, quality questions. An example was “What was the best professional development you have ever attended, and what aspects were so appealing to you?” which is consistent with Kreuger and Casey’s (2015) recommendations regarding the wording of evaluative questions.

The Herbert Dean reviewed the study objectives and recommended 32 faculty members representing all eight Herbert departments. This was consistent with the organizational recruiting approach whereby a neutral party selects experts from within the organization (Patton, 2015). This approach reflected the study objective since the goal was not to generalize to a population, but rather to understand a central research question. A total of 16 faculty members (50%) participated in one of three focus groups, and all

focus groups used the exact same questions and the exact same question format. Participants were invited via email, and follow-up invitations were sent to those who did not respond to the first invitation. This qualitative study was comprised of three focus groups interviews to the point of saturation where no new information was presented. The first two focus groups involved six respondents each and the final focus group had four participants.

After the first focus group question, (*When you hear the term higher order thinking skills, what comes to mind first?*). The participants were presented with a fact sheet. The fact sheet *Brief Descriptions of Higher Order Thinking Skills in Instructional Settings* provided examples of teaching methods that employed the different dimensions of higher order thinking: analysis, evaluation and creation; logical reasoning; judgement and critical thinking; problem solving; and creativity.

One researcher served as moderator and a second researcher served as note-taker for each focus group. Focus group proceedings were digitally recorded and the files were transcribed. Researchers mined the data, reading and re-reading transcripts to create categories and to tag the data using an open-coding approach (Bogan & Biklen, 2003). The categories obtained from the different faculty groups were aggregated. One researcher did all of the coding initially, and then all transcripts and codes were reviewed by another researcher, and this separate analysis was used for verification purposes (Creswell, 1998). From these categories, content analysis was used to look for pattern for the identification of common themes. (Patton, 2015).

Results

The focus group interviews elicited four themes: (a) faculty view problem-solving and analysis, evaluation, and creation as higher order thinking domains that are strengths of their college; (b) faculty perceive that the students' "fear of failure" is the biggest impediment to teaching higher order thinking; (c) to encourage higher order thinking, faculty desire time, teaching assistants, professional development in teaching higher order thinking, and a more robust student assessment of faculty teaching; (d) faculty perceive that the best professional development ever attended was appealing because it was both practical and hands on.

Faculty view problem-solving, and analysis, evaluation, and creation as higher order thinking domains that are strengths of their college. Faculty reported the use of non-routine problems in class discussions, assignments, and testing: "I usually give test questions that are some kind of a real-life situation where they need to take their knowledge of the material and use that to answer the question." Faculty reported using case study assignments that simultaneously required problem-solving and analysis and evaluation and creation such as asking students to design activities for a recreational area given actual government statutes and mission of the facility. The respondents do not clarify if the strength is in ill-structured problem solving.

Faculty strongly perceive that the students' "fear of failure" is the biggest impediment to teaching of higher order thinking. When asked if any of these dimensions of higher order thinking need more development, the respondents reported

that students' academic development and fear of failure were constraints to teaching higher-order thinking. The respondents noted a lack of student acceptance that mistakes occur, and experiments can be designed to decrease error. Faculty perceived that a step-wise approach based on grade levels may be more appropriate across the curricula. The respondents mentioned that students' level of understanding varies within classes causing student frustration. Respondents commented that years of standardized testing may have resulted in students' emphasis on remembering and not thinking. The grading system puts a great emphasis on high student scores but misses the "C" students that often work harder and are in "the sweet spot of learning."

To encourage higher order thinking, faculty desire time, teaching assistants, professional development in teaching higher order thinking skills, and a more robust student assessment of faculty teaching. When asked what resources faculty needed to incorporate higher order thinking into their courses the respondents reported that integrating higher order thinking into their courses was a challenge due to the lack of time and teaching assistants. In contrast to the literature the respondents did not place emphasis on student assessment as much as their own. The respondents expressed that their professional evaluations were linked to student assessment of their courses. The respondents commented on how changes in their teaching or increased difficulty of courses might influence student responses. The respondents did not address how they would gauge higher order thinking in the development of their courses or increases in students' higher order thinking skills. This may require a change in the current

professional evaluation criteria to evaluate how faculty challenge and interact with students to increase higher order thinking.

Faculty perceive that the best professional development ever attended was appealing because it was both practical and hands on. The respondents communicated that the best training was relevant, practical, and hands-on training with opportunities to share experiences. Respondents want incentives to attend training and disclosed that there were no incentives or penalties regarding their participation in current professional development workshops.

The major themes were derived from the coded faculty responses. Selected responses from the focus group transcripts provide context and support of the major themes. The major themes, focus group questions, and selected responses are listed in table 2.1 below:

Table 2.1.
Major Themes, Focus Group Questions, and Findings

Major Theme	Focus Group Questions	Selected Raw Data
Faculty view problem-solving and analysis, evaluation, and creation as three higher-order thinking domains that are strengths of their college.	Do any of these need more development in the Herbert College of Agriculture curriculum? If so, which ones and why?	“Problem solving is one of our biggest strengths, because we are applied science.”
Faculty perceive that the students’ “fear of failure” is the biggest impediment to greater teaching higher-order thinking.	What resources do Herbert College of Agriculture faculty like you need to incorporate higher order and critical thinking skills into their courses?	“Because really their fear of making mistakes, that’s what they fear the most.”
To encourage higher-order thinking, faculty desire time, teaching assistants, professional development in teaching higher-order thinking skills, and a more robust student assessment of faculty teaching.	What was the best professional development you have ever attended, and what aspects were so appealing to you?	“For me it comes down to time in different aspects too. One you know really my time to plan and really put something good together that the students will learn from but two also classroom time.”
Faculty prefer a practical and hands on format but there are few incentives for attending workshops.	What would be the ideal format for a faculty workshop about teaching critical thinking skills?	“I think it’s about learning something new or concepts whatever in the first part of the workshop but then the next part is you’re asked to, how would you implement that in class.”

Discussion

The research revealed that faculty perceive that the strengths of the Herbert College of Agriculture program were problem solving, analysis, evaluation, and creation (Brookhart, 2010). The use of case studies and applied problem-solving techniques that may increase students' higher order thinking skills was recommended as a framework for learning higher order thinking skills (Resnik 1987). The Herbert faculty mentioned using case studies and problem solving and analysis assignments that facilitate higher order thinking. These practices support Ruggiero's recommendation that university instruction should apply problem situations in academic disciplines for students to solve (Ruggiero, 1988). Brookhart contends that using open-ended or un-structured questions that may have multiple answers provides students with opportunities to learn to reason, judge, and reflect (Brookhart, 2010). The faculty mentioned that they provide problem solving challenges in tests and case study assignments. As these challenges provide students some exposure to apply their knowledge to problem solving these opportunities do not provide opportunities for faculty to model problem solving tactics or to interact with students and provide correction or feedback as recommended in the literature (Abrami et al., 2015; Tsui, 2002). Instructors that provide opportunities for students to practice using in class activities, modeling, peer-to-peer interaction, practice, and assessment increase students' problem-solving skills (Halpern, 1998; Mandernach, 2009; Resnick, 1987; Shim & Walczack, 2012; Tsui, 2002).

Faculty perceived that student fear of failure was an impediment to teaching higher order thinking skills. The roots of students' fear of failure may be due to a variety of personal or learning environment factors. The respondents perceived that students' fear of failure may be due to their stage of cognitive development. Academic expectations of college may outpace student development, and students need to learn the basic facts before they can apply them. This was supported in the literature as students' learning of higher order thinking skills was related to their cognitive development, grade point average (GPA), and year in college (Beyer 1988; Burbach et al., 2012). Faculty can provide support to students through individual and class discussions, by interacting with students, using authentic instruction, questioning, and providing feedback and encouragement (Abrami et al., 2015; Beyer, 1998; Halpern, 1998; Tsui, 2002; Mandernach, 2009). The teaching of higher order thinking skills may require faculty to reflect on how they acquired such skills in their personal experiences as a guide to developing their connections with their students. McCormick and Whittington (2000) contended that classroom experiences should incorporate instructor teaching and modeling in combination with academic challenges to engage students.

Students may need to unlearn some of their basic assumptions in order to develop reflective judgement. Factors that influence reflective judgement include established reasoning skills, emotional readiness to debate in front of peers, cognitive and emotional support from the learning environment, and the educational values of the institution and society (King & Kitchener 1994). The creation of a safe and supportive learning

environment allows for students to openly test their knowledge through instructor-led and peer discussions was recommended in the literature (Abrami et al., 2015; Beyer, 1988; Shim & Walczack, 2012; Tsui, 2000).

Faculty perceived that the lack of time was a major constraint in integrating higher order thinking into their coursework. Foster and Pickert (1991) found that lack of time can be mitigated by increased administrative support and resources to allow faculty greater flexibility in the development of their curriculum. The Herbert faculty expressed that the challenge of teaching higher order thinking to students rated higher than facilities and faculty constraints at the University. This suggests that administrative support and resources may already be available to faculty which may help them to implement higher order thinking into their coursework.

Faculty perceive that teaching higher order thinking should occur across the curricula in a step-wise fashion. One response was “we’re at fault for not looking across the curriculum and saying... you’re going to teach the basics...you’re going to build on the second year...emphasize on the third year...senior year you’re ready for problem solving.” Faculty commented on the need to reduce the overlap of teaching the same concepts in different classes and a need to adopt curriculum wide teaching that builds on previous lessons. King and Kitchener (1994) noted that teaching reflective thinking works best when integrated into the whole curriculum as an institutional goal.

The literature identified a need for faculty development in teaching CT (Harder et al., 2009; Wardlow & Johnson, 1999; Whittington, 1995). Faculty need to have

opportunities for training that promote the exchange of ideas during mediated workshops that are hands-on and interactive and that provide interest and challenge participants to engage in activities and group exercises. Faculty professional development should offer a hands-on approach and include opportunities for group discussion and collaboration to facilitate peer discussion and the exchange of ideas (Boyd et al., 2017; Tsui, 2002).

As higher-order learning has not been a part of teacher education, faculty in agricultural colleges may have never had any formal training in teaching higher order thinking skills. It is a recommendation of this research that Herbert faculty review the California Teachers Assessment by Paul et al. (1997) and the methodology to gauge the cognitive level of teaching developed by McCormick and Whittington (2000) as these resources may prove useful in the development of CT course materials.

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Appendix

Brief Descriptions of Higher-Order Thinking Skills in Instructional Settings

Problem solving

A teacher asks “students to build a terrarium that has a sustainable ecosystem, needing no additional water or food during a specified period of time. This is a very unstructured problem.....Unstructured problems are more typical of real-life problems.....For problems that require higher-order thinking, the solution strategy is not immediately apparent..... Problems that require higher-order thinking are non-routine problems” (Brookhart, 2010, p.100-101).

Creativity and CT

In a farm management course, a teacher assigns students’ to prepare a fact sheet on working conditions for farm managers. The goal of the fact sheet is to educate the managers on effective supervision and coordination of laborers. The fact sheet should contain information on facilities, preventive maintenance, safety, and other information that would contribute to an efficient and effective work environment. The teacher developed a scoring rubric that included content, reason and evidence, and clarity of written expression, and shared it with students (Appendix 1).

Rubric for Farm Management Writing Assignment, In Part (Brookhart, 2010, p. 80)

Content	Reasoning and Evidence	Clarity of Written Expression
The thesis is clear. A large amount and variety of material and evidence support the thesis. All material is relevant, and it includes details. Information is accurate. Appropriate sources were consulted.	Information is clearly and explicitly related to the point(as) the material is intended to support. Information is organized in a logical manner and is presented concisely. Flow is good. Introductions, transitions, and other connecting materials take the reader along.	Few errors of grammar and usage; any minor errors do not interfere with meaning. Language style and word choice are highly effective and enhance meaning. Style and word choice are appropriate for the project.

Logical Reasoning

An instructor devotes 10 minutes of every lecture to reading some brief material and evaluating the errors in logic in the piece such as overgeneralization, social acceptability, appeal to authority, etc. The instructor also asks students to explain if the author is using deduction (reasoning from a principle to an instance of the principle) and/or induction (reasoning from an instance of the principle to a principle). This brief class discussion is used to promote logical thinking and reasoning.

Judgement and CT

The instructor assigns students to read two contrasting reports on climate change and asks them to consider the information and rhetoric provided to judge the persuasive strategies used by each author to swing the audience. The instructor asks students to compare the effectiveness of the reports' communication tactics and then give feedback on the clarity and comprehension of the discussion (Brookhart, 2010, pp. 95-96).

Analysis, evaluation, and creation

The following definitions are suggested by Brookhart (2010):

- Analysis “involves breaking down information into its parts and then reasoning with that information” (p. 40).
- Evaluation “involves judging the value of materials and methods for various purposes” (p.40).
- Creation is “putting disparate elements together to form a new whole or reorganizing existing elements to form a new structure.”

In a floriculture management course, an instructor provides four geraniums and asks the students to evaluate them by ordinal placings based on the quality factors covered in the course: cleanliness; being free of diseases, insects, and mechanical damage; well-balanced; and complete and correct labels. Students are asked to work in groups of two to verbally state their placings and provide specific reasons for those

placings in the content of the quality factors. Finally, the instructor provides her placings and reasons. The instructor repeats this activity during the next class period, but this time, students present to the entire class. The instructor provides feedback to address both the “how” and “why” of her placings.

Conclusion

Overview of the Research

The review of literature for the Tennessee Extension Peer Mentoring Program provided an insight into the knowledge base of mentoring. The information should serve as a basis for the evaluation of the program and provides background information for the analysis of research findings.

The research on faculty needs to incorporate higher order learning within the UT Herbert College of Agriculture program found that faculty were engaged in evaluating current program strengths and assessing needs for improvement. A majority of the Herbert faculty perceived that problem solving was a strength of the current Herbert curricula. The faculty viewed students' academic development and fear of failure as barriers to teaching higher order thinking in their curricula. The incorporation of new teaching techniques into current curriculum may prove to be time consuming although new techniques that engage students in learning may improve student self-efficacy.

The Herbert faculty reported that they were motivated to learn more about higher order thinking skills in hands-on interactive workshops but desired incentives for their attendance. They would like the opportunity to confer with other faculty to share information and to develop innovative ways to change teaching techniques.

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Vita

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