

**A MODEL TO AUGMENT CRITICAL THINKING AND CREATE
KNOWLEDGE THROUGH WRITING IN THE SOCIAL SCIENCES OF
AGRICULTURE**

A Dissertation

by

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ABSTRACT

The purpose of this study was to develop a model to augment critical thinking and create knowledge through writing in the social sciences of agriculture. Without a conceptual model or a blue-print of writing in the social sciences of agriculture, teaching writing is hard. This study was divided into three phases, and each phase was reported and analyzed using independent research methods. Not only were the data reported as separate sets of findings, but also the data from each phase of the study were synthesized and reported as a mixed-methods study, which was *a model to augment critical thinking and create knowledge through writing in the social sciences of agriculture*. Five methods were used to collect the data: qualitative theory evaluation, qualitative interviews, qualitative focus groups, Q-sort interviews, and modeling methods.

Using the qualitative theory evaluation, the researcher found three prominent theories and seven conceptual models of writing. Each writing theory and conceptual model brought a unique perspective to writing research. In conclusion, the *social cognitive theory of writing* was the most complete writing theory and the *writing proficiency as a complex integrated skill* conceptual model was the most complete.

Qualitative interviews with eight faculty members in social sciences of agriculture revealed the writing factors that augment critical thinking and create knowledge. The researcher concluded that the *ability to present and defend a topic to a variety of public audiences; opportunities for writing repetition; and rich, timely feedback* were the writing factors faculty members believed augment critical thinking

and create knowledge.

The focus group interviews with 15 students in social sciences of agriculture revealed the characteristics of strong writers. The researcher concluded that *adapting prose to fit the audience, applying writing to real-world scenarios, developing a strong argument, having a specific voice, and understanding grammar and mechanics* should be used to help students develop writing skills.

The data from the review of literature, the qualitative interviews, and the qualitative focus groups were used to develop the Q-sort interview statements. Q-sort interviews with four students, three faculty members, and three administrators revealed three factors that define writing in the social sciences of agriculture. The researcher concluded that writing in college courses can be categorized into three categories: *writing as a process, writing as an application and a development of thought, and writing as an advanced skill guided by complex reasoning.*

The data from the first four studies were collapsed to identify the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. From this data, the researcher developed the *model to augment critical thinking and create knowledge through writing in the social sciences of agriculture.* Additionally, the researcher concluded there are 12 writing factors that augment critical thinking and create knowledge in the social sciences of agriculture (e.g., using real-world scenarios; researching and understanding how ideas are connected; and presenting and defending agricultural topics to a variety of public audiences).

DEDICATION

The time has come for me to dedicate my dissertation, which, to me, is the hardest part of writing it. I cannot believe that three years have come and gone and the time spent pursuing my Ph.D. is almost over.

First, I dedicate my dissertation to my loving parents, Tom and Linda Leggette. From the very thought of getting a Ph.D., my parents have stood with loving hearts, open arms, kind words, and twinkling eyes. They have made countless trips to College Station and have accepted that my trips home would be limited. They are the reason I have been able to follow my heart and pursue my dreams.

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the opportunities you have given me to spread my wings, and I have enjoyed being on the seminal research team for Second Life®. Dr. Deb, you were the kind and gentle spirit who always seemed to have the answer. From not only me but also from the special ladies whom I call my officemates—thank you for being one we could always count on. Dr. Wingenbach, thank you for always pushing me to my limits. At times I got frustrated, but then I would remember you were only pushing me to be my best. Dr. Lombardini, I am thankful our paths crossed in Edmonton and for your willingness to serve on my committee. You brought a unique perspective because of your experience teaching writing intensive courses, and I thank you for your time and commitment to my project. Because of these four people, I believe I have received the best education any girl from the wheat fields of western Kansas could receive.

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CHAPTER I

INTRODUCTION

The written word is powerful (Foster, 1983; MacArthur, Graham, & Fitzgerald, 2006). “Writing is not just a skill with which one can present or analyze knowledge. It is essential to the very existence of certain kinds of knowledge” (Rose, 1985, p. 348). Using the written word, one can “gather, preserve, and transmit information widely, with great detail and accuracy” (MacArthur et al., 2006, p. 1); “[It] is an important medium for self-expression, for communication, and for the discovery of meaning....” (Foster, 1983, p. 159). Writing has many functions and can serve a variety of purposes in different disciplines. A single document may perform several actions at once (e.g., develop an argument to convince its readers, clarify thoughts, create new ideas, discover and present facts; Deane et al., 2008). From the written directions on the back of a microwave dinner to laws written by governments around the world to personal expression of feelings, beliefs, and emotions, writing has become an integrated part of everyday society (MacArthur et al., 2006; National Council of Teachers of English, 2009).

Proficiency in written and oral communication has become an essential outcome of a quality education (Strachan, 2008) because it is a valuable workplace tool (Kastman & Booker, 1998). In 2004, the National Commission on Writing proclaimed that writing and writing education needed to be transformed, and during the mid-2000s, it published a series of reports to address the writing problem in America. “American education will

never realize its potential as an engine of opportunity and economic growth until a writing revolution puts language and communication in their proper place in the classroom” (National Commission on Writing, 2003, p. 3).

As early as 1963, Kitzhaber argued universities and colleges should demand strong writing abilities and skills because poor writing skills are a sign of unintelligence. “Good writing is[,] therefore[,] a prerequisite to graduation” (Kitzhaber, 1963, p. 152). If graduates aspire to be managers and leaders in the profession, they should find writing to be an essential piece of their education (Jackson, 1972). Faculty members, also, must take interest in, accountability for, and responsibility for how writing is taught and assessed (Reynolds, 2010). However, most faculty members in science and social science disciplines are not writing experts (Reynolds, 2010).

Nothing is more essential to academic life than the use of written language, as a means to the ends of communication and the construction of knowledge. What we [writing instructors] teach, therefore, is fundamentally powerful and important, even if we are not written language is not subordinate to anything. (Hjortshoj, 1995, p. 499)

According to the National Commission on Writing (2004), educators need to “understand writing as an activity calling for extended preparation across subject matters—from kindergarten through college” (p. 20) if graduates are to become successful business writers. Every instructor, every program, every department, every college, and every university is responsible for the writing education of its graduates (Bok, 2006). Decisions about writing instruction and program effectiveness are made

without faculty members understanding writing assignments and assessments (Witte & Faigley, 1983), which could result in poor student performance.

In 2005, the *Association of American Colleges and Universities* established an initiative to enhance the quality of college student learning, which includes written communication skills (National Leadership Council, 2007). In an employer survey done by the *Association of American Colleges and Universities* in cooperation with Hart Research Associates (2010), 89% of employers stated educators should place greater emphasis on teaching students how to communicate more effectively. Even though digital media and electronics have shaped the way society communicates and shares information, the need for accurate, clear writing is as important today as it was in ancient history (Bridwell-Bowles, 2004).

Doerfert (2011) in the *American Association for Agricultural Education's National Research Agenda 2011-2015* stated the need for agricultural educators, both broadly and narrowly defined, to produce career-ready graduates who have the skills and abilities to meet the demands of the 21st century workforce. Ghaith (2010) argued writing skills are a basis of literacy that have increased in importance because most professions now require new employees to have strong written and oral communication skills.

Professionals in and out of academia now use writing to manipulate texts as objects, to be silently studied, critiqued, compared, appreciated, and evaluated.

... Writing became central to organizing production and creating new knowledge.

Writing was now embedded in...complex...social practices carried on without face-to-face communications. (Russell, 1991, p. 4)

The National Council of Teachers in English (2009) demanded a call to improve student writing abilities and to conduct writing research that will improve writing instruction; students should “compose often [and] compose well...to *become* the citizen writers of our country, the citizen writers of our world, and the writers of our future” (p. 1). Although writing is a necessary component of an undergraduate education (Strachan, 2008), universities have been plagued by the question of how to teach writing for retention and transferability since the writing process movement began. To plan the future of writing instruction, it is important to take a look back at where writing instruction has been and what needs to change to accomplish and carry out effective and efficient writing instruction (National Council of Teachers of English, 2009).

Writing instruction pre-1970s was focused on improving student errors—the mechanics of writing—and was largely explicit to English and the humanities genre (Foster, 1983; Nystrand, 2006; Rose, 1985). However, since that time, writing has become a stimulus of thought with a direct connection to the writer’s thought process—“an activity of the mind” (Foster, 1983, p. 24). Educational psychologists eventually conceptualized that the memorization of writing and grammar rules did not constitute an expert writer (Kitzhaber, 1963; Rose, 1985). Rather, writing and grammar rules need to be applied to situations, activities, and examples if individuals are to become proficient in writing (Rose, 1985). Rose (1985) believed writing is habitual, and as claimed by

Emig (1977), writing is a learned behavior. “The more practice, the more linguistic habit will take hold” (Rose, 1985, p. 344).

Perceptions of 20th century writing instruction had five themes and two trends. Writing, in the past, has taken a second seat to reading because reading gives society control of its citizens and writing gives citizens control of society; reading is intimate and writing is unpleasant and leads to ambivalence; writing is labor intensive and was predominantly taught as grammar and handwriting; writing has deep roots in testing; and, without curriculum planning and research, writing was considered an undeveloped skill that was used only for testing (National Council of Teachers of English, 2009). Science and progressivism inspired the two trends that effected 20th century writing instruction. The plague of early composition, primarily instruction of grammar and handwriting and writing’s use as an assessment tool, continued to darken writing instruction (Foster, 1983; National Council of Teachers of English, 2009). “Writing became a vehicle for any interest one had in mind and was not used as a knowledge-making activity or understood as a cultural artifact, a process, or an object” (National Council of Teachers of English, 2009, p. 3). Writing was an action that had potential to be used as a method of creating knowledge (National Council of Teachers of English, 2009), yet the educational system failed, in many aspects, to use writing beyond testing.

The National Council of Teachers of English (2009) called for a movement to develop a new composing agenda and respond to the 21st century changes in the composing process. To do this, it proposed three tasks for literacy educators: “*articulate the new models of composing developing right in front of our eyes...[,] design a new*

model of a writing curriculum...[, and] create new models for teaching” (National Council of Teachers of English, 2009, pp. 7-8). It is important for writing instructors and researchers to realize writing’s role beyond testing and assessment and to define that role. Also, the National Council of Teachers of English (2009) claimed that audience’s role in writing should be included in writing models and writing instruction. All too often, educators have taught writing as an independent process instead of a subject, which separates it as simply an activity instead of a way to create new knowledge and understand old knowledge. Understanding writing as a window to knowledge will help develop a well-articulated research base that can be used to guide further inquiry, construct and create new theories, and guide curriculum development. Likewise, it is important to see research’s role in teaching writing (National Council of Teachers of English, 2009).

Writing research in the 1930s and 1940s still lacked theory and the research to establish theory (National Council of Teachers of English, 2009). Many of the early writing researchers (e.g., James Britton and Nancy Martin) were English education professionals with few advanced degrees (Nystrand, 2006). At the Dartmouth Seminar in 1966, a group of academics and researchers from a wide range of disciplines met to critique writing instruction. They agreed that writing instruction was not about the teaching of writing but rather about the process and the learning involved with writing (National Council of Teachers of English, 2009; Nystrand, 2006). The writing process included invention, drafting, peer review, reflection, revising and rewriting, and publishing (National Council of Teachers of English, 2009). At the Cambridge Cognitive

Revolution, which was about the same time as the Dartmouth Seminar, researchers began researching language, writing rules, and literacy (Nystrand, 2006). Although funded writing research was ignited by the Dartmouth Seminar and the Cambridge Cognitive Revolution, various researchers had conducted earlier research studies (Nystrand, 2006).

Mina Shaughnessy put writing research on the forefront when she began conducting research on student errors in the 1970s (Nystrand, 2006). Two popular press articles published in the mid-1970s (*Bonehead English* and *Why Johnny Can't Write*) stated that the public schools' lack of emphasis on writing, the forgotten skill, was to blame for unprepared college students and the need for remedial writing courses (Nystrand, 2006). In the late 1970s, the National Institute of Education launched a research program that focused on writing instruction based on empirical research instead of traditional rhetoric, which was spawned by a discussion about scientific research methods as a means to investigate writing (Nystrand, 2006). Eventually, the work of the early researchers would lead to a writing research movement in the 1970s and 1980s, and the culmination of these early research agendas would soon influence theory and model development in writing (Nystrand, 2006).

Initial writing research was designed to “understand the nature of writing as a prerequisite to improving instruction” (Nystrand, 2006, p. 21). However, now writing research has become more about topics like writing issues, evidence, audience, conclusion, principles, and discourse. The increased number of advanced degrees awarded in composition spawned research of writing as more of a social activity and

process, which sparked writing research in programs beyond English (Nystrand, 2006). As part of the research trend, research was conducted on Writing Across Curriculum programs, writing intensive courses, and writing centers and facilities (Nystrand, 2006).

Wallace, Jackson, and Wallace (2000) argued that too many writing theories exist and not enough empirical evidence exists that informs the teaching writing profession. Many things have changed about writing since the first writing model was developed by Hayes and Flower in 1980; however, writing models have not changed to reflect the change in writing and communication mediums. Therefore, writing is being taught using age-old models if a model is being used at all (National Council of Teachers of English, 2009). Although much research has been done on writing and the best ways to facilitate writing instruction, “the chilling truth is that we are no closer to knowing how to teach writing than we were at the beginning of the process movement” (Wallace et al., 2000, p. 93).

According to the National Council of Teachers of English (2009), new models need to be developed and implemented into course material. Hayes (2001) claimed that vigorous writing research must be conducted to modify the current models or develop new, more specific models. In a world where writing is used like never before, educational institutions have three challenges: “developing *new models of writing*; designing a *new curriculum* supporting those models; and creating *models for teaching that curriculum*” (National Council of Teachers of English, 2009, p. 1). New models of writing need to include visual components as well as audience and social awareness (National Council of Teachers of English, 2009).

Because of the need for students' to become better writers and the lack of consistent instruction, universities including Texas A&M University have adopted and implemented writing intensive courses. In 2004, Texas A&M Faculty Senate decided students needed more writing instruction directly related to their disciplines because students cannot learn to write or perfect their writing skills in basic English courses (University Writing Center, 2013b). According to the Texas A&M University Office of Undergraduate Studies (2011), students "will have acquired the knowledge and skills necessary to . . . communicate effectively, including the ability to . . . demonstrate effective writing skills" (para. 1),

To combat the problem of insufficient writing skills, Texas A&M University established writing and communication (W or C) intensive courses with three goals in mind: Students will write and speak proficiently, students will master writing and speaking most often used in the students' profession, and students will understand that writing and speaking takes time and requires practice (Strachan, 2008; University Writing Center, 2013c). In 2013, almost 10 years after the beginning of the writing intensive course program, writing intensive courses are still a major part of the course curriculum at Texas A&M University. However, many unknowns still exist about teaching writing to 21st century students in the social sciences in the College of Agriculture and Life Sciences.

This dissertation research is embedded in Gorman's (1986; p. 37) conceptual model of writing across the curriculum and focuses on the pedagogical writing research concept. Writing across the curriculum is a broad subject that includes students, faculty,

administration, pedagogy, and resources. Conducting research on each piece within the conceptual framework is a lifetime of research dedicated to the further development of research on writing across the curriculum and writing intensive courses. Understanding and conducting pedagogical research will not only build on the writing research base, but it will also provide a foundation for the direction of how to teach writing in the social sciences of agriculture. Providing practical implications on how to teach writing for retention and transferability will lay the foundation for teaching practices that could lead to a stronger, more-structured writing intensive course program in not only the College of Agriculture and Life Sciences at Texas A&M University but also colleges of agriculture across the country.

CHAPTER II

LITERATURE REVIEW

Students lack the ability to write well (Epstein, 1999; Howard et al., 2006; National Commission of Writing, 2003). Even though colleges, universities, and education organizations have advocated for higher writing standards in education (National Commission on Writing, 2003, 2004, 2005, 2006; National Leadership Council, 2007), some would argue that students still do not receive the instruction they need to be proficient in writing. Fifty years later, Kitzhaber's (1963) quote is still relevant to the educational system:

Though a real cure [for students' poor writing skills] seems out of the question, it would be a great error for people whose business is education and who recognize the crucial importance of using language responsibly to sit idly by and do nothing to arrest tendencies that they know to be, in the strictest sense, anti-intellectual.

(p. 130)

To improve the education of students in all college majors, faculty members and researchers must go back to the basics to what is known about writing, its development, and the way people learn to write as well as conduct writing research using new methods and tools (MacArthur et al., 2006).

Writing Models and Theories

Controversy surrounds the theoretical and philosophical underpinnings of writing. Early empirical writing research was believed to be a precursor to improving

writing instruction (Nystrand, 2006). Writing research was once focused on the required writing abilities, but it has shifted to more writing as a knowledge creation and development tool. Writing, at a complex level, is not knowledge telling; it is knowledge transforming (Bereiter & Scardamalia, 1987).

Since 1980, writing researchers have worked to define the writing process by developing writing models (Becker, 2006). The history of writing models has four prominent time periods: Hayes and Flower circulated the general model of text writing in 1980; Bereiter and Scardamalia, in 1987, presented the first model of developmental writing; Levelt offered a model of speaking activity in 1989, which is not discussed in this work because it is not a model of writing but did have an impact on writing and writing research; and, in 1996, Hayes modified the original Hayes and Flower model and Kellogg published a model showing the relationship of text writing and working memory (Alamargot & Chanquoy, 2001). Simply stated, Hayes and Flower (1980a) and Hayes (1996) defined writing expertise, Bereiter and Scardmalia (1987) modeled the development of writing expertise, and Hayes (1996) and Kellogg (1996) integrated working memory into the already existing writing process models. Hayes and Flower received some criticism for their early writing process model. However, their original intention was not to be the only model of writing but rather to begin to define the processes and knowledge involved with writing (Alamargot & Chanquoy, 2001).

Writing is a process skill because it is not completed in a step-by-step instructional approach and different ways exist to complete the process (Marzano, Pickering, & Pollock, 2001). It is complex and requires combining and implementing

mental activities (Alamargot & Chanquoy, 2001). Writing is a robust process (Marzano et al., 2001) where the stages continuously interact (Foster, 1983). Although each of the models integrate various steps and activities into the writing process, they all, essentially, have three major processes: “(1) to plan the content, (2) to translate this content into a linguistic trace[,] and (3) to revise or to correct this content or this trace” (Alamargot & Chanquoy, 2001, p. 21).

Foster (1983) contended the writing process has three parts: “the preparatory or conceptual stage, the developmental or incubation stage, and the production stage” (p. 25). Within those three parts are activities and exercises that help writers build and construct written work: invention, drafting, peer review, reflection, revising and rewriting, and publishing (National Council of Teachers in English, 2009). Although writing is still a process approach guided by strategies and steps, instructional strategies (e.g., self-regulation, searching prior knowledge, and goal setting) for writing have changed and developed (Pritchard & Honeycutt, 2006). In the 1990s, research moved away from defining writing to investigating “writing in all its situated contexts, especially beyond school” (Nystrand, 2006, p. 22)—from workplace to other non-academic settings (Nystrand, 2006).

Raimes (1991) proposed that the theories and practices of teaching writing could be classified according to four elements that can guide both instruction and research: “the *form*...linguistic and rhetorical conventions of the text; the *writer*...writer’s ideas, experiences, feelings, and composing processes; the *content* or subject matter; and the *reader*, specifically the expectations of the academic audience” (pp. 238-239). Writers

need to understand their audience and its expectations and characteristics, so they can determine what and how to write (Alamargot & Chanquoy, 2001). They must constantly control text production so only the pertinent and necessary information is generated and conveyed (Alamargot & Chanquoy, 2001). Based on the elements of writing (form, writer, content, and reader), as defined by Raimes (1991), she proposed four approaches to writing: form-focused approach, writer-focused approach, content-focused approach, and reader-focused approach.

Teaching writing using a form-focused approach was the focus of writing in the 1960s and 1970s. During this time, the teaching of writing was centered on composition and formal features, including rhetorical form and accurate grammar, of writing—basically writing to a mold (Raimes, 1991). Raimes (1991) referred to a situation that places more emphasis on the form-focused approach as a copyeditor's stance because it focused more on the formal features of writing instead of looking at writing as a relationship among the reader, writer, and content.

Writing research in the 1970s influenced the writer-focused approach, which is writers' actions and behaviors during the writing process. Students were given more time to complete multiple drafts and revisions and receive feedback from their peers and teachers with more focus on the relationship of the writer and reader. Teachers began requiring students “to think through issues by means of writing about them, to practice generating and revising ideas through the act of writing, and to read, discuss, and interpret texts, including each other's” (Raimes, 1991, p. 241). Raimes (1991) called this approach the therapist's stance because it is the “extreme position of valuing the writer's

voice, openness, sincerity, and originality in a framework of personal writing above any notions of audience, context, of [*sic*] content, or accuracy” (p. 241). The writing process approach described by multiple researchers (e.g., Hayes and Flower, 1980a) is a writer-focused approach (Raimes, 1991), which can sometimes lead to an inaccurate picture of college-level writing and an incomplete theory of writing.

The content-focused approach was considered the new process approach; it focused more on the subject matter or the content of the work than on the features of writing or the writer (Raimes, 1991). Raimes (1991) situated this approach as a butler’s approach because the subject matter of outside disciplines is valued more than the content of language courses. Therefore, language courses have no value as standalone courses; rather language courses are service courses to other subject matter areas (Raimes, 1991).

Last, Raimes (1991) proposed the reader-focused approach, which overvalued the reader, audience, or discourse community; Raimes noted it as the sergeant major’s stance on writing. In the reader-focused approach, “academic tasks and texts are seen as fixed, stable, and determinate” (Raimes, 1991, p. 244). The reader and content are accentuated, and the writer and his/her expertise gets lost in the process. The discourse community should not set the pace for writing; rather it should be used with the other three elements to develop written prose (Raimes, 1991). Writers’ main goal should be to maintain a balanced stance between all elements of writing (Booth, 1963). Placing more emphasis on one element over the other creates an unbalanced stance, which Raimes (1991) argued leads to warped instruction.

“A balanced approach [of writing] recognizes that the four elements...are not discrete entities to be emphasized and reduced to prescriptions...they are fluid, interdependent, and interactive” (Raimes, 1991, p. 246). Writers become readers, readers become writers, content and subject matter are not independent, and form is the product of the reader, writer, and content (Raimes, 1991).

When evaluating and considering the vast amount of knowledge that exists in the world, it is possible to wonder if the only reason the knowledge exists is because of people’s ability to write and document findings—essentially to disseminate information (Rose, 1985).

Writing seems central to the shaping and directing of certain modes of cognition, is integrally involved in learning, is a means of defining the self and defining reality, is a means of representing and contextualizing information (which has enormous political as well as conceptual and archival importance), and is an activity that develops over one’s lifetime. (Rose, 1985, p. 348)

Learning how to write and compose should be an activity that it is developed and perfected throughout a lifetime—from the toddler learning to talk and construct words and sentences to an elderly person learning to use new communication mediums (National Council of Teachers of English, 2009).

Need for College Writing Instruction

The economical, global, and environmental shift in the United States has changed the way educators educate, students study, and workers work (National Leadership

Council for Liberal Education, 2007). During the first decade of the 21st century, writing was recognized by the National Commission on Writing (2003, 2004, 2005, 2006) as an essential life skill that is “central to educational and professional success in our globalized society” (Reynolds, 2010, p. 3). Each National Commission on Writing report (2003, 2004, 2005, 2006) documented the need for writing in different sectors of society—United States’ schools and colleges, business and industry, and government.

Effective writing is paramount to students’ success in their personal and professional lives (Motavalli, Patton, Logan, & Frey, 2003; Reynolds, 2010; Strachan, 2008; Zhu, 2004). Writing has become a common, yet overlooked, qualification on position descriptions and job announcements in virtually every professional position. “The need for writing in modern literate societies—societies marked by pervasive print media—is much more extensive than is generally realized” (Grabe & Kaplan, 1996, p. 3). People write forms, letters, contracts, emails, memos, professional articles, etc. (Grabe & Kaplan, 1996); yet, research (Ingram, 2007) has shown students are not prepared for the writing demands that exist within professional positions. Bok (2006) claimed “freshmen have never arrived at college with impressive writing skills” (p. 82). Whereas, Gottschalk and Hjortshoj (2004) argued “composition teachers could never fully prepare students to write effectively in their academic concentrations or career disciplines” (p. v) even in the days of less specialization.

Students become better writers through “deepening engagement and commitments, in lively association with other students and teachers, in fields of study they want to write about” (Gottschalk & Hjortshoj, 2004. p. v). Davies and Birbili

(2000) claimed people need two types of knowledge to transfer and adapt basic literacy skills, like writing, to different contexts: “metacognitive knowledge about the best ways of solving the problems of writing [and] conceptual knowledge about the nature of writing” (p. 441). Formal education should set the foundation for students to gain the two types of knowledge, and the workplace should help employees cultivate and develop the two types of knowledge (Davies & Birbili, 2000). However, “if colleges do little to encourage good writing beyond the required, introductory course, large numbers of students will continue to graduate without being able to write much better than they did when they arrived at college” (Bok, 2006, p. 96).

Writing was originally used in the classroom as a method of testing (National Council of Teachers of English, 2009). However, in addition to testing, it is now a method of learning, understanding, and retaining information (Foster, 1983; Strachan, 2008). Teaching writing is difficult because of the lack of a clear right and wrong and a standard, measurable outcome at the end of instruction (Foster, 1983). Rose (1985) argued that labeling writing as a skill, however, is downplaying the complex intricateness that it “is continually developing as one engages in new tasks with new materials for new audiences” (p. 348). “Writing, speaking, and listening[, as defined by Moje (1996), are] tools for engaging in and making sense of social practices” (p. 175). Students often overlook the importance of informal writing as a means to more elaborate prose. With informal writing, students have something to say and they begin the thought process that leads to more formalized writing (Vilardi, 1986). However, writing is often

“learned initially only with the aid of formal and systematic instruction” (Emig, 1977, p. 122).

Writing education has two sides: technical, factual information and the skills and abilities to continue the learning process long after the confinements of the traditional classroom (Orr, 1996). Land-grant institutions were founded on providing the common man with an education in technical and basic liberal arts skills (Benjamin, 1962; Burnett & Tucker, 2001; McDowell, 2002; McDowell, 2003). “A renewed emphasis on the original land-grant mission, manifested through continued protection and advancement of a more liberal experience for undergraduates, can only serve to strengthen the future of agriculture in the United States” (Grant, Field, Green, & Rollin, 2000, p. 1688). According to Grant et al. (2000), land-grant institutions struggle with finding a balance between fulfilling the obligations of the land-grant mission established in 1862 and providing students with the technical information they need to succeed. However, Orr (1996) provided a more defined purpose of an education: “. . . connections, the setting of the fact in its context, the pulling together of disparate knowledge and understanding into larger, more integrative concepts . . . what the students have left after they have forgotten everything they have learned” (p. 2828). Successful integration of liberal arts curriculum into a technical education provides students with a whole education, lacking nothing (Orr, 1996).

In professions like agricultural sciences that require interaction and communication with people, communication skills are a must. However, Harder (2006) labeled writing as the neglected life skill and argued that 4-H should include more

writing opportunities for its members and that agricultural youth organizations should begin incorporating writing into their programs. In business, writing impacts career success—from making the sale to clearly and concisely evaluating a current program (Reynolds, 2010; Zhu, 2004). Emphasizing communication skills will create a more broadly educated group of new professionals (Zhu, 2004), and students can increase their job prospects by developing strong writing skills in their disciplines and gaining an understanding of their disciplines' style and format (National Commission on Writing, 2004).

Higher education has characterized writing and English as skills that students learn at a young age instead of skills that are continuously improved through practice and development of text (Russell, 1991). Types of writing vary between disciplines, and students often learn how to write in English courses, which can be troubling because one course is teaching every student how to write (Bridwell-Bowles, 2004). Bridwell-Bowles (2004) explained that, if engineering students enroll in writing courses in the English department, faculty members and students believed that the writing courses are detached from the engineering discipline and do not provide students with industry examples. “The apparent split between ‘writing’ and ‘content’ is not merely false, it’s counter-productive” (Runciman, 1998, p. 48). Although the finishing point of a freshman English course has, in the past, marked the end of formal writing education, Brumback (1985) argued it should not stop there. Students need to be guided by experts in their professions. Learning how to write in a discipline-specific context provides students with a prolonged and sustained immersion in the writing process as it specifically relates

to their discipline (Texas A&M University Writing Center, 2013). “Writing in a relevant context promotes discovery of linkages among existing ideas, the reshaping and reorganization of old ideas, and the creation of new ones” (Ryan & Campa, 2000, p. 175).

Freshman English courses serve as a refresher for the material (e.g., grammar, punctuation, mechanics) students learn in high school, but they do very little to help students learn how to write for the professional workplace (Fullenkamp, 2001) because content, context, audience, writer’s interest, and time spent writing are irrelevant in freshman English (Runciman, 1998). Students can take English and speech classes, but much of what the students will use in the industry is taught in their discipline (Brumback, 1985). At the freshman level, students need to gain a foundation of skills and experiences (i.e., understand writing process, understand variation of contexts, understand writing situation, practice peer review, use technology, and conduct research) that writing in the disciplines instructors can build on (Maimon, 2012; University Writing Center, 2013c). Maimon (2012) stated members of the United States educational system are realizing that students will not learn everything they need to know about writing in high school and that they need writing education beyond the freshman year. Thus, it has taken 20 years for higher education and the American educational system to realize writing’s place in each discipline.

Writing intensive courses offer students not only the opportunity to improve their writing skills but also their understanding of how knowledge is organized and created in their specific discipline (Strachan, 2008). The integrated approach of writing across the

curriculum affords students the opportunity to transfer writing skills from the specified course content to the workplace (Schneider & Andre, 2005). Although discipline-specific writing and writing intensive courses are both common curriculum changes designed to enhance college students' education, they are not the only types of programs that foster learning (Fulwiler & Young, 1990). Some colleges and universities have implemented programs like first-year composition courses, writing assessments, and upper-division writing courses to promote the development of students' writing abilities (Fulwiler & Young, 1990). Grabe and Kaplan (1996) argued that writing can be taught at three levels: beginning, intermediate, and advanced, and post-secondary students should fall into the advanced level of writing education. College-level writing assignments should "encourage assimilations of and response to diverse ideas and perspectives" (Wilson, 1986, p. 67).

Schneider and Andre (2005) stated institutions of higher education play a major role in not only providing students with writing instruction but also with research and analytical skills. ". . . [T]hey [higher education institutions] must facilitate students' acquisition of the kind of procedural knowledge—including research and analytical skills—that underlies competence in workplace genres" (p. 210). The question is not if students need to learn how to write, but how the academy helps students improve as writers and thinkers? (Strachan, 2008). Further, what is hindering students from reaping the "cognitive benefits of writing"? (Bereiter & Scardamalia, 1987, p. 359)

Writing and Critical Thinking

Aristotle once said “to write well, express yourself like the common people, but think like a wise man.” Thinking is an essential piece of the writing process because without adequate thinking the written prose is often unclear and unorganized (Fullenkamp, 2001). Critical thinking skills, which can be accomplished through writing assignments that promote the use of students’ logical thought processes and problem solving skills, are among the key outcomes of an undergraduate education (Hayes & Devitt, 2008; Schmidt, Parmer, & Javenkoski, 2002; Strachan, 2008; Tapper, 2004). The objective of critical thinking is “to assess the truth of statements, the validity of an argument, or the soundness of a proposal, and come to a judgment” (Henderson, 1972, p. 46). Tapper (2004) believed that good thinking often leads to good writing. Key terms of critical thinking are “questioning, evaluation, analysis, reflection, inference, and judgment” (Tapper, 2004, p. 201).

Critical thinking, as defined by Tsui (2002), is “students’ abilities to identify issues and assumptions, recognise [*sic*] important relationships, make correct inferences, evaluate evidence or authority, and deduce conclusions” (p. 743). Problem solving is a key component of critical thinking (Tapper, 2004). Students, too, have varying definitions of critical thinking: “involving support for claims and positions taken in argument in written assignments” (Tapper, 2004, p. 212), “support, argument, developing an argument, criticism, and comparison” (p. 214), and “related to the adaptability and the practicalities of action and problem solving” (p. 215). Critical thinking is not just knowing the facts but knowing how to “back up a position on an

issue, evaluate sources, and state pros and cons” (Tapper, 2004, p. 214). Critical thinking is forming a logical opinion with valid information (Anson, 2006; Tapper, 2004).

Educators who teach students how to think critically should do so by incorporating a few teaching practices: focus on what they want their students to learn, work to awaken curiosity in their students, help students overcome common misconceptions and interferences that keep students from thinking, use writing assignments and tests to evaluate students, help students improve their ability to reason, and have high expectations for their students (Bok, 2006). Critical thinking skills involve creativity, common sense, logical reasoning, and resourcefulness (Hartel, 2001), and it is achieved through application (Bean, 2011; Henderson, 1972); “Only through writing, perhaps through the condensation and analysis of classroom notes or through the writing of drafts of papers that required them to integrate theory with evidence, did they achieve the insights that moved them to complex reasoning about the topic under consideration” (Sternglass, 1997, p. 295). When students define a problem, ask questions, research the problem, and state their findings in writing, they are using writing to complete a task, which should increase their critical thinking ability (Bean, 2011; Henderson, 1972).

Henderson (1972) said that to think critically is to become a reflective thinker. Irani and Telg (2005) found, in a study about critical thinking in agricultural communications, that students lack critical thinking skills because of “an inability to read critically or to read well, a lack of analytical skills, and a lack of curiosity” (p. 13). Students’ intellectual competence goes beyond the passive consumption of information to “construct[ing] meaning, using words, images, and theories” (p. 63) and developing

inquiry based questions about the course material (Chickering & Reisser, 1993). If students are to move from passive consumers of information to active explorers of information, they must be able to think critically and master communication skills (e.g., writing; Orr, 1996). “Unquestionably, college writing courses ought to foster critical thinking” (Carpenter & Krest, 2001, p. 46) because writing and thinking act as partners in education (Kitzhaber, 1983).

Writing, as postulated by Bean (2011), is a process of critical thinking. It is the “process[ing of] information in a physical, tangible form” (Reaves, Flowers, & Jewell, 1993, p. 34). If separated from thinking and creating, writing can be learned (Bean, 2011). Writing alone is like writing encyclopedia information, but writing and critical thinking are like writing an argument or analysis with conceptual understanding (Bean, 2011; Rutherford & Ahlgren, 1989). Writing is a method of learning (Emig, 1977; Foster, 1983; Applebee, Langer, & Mullis, 1987) and a mode of inquiry (Strachan, 2008). “Writing through its inherent re-inforcing [*sic*] cycle involving hand, eye, and brain marks a uniquely powerful multi-representational mode for learning” (Emig, 1977, pp. 124-125). According to Gottschalk and Hjortshoj (2004) and Grauerholz (1999), writing enhances students’ ability to think critically, be creative, retain technical information, develop imaginations, and advance their communication abilities. Writing engages both hemispheres, therefore, using the brain to its full potential (Emig, 1977). “Writing serves learning uniquely because writing as process-and-product possesses a cluster of attributes that correspond uniquely to certain powerful learning strategies” (Emig, 1977, p. 122).

Bean (2011) characterized writing as the box and the wrapping paper serves as a container for the ideas or content. It “involves intellectual and often emotional struggle” (Bean, 2011, p. 23). Writing promotes a deep understanding of the subject matter because it engages people to deal with actuality through enactive (dominated by the hand), iconic (dominated by the eye), and representational or symbolic (dominated by the brain) activities (Emig, 1977). Trapper (2004) found college helped students view topics or subject matter from a more unbiased view, having a more balanced view of the situation and not just regurgitating facts.

“Clear writing makes for clear thinking, just as clear thinking makes for clear writing” (Deane et al., 2008, p. 22), which was also noted by Applebee et al. (1987). According to Emig (1977), clear writing is “that writing which signals without ambiguity the nature of conceptual relationships, whether they be coordinate, subordinate, superordinate, casual, or something other” (p. 126). A critical thinker can communicate with others to find answers to complex problems (Deane et al., 2008; Paul & Elder, 2009). Writing, coupled with critical thinking, expands information and not merely transmits information (Applebee et al., 1987; Elbow, 1973).

Writing courses are an opportunity for students to compose their written word based on their thoughts as well as interpret and analyze research (Geiger, 1986). “Reasoning and analysis are always communicative acts...it is wrong to divorce analytical thinking from its communicative acts” (Allen, 1997, p. vii). Writing is a connective process that brings together the past, present, and future to develop ideas and generate dialogue (Emig, 1977). Elbow (1973) stated

Writing is a way to end up thinking something you couldn't have started out thinking. Writing is, in fact, a transaction with words[,] whereby[,] you free yourself from what you presently think, feel, and perceive. You make available to yourself something better than what you'd be stuck with if you'd actually succeeded in making your meaning clear from the start. (p. 15)

Perhaps students' inability to write well is their lack of ability to think critically; therefore, the problem may lie in teaching and guiding students how to think (Vilardi, 1986). Students concern themselves with achieving the instructors' criteria instead of using writing to explore, discover, and identify new information (Vilardi, 1986). Can critical thinking skills be taught in the disciplines, or should they be taught in an explicit critical thinking course and transferred across disciplines? McPeck (1992) argued "disciplinary knowledge already contains the major portion of what most people understand by 'critical thinking'" (p. 34). Maimon (2012) said having separate courses for topics like critical thinking, civics, and ethics as unnecessary because such topics are more effective when implemented into current course curricula. Students must be able to see how skills (e.g., writing, critical thinking) transfer across disciplines, but the concern is that students have not learned how to transfer critical thinking skills they learn in the classroom to non-academic settings including the workplace (Tapper, 2004). Thus, teaching critical thinking in the disciplines could be much like teaching writing in the disciplines—discipline-specific courses have more examples and explanations.

Many syllabi and course outcomes include a statement about students' ability to think critically; however, critical thinking is not taught or measured (Tapper, 2004).

Tapper 2004 stated that it is assumed students gain critical thinking skills through osmosis and critical thinking is assessed through writing (Tapper, 2004). Therefore, the questions lie in how students develop critical thinking skills and how critical thinking is integrated into the course material (Tapper, 2004). If a course requires students to actively seek out information and engage with the course material and not passively consume a lecture, then communication, listening, critical thinking, and reflecting activities can be incorporated into the course (Chickering & Reisser, 1993).

Irani and Telg (2005) found that the four best ways to integrate critical thinking into coursework were “using real-world projects and situations, emphasizing research, demanding more and richer writing assignments, and exposing students to differing viewpoints” (p. 13). Discussion accompanied by feedback-rich writing assignments can improve students’ ability to think critically (Hayes & Devitt, 2008), and writing instructors do not encourage writing education without criticizing and addressing writing problems (Boice, 1990). Huang (2010) argued “courses that integrate skills, such as reading-based writing, that develop both critical reading skills and writing skills deserve consideration for inclusion in the curriculum” (p. 532).

Essentially, educators have two views of critical thinking: problem solving and application of principles of logic (Henderson, 1972). Educators should not be students’ main source of information; educators should be guides to finding assessing, integrating, and applying information (Maimon, 2012). To teach critical thinking as problem solving, educators assign students a problem to define and solve. The problem can be solved through students’ hunch or data collection (Henderson, 1972). Whereas, to teach critical

thinking using application, educators should use principles of logic and show their relationship to specific contexts (Henderson, 1972).

A more specific view of teaching critical thinking is to include knowledge and skills in “discussing controversial social issues, engaging in literary criticism, criticizing expository discourse, analyzing and evaluating proofs, and judging the soundness of scientific experiments” (Henderson, 1972, p. 51) as it relates to the context of the curriculum. In science, critical thinking should be taught as adequate explanations and sound experiments (Henderson, 1972). Argumentative and persuasive writing assignments are more likely to increase students’ critical thinking skills than other writing assignments (e.g., descriptive, narrative, and expository writing; Wilson, 1986). “[T]eaching critical thinking involves helping students develop standards or criteria for judgment and developing their skill in employing these in assessing the worth of the object of criticism” (Henderson, 1972, p. 46). At the basics of critical thinking, students must determine the logic of sentence structure and linguistics.

According to Schneider and Andre (2005), the management students they interviewed as part of a satisfaction of writing instruction study were satisfied with the writing instruction they received because of the research and analytical skills they gained. Students in communications disciplines did not feel satisfied with the writing instruction they received. They expected to be prepared in all areas of communications but were only prepared in the theoretical underpinnings of communications and select practical areas (Schneider & Andre, 2005). Because of the opportunities for writing assignments to closely align with practicality of the workplace, management students

were able to apply theory to practice in many of their writing assignments. This real-world application is important because students are able to gain experience producing the kinds of technical documents that require critical thinking and problem solving (Schneider & Andre, 2005).

In an Australian study, students believed the university had an obligation to teach them how to think critically, approach problems, and perform tasks. Students also matured in their ability to think critically during their four years in the undergraduate agriculture program (Tapper, 2004). Zimmerman (1991) stated that, in a study about the use of journals in a technical writing classroom, one student said “It has given me a reason to write down my thoughts. It has given me a reason to think and write at the same time. It has made me have to write” (as cited in Zimmerman; p. 26).

Tapper, in a 2004 study, found that students believed they think critically when they write, which they defined two ways: (a) taking a position and leaning toward that side but presenting both sides and rebutting the opposite position; or (b) taking a position, researching both sides, and perhaps, changing that opinion based on evidence in the literature. Additionally, a third-year agriculture student believed that critical thinking came automatic with writing (Tapper, 2004).

Although this may help define how students think critically while writing, how do they apply critical thinking skills? Tapper (2004) found students believed researchers and extension professionals apply critical thinking in different ways. “Researchers assessed and criticized whether a particular area of research is worthwhile, and extension agriculturalists needs to choose appropriate information for the people they work with”

(p. 216). By the fourth year of college, students begin to add to the body of knowledge with their own research and work (Tapper, 2004), which is what distinguishes writers from the Bereiter and Scardamalia (1987) knowledge telling strategy model and the knowledge transforming strategy model.

Writing Across the Curriculum

Changes in writing curriculum began with the Writing Across the Curriculum program in the mid-1970s (McLeod, 1992b). WAC programs were intended to reinforce students' writing abilities between freshman writing courses and graduation and improve student writing within their discipline (Farris & Smith, 1992). "The WAC movement as well as many advances in our understanding of the cognitive and social processes of writing all stem from a recognition that writing is not a single, rudimentary and foundational content" (Runciman, 1998, p. 47). In the 20th century organizations like the Association of Teachers of Technical Writing emerged because of the growth of technical writing courses across the disciplines, especially in schools of engineering. Engineering faculty members believed that English departments could not adequately prepare engineering students for the writing demands of their profession (Kynell & Tebeaux, 2009).

Writing in the curriculum promotes "general literacy, critical thinking, improved writing, and active learning" (Fulwiler & Young, 1990, p. 1). Writing is active learning (National Commission on Writing, 2004). It is a process students use to discover and develop scientific information and ideas and present new information and ideas to a larger audience (Foster, 1983). Students connect old ideas with new ideas through

researching and writing about their interests (Ryan & Campa, 2000). Writing in discipline specific courses provides students with preparation for workforce writing tasks (Schneider & Andre, 2005). Faculty members told Zhu (2004) that employers seek oral and written communication skills as one of the top skills in graduates. In a study by Huang (2010), undergraduate students labeled writing as more important than reading, speaking, and listening.

WAC is different than the traditional view of freshman composition. From the perspective of the WAC program, writing should be unique and situated within a context (Runciman, 1998); “learning to write in the genres of disciplines is an exercise in epistemology” (Strachan, 2008, p. xi). Writing is a set of processes that includes a specific purpose, targets an audience, incorporates intellectual and emotional behaviors, and sees has factors like content and writer motivation. It should include pre-writing activities like exploration and informal writing to deepen learning (Runciman, 1998). Epstein (1999) argued discipline experts can teach writing in their profession better than any English expert. “The conclusion that domain-specific knowledge in rhetoric and writing must be identified contextually and taught directly so as to become procedural [i.e., automatic]” (Teich, 1987, p.22). Scholars in all disciplines have the obligation to teach writing; “It takes a campus to teach a writer” (Maimon, 2012, p. 97). It is not a choice; it is a responsibility (Maimon, 1986).

Zhu (2004) found two views of writing on college campuses: (1) English department faculty members teach students how to write and apply writing skills to different contexts; whereas, discipline-specific faculty members help students develop

writing skills; and (2) English department faculty members teach students the fundamentals of writing; whereas, discipline-specific faculty members teach students the aspects of writing in their disciplines. According to Strachan (2008), faculty members have the obligation to teach students how to write in their disciplines. Educators argue it is not their responsibility to teach writing because they do not have the formal education in teaching writing (Cobia, 1986; Stewart, 1987), and Zhu (2004) stated that teaching discipline-specific content is an educators' first priority.

Each discipline has a social component that includes an audience students must learn to identify and write to (Maimon, 1986). Although writing is a skill, it is part of every discipline and cannot be taught isolated from the disciplines (Grimes, 1986). "Acquiring the knowledge of a discipline is partly a matter of learning its language: its vocabulary, conventional sentence structures, patterns of organization and reasoning, [and] modes of audience address" (Strachan, 2008, p. 50). Each discipline has distinct kinds of inquiry, knowledge, and communication that should be represented in writing across the curriculum programs (Grimes, 1986). Writing across the curriculum, as postulated by Strachan (2008), is a socially-situated activity that helps students create knowledge in their discipline.

Bridwell-Bowles et al. (2009) said the best practices of Writing Across Curriculum courses are

faculty leadership, student engagement, significant amounts of formal and informal writing, feedback and revision, a focus on disciplinary and professional genres in upper division courses, direct teaching by senior faculty, forums for the

exchange of ideas across disciplines, active learning, reduced class sizes, strategic planning for communication-intensive courses within majors, and more.

(para. 21)

WAC courses should include small writing tasks throughout the course, require multiple drafts of large assignments (Strachan, 2008), and teach students how to critically read their own work and use peer review (Maimon, 2012). Faculty members should encourage students to participate in cooperative learning experiences, like internships, to enhance and practice their written communication skills. Cooperative learning experiences equip students with experience in meeting the writing demands of their chosen field (Schneider & Andre, 2005). Additionally, faculty members should do a better job of explaining the importance of writing in the disciplines, which could help students make a smoother transition into the workplace (Schneider & Andre, 2005).

“Communication is central to all disciplines; no students can be considered competent until and unless he or she can participate in the written and oral work of the field”

(Anson, 2006, p. 109).

Writing Instruction in Agriculture

Agriculture faculty members have the obligation to ensure that students leave their programs with a strong grasp on how to convey information through writing and an understanding of why they need to possess strong writing skills (Walker, 2011). Being able to write well in agriculture is important (Jackson, 1972) because writing in agriculture helps students think critically, gather and comprehend information, and gain content knowledge (Cobia, 1986).

In an era when agricultural education [narrowly and broadly defined] is concerned with informing people about agriculture, faculty [members] must ensure students are literate in the subject matter, have the skills to effectively communicate, and are successful in finding employment after graduation.

(Garton & Robinson, 2006, p. 553)

Although graduates of agriculture disciplines need writing skills (Flowers & Reaves, 1991; Stevens, 2005; Stewart, 1987), the agricultural science classroom is not an English classroom (Tobey, 1979).

Walker (2011) claimed, for agricultural students to be successful in the workplace, they need skills in technical agriculture, communications, data collection, and time management. Specifically, Howard et al. (2006) suggested that poultry science students need more technical writing training, as could be the case in most agricultural disciplines. Students need to be able to gather information from a variety of sources and disseminate the information to larger populations (Walker, 2011). “[I]ntegral to any science curriculum must be activities that teach students to systematically gather, critically analyze, and then amalgamate different sources to ensure a deeper understanding of specific content” (Freeman & Lynd-Balta, 2010, p. 109).

Employers seek employees who have technical agriculture knowledge and the ability to creatively and effectively communicate agriculture information in a simple language (Walker, 2011). Flowers and Reaves (1991) believed agricultural students should learn how to communicate their thoughts to a broader audience and gain a skill valued by the agricultural industry. The agricultural industry depends on its graduates to

communicate vital information to internal and external audiences (Fullenkamp, 2001; Scanlon & Baxter, 1993). “The agronomists, nutrition specialists, microbiologists, animal scientists, and other technical agricultural professionals of today are more than technical experts; they are technical communicators” (Fullenkamp, 2001, p. 5).

Strong agriculture curriculum should include opportunities for students to write, listen, and speak and to apply those skills to real-world scenarios (Walker, 2011). A quality education should promote writing to learn and encourage students to use writing as a way to master the subject area (Zekeri, 2004). Writing, when integrated into the course content, is an outlet for students to learn their professions’ jargon and content-related material that may not otherwise be included in the course lecture (Aaron, 1996). Faculty members can make judgments about a students’ ability to process and apply information based on how students develop written responses to writing prompts and questions (Aaron, 1996).

Faculty members can use writing to learn as a method of teaching agriculture concepts and the basics of writing (Tobey, 1979). Colleges of agriculture should produce graduates and take responsibility for producing successful future employees and providing students with written communication skills (Cobia, 1986; Orr 1996; Schaefer, 1984). Coorts (1987) claimed that improving students’ ability to communicate is among the top seven needs of agriculture curriculum. Lowering the amount of required writing courses is not proactively preparing students to be productive professionals in the agricultural industry (Jackson, 1972). “Professors of technical courses need to place a high value of coupling writing with oral skills with technical education for the purpose

of learning” (Koch & Houston, 1989, p. 13). Using writing as a way to learn helps students increase their intellectual capacity, which can help them make the transition from college students to employees more efficiently (Epstein, 1999). Agricultural students need experience defining problems, gathering information, drawing conclusions, asking questions, and presenting information to a larger audience, which can be achieved by adding oral and written communication exercises to the current course material (Orr, 1996).

The overemphasis of technical agricultural curriculum could leave students unprepared “for the dynamic, systematic, and difficult problems they will encounter as future leaders” (Grant et al., 2000, p. 1688). However, an overemphasis on liberal arts curriculum and skills leaves a generation lacking the technical skills to meet the needs of the agricultural industry, which could create a gap in the skilled workforce. Agriculture can no longer view itself as a singular entity; it is part of a larger educational system (Orr, 1996). Students should leave the academy as “literate, creative, productive, and responsible” members of society (Orr, 1996, p. 2831). Grant et al. (2000) argued that students need to be introduced to curiosity, creativity, confidence, critical thinking, and communication while they are in college. Providing students with a baseline of instruction in “curiosity about the world, leading to a global awareness; enthusiasm for question identification and analytical problem solving; ability to see a series of questions and answers as linked, which leads to a systems-based view; and effective communication” (Grant et al., 2000, p. 1688) during students’ first year will introduce them to concepts they can use and refer back to during their collegiate experience.

All disciplines, not just English, have the obligation to teach writing and integrate it into the curriculum as a way to learn (Flowers & Reaves, 1991; National Commission on Writing, 2003; Smith, Charnley, & McCall, 1993; Spack, 1988; Stewart, 1987). Agriculture faculty members agree that graduates need to be able to write because, if graduates cannot write, they will not be able to convey their knowledge (Gamon, 1988; Koch & Houston, 1989). Koch and Houston (1989) suggested professors continually reinforce to students that writing is important in agriculture professions because employers expect students to write. By implementing communication skills and exercises into the curriculum, professors can reinforce the importance of communicating in agriculture (Koch & Houston, 1989).

Writing is a form of knowledge assessment, also (Ryan & Campa, 2000). Nilsson and Fulton (2002) stated that writing assignments were the most used form of evaluation in agriculture capstone courses and the most important outcome measure was communication skills. Ryan and Campa (2000) used writing in a wildlife conservation course to increase students' cognitive skills and help them retain information related to the course content. Instruction related to the development of scientific and technical writing skills within the disciplines is needed because too many courses include writing as a component and not as a way to learn content (Howard et al., 2006). Writing helps students engage in the course content and breakdown complex ideas and constructs (Ryan & Campa, 2000). Walker (2011) incorporated writing assignments into a junior-level animal science course to give students the opportunity to publish a popular press magazine article as well as gain a better understanding of the animal science topics

discussed in the course. Students had control of the inquiry-based writing assignment, yet they were provided guidelines and support as needed.

When Orr (1996) implemented journals and formal papers into internship and independent study courses, students had more opportunities to develop their communication and evaluation skills. Integrating communications curriculum into courses increased students' theoretical knowledge and understanding. According to Zimmerman (1991), journal writing can be used in agricultural courses to explore students' understanding, thoughts, and feelings about a particular topic. Journals help students to explore, focus, and clarify their ideas. One student said, "My journal has helped me to write better and to put down new things that I acquired each day" (Zimmerman, 1991, p. 27). Before Lopez et al. (2006) integrated a wildlife management plan into their writing intensive course at Texas A&M University, they collaborated with the Texas Parks and Wildlife Department to develop guidelines for the plan. This gave students an opportunity to gain experience writing and developing a plan very similar to what they would encounter as professionals in wildlife and fisheries sciences.

Although integrating communications-rich curriculum into the agricultural classroom cannot be accomplished without the approval and support of college administration and help from the writing center and English faculty, Orr (1996) argued that using communication skills development exercises helps students thoroughly understand animal science concepts and actively participate in the course content. Orr (1996) suggested several ways to integrate writing assignments into animal science: (a) write about the most important thing they learned in class that day; (b) develop exams

using facts and concepts from the course material; (c) require questions to be answered in writing; (d) use realistic writing assignments that require students to identify the purpose and an audience; (e) assign shorter, more frequent assignments; (f) write the author of the textbook to critique the chapter and ask additional questions; and (g) identify most important or difficult concepts related to the course material.

Writing Instruction at Texas A&M University

Texas A&M University Writing Center (2013) claimed that faculty members are obligated to teach writing as it relates to their disciplines. “Writing and public speaking skills are not general skills learned early in life but a series of specialized skills that must be acquired and practiced over long periods of time” (University Writing Center, 2013a, para. 6). Texas A&M University began requiring students to take one writing intensive course in the fall 2004 semester, and the requirement shifted to two communication intensive courses for the fall 2007 semester (University Writing Center, 2013b). W (writing intensive) courses are “discipline-specific, content area-courses that incorporate writing either to demonstrate knowledge or to reinforce learning or both” (University Writing Center, 2013a, para. 8). W courses are approved every four years, and writing should be taught in at least one class period during the semester (University Writing Center, 2013b). Basic requirements of W courses are

- require writing related to the students’ major[,]
- provide instruction in writing and feedback that allows for the improvement of major assignments[,]

- base a percentage of the final course grade on writing quality (about 25% for a 4-credit course, 33% for a 3-credit course, and 75% for a one-credit course)[,]
- require a minimum of 2000 words[, and]
- base less than 30% of the percentage of the grade based [*sic*]on writing quality on collaborative writing. (University Writing Center, 2013c, para. 5)

Students' writing should continue to develop after college graduation, but they should have a clear understanding of the process when they graduate from college (Texas A&M University Writing Center, 2013). Students can better understand writing with consistent practice and feedback; however, just adding one more assignment to the list will not improve students' ability to write (Epstein, 1999; Texas A&M University Writing Center, 2013). Writing intensive courses should have opportunities for students to practice writing, revise their work, get feedback from instructors, and clarify expectations (Epstein, 1999; Texas A&M University Writing Center, 2013). Writing assignments should be used as a method of learning and teaching course content and should inspire students to be creative, use critical thinking skills, and take ownership for their writing (Texas A&M University Writing Center, 2013). Students will use the skills they gain in writing intensive courses to solve problems and speak more effectively and efficiently about their disciplines (Texas A&M University Writing Center, 2013).

Students at Texas A&M University have completed a variety of writing assignments in their writing intensive courses. In a senior-level wildlife and fisheries sciences course, students were required to produce a wildlife management plan (Lopez

et al., 2006). The wildlife management plan was the primary assignment for the course, accounted for more than 50% of the grade, and required students to participate in writing and experiential learning opportunities. Additionally, students had to communicate (orally and written) with landowners and natural resource agencies to complete the plan. Students completed the management plans by researching the land; gathering information through lectures, course material, and field trips; analyzing and evaluating goals and objectives; synthesizing research findings; writing the results; participating in instructor and peer review; and presenting the final product to the landowner (Lopez et al., 2006).

Faculty Members' Perspectives of Writing

“Writing is what university professors do,” and their scholarly identity is noted in what they write about and their research (Strachan, 2008, p. 141). Yet, Kitzhaber (1963) said it is sad but true that few faculty members consider good writing (defined as correct, accurate, and clear) important. Many faculty members believe that they require their students to produce good writing but, in reality, their definition of good writing is skewed; therefore, the writing is nothing more than superficially correct (Kitzhaber, 1963). “Without turning a hair[,] they will swallow cacophonous wording, disorganized paragraphs, and strings of eight or ten consecutive prepositional phrases, but they will strangle on a supposed misuse of ‘shall’ or will” (Kitzhaber, 1963, p. 129).

More than not understanding and being able to recognize good writing, faculty members argued they do not have time to grade students' writing because of large class sizes, they do not have the ability to assess writing because of their lack of knowledge

about writing, and they do not believe they have the responsibility to teach writing (Kitzhaber, 1963). Teaching writing intensive courses can be demanding because instructors are expected to teach how to think critically, use writing conventions, form arguments, and use document styles (Texas A&M University Writing Center, 2013). Bridwell-Bowles et al. (2004) said many of the faculty members at Louisiana State University did not believe they have the responsibility to teach writing. The faculty members believed the obligation belonged to the English Department, which was the same result that Cobia (1986) found almost 20 years earlier. In 1986, Cobia (1986) claimed that faculty members were hesitant and unprepared to teach writing:

No way! Are you crazy? I don't have enough time to grade all that stuff. Besides, what business do I have teaching writing skills? I can't write myself. I can't recognize poor mechanics let alone teach someone else to write properly. I'm not trained in writing; it's not my job. (p. 22)

Even though the Cobia (1986) and the Bridwell-Bowles et al. (2004) studies were two decades apart, faculty members had the same beliefs about teaching writing across the curriculum. According to Fullenkamp (2001), faculty members did not believe that communications curriculum should be required in every course within the college of agriculture because of the need for students to learn technical content. However, faculty members did agree that communication skills were an important outcome of a technical curriculum and that communication material should be situated, context specific, and purposeful (Fullenkamp, 2001). Boice (1990) argued faculty

members should quit blaming each other for poor writing skills and start taking responsibility for mediating the problem.

Writing instructors often express their inability to do it all: teach content, improve students' writing ability, grade mass amounts of assignments, and mentor students. Faculty members are faced with limited classroom instruction time to teach content-related material while incorporating writing instruction and grading written assignments (Epstein, 1999; Gamon, 1988). Faculty members, as noted by Epstein (1999), have a tough time assessing and evaluating student work because of the variation in ability and skill. Some students write well, and others cannot write at all (Epstein, 1999). "Because student writing is so poor and so time-consuming to grade, they [faculty members] have discontinued writing projects altogether" (Epstein, 1999, p. 36). Leaving faculty members to decide what is important and what the students need to know when they graduate (Gamon, 1988). However, Fullenkamp (2001) stated "faculty acknowledge that the relationship between communications and technical knowledge is too intertwined to...separate them" (p. 70).

Soven (1986) suggested teaching writing cannot be eliminated at the cost of teaching content. "Teaching writing is hard, time-consuming work" (Bok, 2006, p. 83), but, with proper strategies and techniques, instructors can help students comprehend subject matter, enjoy writing, and improve writing skills (Cobia, 1986). Instructors can focus more on specific areas of the writing process, which could eliminate work (Soven, 1986). For example, instructors could eliminate the research paper and reduce the number of writing assignments to focus more on prewriting, drafting, and revising

strategies (Soven, 1986) within the disciplines. They could experiment with different types of structuring modes and instructional formats to increase students' writing abilities (Soven, 1986).

Faculty members should constantly encourage students to be forthcoming in problem solving, using their resources (e.g., stakeholders), soliciting feedback, and revising so students can become better writers (Schneider & Andre, 2005). Without faculty members providing students with ample, timely feedback on not only grammar conventions and mechanics but also on the content and quality of the work, students cannot become better writers (Bok, 2006). In a study about the academic writing needs of students, faculty members stated the most important writing skill was to “write in response to an assignment and stay on topic without digressions or redundancies” (Huang, 2010, p. 527). Most faculty members interviewed by Zhu (2004) focused on providing students feedback that related to content and discipline-specific writing, and some faculty members viewed themselves as sources of feedback and opportunity.

In an Iowa State University College of Agriculture and Life Sciences study, faculty members supported the integration of communication courses and believed they should help students understand communications as it relates to their professions (Fullenkamp, 2001). Additionally, agricultural faculty members believed that the most important communication concepts for students to understand were how to be a team member and how to display data in tables and figures (Fullenkamp, 2001). To teach communications concepts and principles and technical material at Iowa State University, faculty members reported they used research papers, journals, critiques, summaries, and

collaborative activities (Fullenkamp, 2001), as well as current event summaries, industry poster presentations, and newsletters as integrated communications curricula. Faculty members were not only uncomfortable with integrating communications into the course but also with evaluating students' communications activities and assignments. Some of the faculty suggested they would like additional information about integrating communications into their courses in areas like writing appealing sentences/paragraphs, providing leadership, selecting credible sources, etc. (Fullenkamp, 2001).

Often times, faculty members are not mindful of how they developed writing skills, which could be a hindrance to the writing instruction. Faculty members may have forgotten what it is like to be a novice writer because, often times, they focus on conveying their research findings and not on the writing process (Strachan, 2008). Faculty members said they became great writers because they immersed themselves into their discipline, their line of inquiry and made writing about their research interests a part of their lives (Strachan, 2008). Writing intensive courses “gave them access to recognition and reflection on their own writing experiences, which encouraged them to be reflexive about their process and become more aware of the conditions that influenced their own writing” (Strachan, 2008, p. 142).

In 2010, Rocca stated faculty members still believed they did not have more than fair skills to teach writing. Rocca (2010) claimed that faculty members ranked improving student reading/writing skills number four as a priority area for professional development. However, faculty members did state a moderate to high level of interest in improving their ability to help students develop writing skills (Rocca, 2010). Teaching

writing intensive courses provided faculty members the opportunity to apply their writing skills in a context that helps their students become better writers (Strachan, 2008). The writing intensive course teaching process was “a key to the transformation in their understanding of students’ needs as writers and in their pedagogy” (Strachan, 2008). Because faculty members were willing to improve their educational effectiveness, higher education administration should be just as willing to help faculty members become more effective teachers (Rocca, 2010).

Students’ Perspectives of Writing

In a study by Light (2001), students said that they wanted to strengthen their writing skills and abilities three times more than any other skill. Students’ perceptions of writing and their preparation for workplace writing could be related to their preconceived notions about writing in their discipline, how they received writing instruction, and how much and when they practiced writing (Schneider & Andre, 2005). Students have often encountered negative experiences with writing before entering college. Therefore, they enter the writing classroom seeing an opportunity to fail at writing again, which can impact their abilities to be a successful discipline-specific writer (Kaufer, 1986; Youga, Neuleib, & Scharton, 1986). Kaufer (1986) stated students often associate writing with giving blood because they have yet to discover the power behind the prose.

However, according to Ghaith (2010), undergraduate students believed that they had been adequately prepared with basic scientific and technological skills related to critical thinking, writing, and gathering important information. Seventy-nine percent of

the participants reported they possessed strong writing skills, which could have been a result of the strict communications core curriculum required by the institution (Ghaith, 2010). Helping students understand that college writing courses are designed to help them become better writers and not designed to expect them to be expert writers is important (Youga et al., 1986). Faculty members should reinforce to students that their writing instruction does not stop when they graduate because the university classroom is just the beginning of learning how to write in their discipline (Schneider & Andre, 2005).

Former college student participants of the Agriculture Future of America organization reported that business writing skills were somewhat valuable to their job, and they agreed AFA should focus on developing writing skills in its participants (Svacina, 2009). In a study done by Howard et al. (2006) on the perceptions of poultry science undergraduate students, 85% perceived they would have some type of writing responsibilities in their future career or graduate program. More than 50% of the students had no experience writing a robust research article, which lead Howard et al. (2006) to conclude that students needed more opportunities to participate in robust writing experiences.

In a study done by Orr (1996) after a curriculum revision that added more opportunities for students to write and conduct research in their professions, students had a positive response to integrating more writing assignments and preferred formal reports and presentations over journal assignments. Before taking the course, students believed their writing skills were lacking, but they could see improvement in their skills at the

course end. Chickering and Reissier (1993) made the connection that for students to more clearly and completely analyze a situation they would have to learn more about the subject area. Perhaps then, before students could write a thorough, well-defined manuscript about a topic in their specialized field, they would have to spend time mastering, understanding, and engaging with the topic (Chickering & Reisser, 1993). Students' ability to master, understand, and engage with a topic should be evident in their manuscript because their written work is a consistent reflector of their subject knowledge (Epstein, 1999).

Although writing instructors may believe that students lack the ability to produce well-developed prose, students perceive themselves as having a higher level of writing competency (Huang, 2010). Students use appropriate language and tone when writing for specific audiences and are sufficient at identifying with their reader; however, they lack clarity, ability to create smooth transitions, and ability to communicate clear, easy-to-read information (Epstein, 1999). Undergraduate students ranked “demonstrate a command of standard written English, including grammar, phrasing, effective sentence structure, spelling, and punctuation” (Huang, 2010, p. 525) as the most important writing domain. In the same study, graduate students ranked “demonstrate competence in discipline-specific writing tasks (e.g., research papers, thesis proposals, grant proposals, theses)” (p. 525) as the most important, which was not in the top six for undergraduates.

In an Australian bachelor of agricultural science program, students reported their biggest concerns with the rough drafts of their papers were related to the broader categories of paper structure, getting information, and audience reactions (Tapper,

2004). Also, students reported they had specific issues with critical thinking—“arguments, making a main point, dealing with information in critical ways, supporting statements, and the need to present and evaluate both sides of an issue” (Tapper, 2004, p. 210). Students in a Huang (2010) study said they did not get enough examples (e.g., class or lab discussion, general formats, or comprehensive specifications in print or Web format) of what their writing instructors expected (Tapper, 2004). Most of the criteria were general and only provided students a skeletal glimpse of what was required (e.g., content, analysis, style, layout) on the various writing assignments (e.g., literature review, research projects, business analysis, plant pathology collection, practical exam; Tapper, 2004).

Additionally, in a study by Huang (2010), undergraduate students reported needing help with writing more than reading, speaking, or listening, and they viewed their writing issues as more surface-level than discourse-level, which are the basics of standard English (e.g., sentence structure and organization). Students expressed that they need continued support and instruction at the discourse and local levels of writing (Huang, 2010).

Writing Instruction Factors

The writing demands of industry, the call to sort through mass amounts of relevant and irrelevant information, and the need to broadly disseminate information about agricultural issues and policies have caused a shift in the definition of an effective and efficient communicator and writer (Hawisher, Selfe, Moraski, & Pearson, 2004). University stakeholders need to identify and focus on creating a list of 21st century

employability skills that ensure accurate and efficient delivery of information. The employability skills should be incorporated into course curriculum using developmental exercises and properly assessed at the end of the students' undergraduate career (Ghaith, 2010) because employers call for increased writing abilities and grumble about students' inability to write well (Bok, 2006). Writing has the potential to be a multimodal form of communication that is efficiently and effectively taught across disciplines (Bridwell-Bowles et al., 2009). However, many higher education institutions, unlike businesses and industries, struggle with finding the balance of collaboration across disciplines (Bridwell-Bowles et al., 2009). Often times, once students pass English composition, formal education of writing becomes a dreaded university requirement and something faculty members do not care to teach well (Kitzhaber, 1963).

To write, according to Alamargot and Chanquoy (2001), is “(1) to choose the ‘appropriate words’ for each idea, (2) to use very strict syntactic, grammatical[,] and orthographic rules, (3) to use correct punctuation and connection marks,...to translate...the semantic relationships linking these ideas” (p. 1). Metacognitive knowledge as it pertains to writing skill development “informs processes and goals for writing such as composition strategies of planning, drafting, redrafting[,] and proof-reading, and understanding about the importance and nature of context-specific exigencies of writing” (Davies & Birbili, 2000, p. 441).

Faculty members reported students need help effectively summarizing information, organizing information to convey a message, and understanding written English (e.g., grammar, punctuation, sentence structure) because students have trouble

using new information, summarizing it, and applying it to their prose (Huang, 2010). “Only about 10% of the students in my classes are competent in these written communication skills at a basic level of undergraduate writing” (Huang, 2010, p. 530). However, Davies and Birbili (2000) argued that writing ability could only be improved through “experience, practice, and informal discussion” (p. 442), which includes instructors at all levels and in all disciplines to consistently reinforce positive behaviors related to planning, drafting, reviewing, and revising. At first, writing instructors should strictly guide the writing process before relinquishing the process more to the students as the semester progresses (Youga et al., 1986). Instructors should meet with the students early on in the process to help students ward off any major content problems and assist them before minor problems turn into major ones. This eliminates mass amounts of grading at the end of the process and helps students spend their time wisely (Youga et al., 1986).

Important elements and components of writing instruction are still unclear and, therefore, still being explored (Hilgers, Bayer, Stitt-Bergh, & Taniguchi, 1995). Hillocks (1986) identified four tactics to teach writing: presentation, natural process, focused practice, and skills. Deane et al. (2008) claimed that, for writing instruction to be successful, students should acquire the skills “to produce a wide range of texts, for a variety of purposes, across a broad class of social contexts” (p. 1). Writing instruction should no longer be taught as the different types of writing modes because writing should be taught as a “complex cognitive activity, which involves solving problems and deploying strategies to achieve communicative goals” (Deane et al., 2008, p. 1).

Because clear definitions of writing intensive courses and instruction are lacking, writing programs tend to not be stable (Hilgers et al., 1995). Many times students are not given the time to reflect on their education except with end-of-the-semester course evaluations, which are more quantitative in nature and do not give students time to reflect (Hilgers et al., 1995). A common problem with writing instruction is that it is not useful (Boice, 1990). Private writing is an important precursor to public writing and should not be overlooked in the writing process. Much of what is produced publicly began as private writing, often as a form of reflection (Hammond, 1986).

General technical writing courses are not specific enough for students to gain an understanding of the writing fundamentals. Assigning writing within a context helps students clarify the purpose and meaningfulness of the assignment (Howard et al., 2006). However, Bereiter and Scardamalia (1987) argued that mature writers have the ability to make a writing task meaningful, which is how they develop confidence and competence in their writing. Writers who fit into the strategy of knowledge telling depend on the writing instructor to make the task meaningful; whereas, the writers who fit into the knowledge-transforming strategy depend of their own abilities to make task meaningful. Letting students remain at the knowledge-telling strategy is a failure by the educational system because it hinders students' intentional cognition (Bereiter & Scardamalia, 1983). Intentional cognition is "the setting and deliberate pursuit of cognitive goals—goals to learn, to solve, to understand, to define, and so on" (Bereiter & Scardamalia, 1987, p. 361). Often times in education, learning and developing are spontaneous or accidental, and it should be more intentional, which is a cause of educational failure

(Bereiter & Scardamalia, 1987). Bereiter and Scardamalia's (1987) knowledge-transforming writing strategy is intentional writing.

Writing skills are just the foundation of strong discipline-specific writing that involves “knowledge of unique thought and communication processes” (Zhu, 2004, p. 38). Writing is developmental (Young & Fulwiler, 1986). It is not simply setting down to write; it is a process guided by multiple drafts, assessments, reviews, and edits (Epstein, 1999; Texas A&M University Writing Center, 2013; White, 1991). “The conscious deployment of process strategies, the time needed for review and revision, and opportunities for collaboration and feedback” are all strategies that can improve the writing process and product. (Davies & Birbili, 2000, p. 444).

Students should have the opportunity to experiment with writing in a supportive yet challenging environment that encourages the generation of material before the final stages of the writing process—editing and revising (Vilardi, 1986). Troxler, Jacobson-Vann, and Oermann (2011) stated writing courses should include short assignments (George, 1986), examples and rubrics, and opportunities for multiple revisions and feedback. Youga et al. (1986) proposed that writing is guided by nine stages: invention, notes, drafts, conferencing, peer editing, revision, polishing, copyediting, and final draft. However, Davies and Birbili (2000) argued giving students a template or frame to guide them in the development of writing assignments diminishes their ability to develop and improve metacognitive knowledge related to writing.

Writing must be practiced regularly at different times, in different settings, and for different audiences (Texas A&M University Writing Center, 2013; Young &

Fulwiler, 1986). Writing, also, has different purposes and roles in different situations (Zhu, 2004). Once students have investigated the topic and drawn references, they can formulate a plan of attack (Hammond, 1986). This provides students with a model of writing that is a mirror image of what they will do in the workplace (Hammond, 1986). Replicating writing projects found in the workplace ensures students receive effective writing instruction (Schneider & Andre, 2005). The old subject model, development of the form, is specific only to the classroom and does not give students an understanding of the expectations of workplace communication (Hammond, 1986).

Hammond (1986) claimed the basic writing skills are research, observation, selection, planning, writing, and revising. The Texas A&M University Writing Center (2013) said written and oral communication requires students to have knowledge of American English and use basic communication skills. According to Walker (2011), students' writing assignments should "emphasize correct grammar, sentence structure, thought progression, and critical thinking" (p. 56). However, Ryan and Campa (2000) argued writing instruction should emphasize ideas and not grammar, but with revision and feedback, students' grammar and use of the English language will often improve.

Writing researchers have found varied ideas of what writing factors are important. Connolly (1989) contended it is not necessary for faculty to focus on style, grammar, and structure; whereas, Bogel (1986) contended that grammar, spelling, and punctuation should be taught in the confinements of the context-specific classroom. Eblen (1983) found that faculty members ranked writing elements as (1) overall quality of ideas, (2) organization, (3) development, (4) grammatical form, and (5) coherence.

Zhu (2004) found students should be proficient in “audience awareness, logical organization, paragraph development . . . , clarity, sentence structure, grammar, and mechanics” (p. 37) as well as terminology specific to the discipline. Zimmerman (1991) concluded writing should be clear, focused, organized, documented, concise, correct, and conventional, and Walker, in 2011, assessed students’ writing for content, format, creativity, grammar, citations, and length, with content comprising 50 percent of the students’ grade.

Too often the focus is on avoiding grammar mistakes and correcting formatting errors, which is what some writing instructors would consider effective writing (Foster, 1983). However, effective writing is more than that—it is the ability to make an argument, to think critically, and to identify an audience (Foster, 1983; Ryan & Campa, 2000; Zhu, 2004). Writing is not just editing (Foster, 1983). Writing instructors should not emphasize grammar, spelling, and punctuation over process because it is a misrepresentation of writing (Foster, 1983). Too much attention on grammar, spelling, and punctuation takes the focus off of the “crucial, subjective phases of writing that precede editing” (p. 9), therefore, limiting critical thinking and human development that occur during key the different stages of the writing process (Foster, 1983).

Additionally, students should learn writing techniques in writing courses because students cannot improve their skills if they do not learn the techniques to improve those skills (Hammond, 1986). Hammond (1986) recommended the following techniques: “finding the best evidence, organizing chaos, writing correct sentences, throwing out excess verbiage, punctuating with care, recognizing the effects of ethos, logos, and

pathos in one's own work and the work of others" (p. 109). According to Schneider and Andre (2005), writing skills and techniques should include locating information; writing and conducting research; analyzing data; using programs like SPSS; writing evaluation reports, proposals, and plans; and writing for a particular audience. Boice (1990) recommended that, for writers to remain productive, they should write for at least an hour a day Monday through Friday.

Students in science fields should be prepared to write for two types of audiences (professional and layman; Orr, 1996) and have an understanding of how to write technical reports, research journal articles, fact sheets, project proposals, and Web text for a variety of audiences (Motavalli et al., 2003; Schneider & Andre, 2005). Targeting the audience and writing specifically to the identified audience are important pieces of the writing process (Zhu, 2004). The National Council of Teachers of English (2009) said that in the 21st century, because of the many communication mediums, audiences are everywhere and, therefore, have created a challenge for writers. Too often, writing assignments are designed with the professor as the target audience and are not representative of what employees will be expected to do on the job (Aaron, 1996; Kaufer, 1986). Therefore, students have not experienced what it is like to write for an audience outside of the academy (Walker, 2011). "An arbitrarily assigned topic, with an error-hunting teacher as the sole audience, may do little for the writer, whereas a topic the writer cares about and an audience responsive to what the writer has to say are the essential ingredients for a profitable experience" (Bereiter & Scardamalia, 1987, p. 260).

All writing assignments should begin with an investigation into the facts of the specific topic followed by drawing inferences about the facts, and writing should not be assigned in form of general person-experience essays or argumentative prose (Hammond, 1986). Zhu (2004) recommended writing instruction focus on accurate, content-focused information, which requires students to gather facts and present content, and Hammond (1986) recommended the focus be on quality of evidence, content, and thought. Students should be given specific writing assignments that require research, which is a key component of writing (Hammond, 1986) and critical thinking (Tapper, 2004). Hammond (1986) argued that, if faculty members strive to teach communication and research, students will be a literate generation. Furthermore, Motavalli et al. (2003) stated writing is more effective when students understand the reason for the assignment, relate it back to a job-specific context, and write for a specific, realistic audience. Students should be expected to participate in collaborative writing assignments because, often times in the workplace, students are required to write as part of a team with multiples writers and readers (Schneider & Andre, 2005).

Faculty believed that short writing assignments that provide students with problem-solving opportunities and multiple revision opportunities were more productive than assigning students one large paper at the end of the semester (George, 1986; Grimes, 1986; Orr, 1996). Short assignments help teach writing as efficient as possible (Hammond, 1986). The final writing products should be a culmination of shorter assignments throughout the semester, and each assignment should receive equal attention of the final product (Bogel, 1986; Grimes, 1986). Multiple, informal writing

assignments help students improve their writing skills and help educators improve their abilities to teach writing (Orr, 1996). However, Bean (2011) argued the number of writing assignments is not as important as the depth of the assignment.

Marzano et al. (2001) claimed that writing is basically pre-writing, writing, and revising with each one having subcomponents. For example, during the revising component, students should look for composition, transitions, word choice and phrasing, subject-verb agreement, and spelling and punctuation. Teachers lecture on the components and subcomponents of writing then provide writing exercises that address each one of those tasks to accomplish focused practice, which has the highest impact on improving students writing (Hillocks, 1986). Writing assignments that propagate out of prewriting and revision steps are more likely to lead to a quality final product than assignments that are not connected to preliminary thought or feedback (Wilson, 1986).

Good writing comes from practice (Foster, 1983; Orr, 1996; Schneider & Andre, 2005; Young & Fulwiler, 1986). The more students write the better writers they become. “Undergraduates will never learn to write with clarity, precision, and grace unless they have repeated opportunities to keep on writing and get prompt feedback from the faculty” (Bok, 2006, p. 87). Insufficient practice is a reason why many students fail to become better writers during their collegiate careers (Bok, 2006). “No single course...can transform undergraduates into skillful writers...real proficiency ...requires sustained practice” (Bok, 2006, p. 87). When students lack a skill, the only way to improve the skill is by doing more of it, which in this case is written communication (Cobia, 1986). “... [S]heer number of hours that most graduates spend writing is

convincing evidence of its significance” (Jackson, 1972, p. 43). The more opportunities students have to write carefully structured and formatted prose, the better writers they will become. The key is that students must put together structurally correct and defined prose for them to become better writers (Foster, 1983; Kitzhaber, 1963).

Peer review helps students improve the final product by soliciting feedback from and providing feedback to their peers (Lopez et al., 2006; Ryan & Campa, 2000).

Beyond feedback, students gain skills in writing, editing, and assessing others’ work (Gottschalk & Hjortshoj, 2004) and should be expected to assess their writing as well as others’ writing for tone, facts, inferences, and audience consideration (Hammond, 1986).

According to Youga et al. (1986), students can learn best from peer review by using models like the Richard Lanham’s Paramedic Method, which includes an analysis of the purpose, audience, voice, detail, organization, and errors within written prose.

Additionally, Foster (1983) stated writing labs and workshops are central to writing instruction because they offer an “individualized relationship usually seen as necessary to encourage poorer writers” (p. 29).

Eblen (1983) grouped students’ writing problems into two categories: problems associated with communicative maturation (e.g., organization, development, egocentrism, clarity, and coherence) and problems associated with standards of edited American English (e.g., conventions, sentence structure, documentation, diction, and appearance). In a study by Howard et al. (2006), students stated that procrastination was a hindrance in the development of writing assignments and that they often procrastinate because of the lack of clarity and uncertainty in the assignment. Although faculty may

realize poor written communication skills need to be addressed, they are left feeling unprepared to tackle such problems (Cobia, 1986; Stewart, 1987) and left to decide what writing factors and concepts should be included in writing courses.

Conceptual Frameworks

Each phase of this study was guided by independent conceptual frameworks that included related literature and, if present, an underlying theory that supported the research.

Theory and Model Evaluation

The first phase of this research study was supported by Dudley-Brown's theory of evaluation criteria (1997). Without theory, research is not meaningful, and without research to test and generate theory, theory does not have meaning (Camp, 2001). "To utilize theory appropriately, in all domains of practice, education[,] and research, it is important to know how to describe, analyze[,] and evaluate theory" (Dudley-Brown, 1997, p. 76). Before a set of criteria can be applied to the evaluation of theory, a definition of theory must first be reached (Camp, 2001; Dudley-Brown, 1997). Creswell (1994) stated three types of theories exist (grand theories, middle-range theories, and substantive theories), and they are categorized from generality to specificity.

Different views of what qualifies as theory exist in the theoretical paradigm of research, and researchers, often times, interchange theory with conceptual framework, conceptual model, model, and paradigm (Dudley-Brown, 1997). Camp (2001) stated discrepancies exist about what defines a theoretical framework. Ary, Jacobs, and Sorensen (2010) postulate that a theory should (a) "be able to explain the observed facts

relating to a particular problem;” (b) “be consistent with observed facts and with the already established body of knowledge;” (c) “provide means for its verification;” and (d) “stimulate new discoveries and indicate further areas in need of investigation” (pp. 15-16). Camp (2001) claimed theory, as it relates to quantitative research, is “specification of relationships” and, as it relates to qualitative research, is “explanation of reality” (p. 4). A qualitative researcher’s perspective of theory is both theory building and theory testing, but theory building is a preferred approach (Bryman, 2012). Theory building or theory testing is dependent on the type of qualitative approach and should be specified before collecting data (Bryman, 2012).

Although Dudley-Brown (1997) focused on the evaluation of nursing theory, nursing theory definitions originated in psychology and social sciences, which were reiterated by Ary et al. (2010). McKay (1969), a nursing theory evaluator, defined theory as “a logically interrelated set of confirmed hypothesis” (p. 394), and according to Jacox (1974), theory is “a systematically related set of statements including law-like generalizations that are empirically testable” (p. 324). A theory is useless unless it can be tested (Strickland, 2001); however, empirically testing a theory is only one form of evaluation (Dudley-Brown, 1997). Thereby, postulating that theory is a framework that has been tested and would be considered empirically sound. However, Chinn and Kramer (1983) claimed a theory was “a set of concepts, definitions, and propositions that projects a systematic view of phenomena by designating specific interrelationships among concepts for purposes of describing, explaining, predicting, and/or controlling

phenomenon” (p. 70), which lacks structure (Dudley-Brown, 1997) and highlights that theory is applicable beyond a empirically tested structure (Meleis, 1985).

Fawcett (1989) suggested ways to analyze the purpose of a work is to determine if it is a theory; the purpose of a theory should be to describe, explain, or predict concrete, explicit phenomena. Further, Fawcett (1989) defined conceptual models as “global ideas about individuals, groups, situations[,] and events of interest to a discipline” (p. 2). According to McKay (1969), models are “symbolic representations of perceptual phenomena” (p. 394) that can “explain phenomena, predict results of actions, and serve as influences for improved practices” (p. 394).

Evaluation criteria. Theory evaluation, according to Meleis (1985), offers constructive criticism of the framework, modification of the current theory, and researcher appreciation for theory development. Theory building and evaluation should be a goal of researchers to give meaning to research findings. Dudley-Brown (1997) noted theory evaluation should be conducted to make an informed analysis of theory before and after it is applied to research and before it is used in education and practice. Theory evaluation is both subjective and objective, but subjectivity can be reached if a set of formal criteria is used such as the one presented by Dudley-Brown (1997).

Dudley-Brown proposed an evaluation of nursing theory using a criteria approach, which was created and designed using a culmination of criteria suggested by nursing theory evaluators one of which was Fawcett’s (1989) evaluation of conceptual frameworks. The criteria proposed by Dudley-Brown (1997) provides a more quantifiable and observable way to evaluate theory and takes into account objective,

subjective, internal, and external criteria in the evaluation. Dudley-Brown (1997) said that theory evaluation should be conducted using a set of specific criteria—accuracy, consistency, fruitfulness, simplicity/complexity, scope, acceptability, and socio-cultural utility (see Table 1 for a complete description of each criterion). Some of the terms used by Dudley-Brown (1997) to evaluate nursing theory were modified from and expanded on Kuhn's (1977) terms of theory evaluation. Additionally, some of the terms were adapted to better evaluate writing models and theories.

Education and Identity

The second phase of this research study was supported by Chickering and Reisser's theory of education and identity (1993). Education and identity “present[s] a comprehensive picture of psychosocial development during the college years” (Evans, Forney, Guido, Patton, & Renn, 2010, p. 67). Chickering and Reisser (1993) named seven vectors that students can move through at different times and rates during their collegiate experience. This study will focus on the first vector—developing competence (Chickering & Reisser, 1993). They defined developing competence as a “three-tined pitchfork” (p. 53) that includes intellectual competence, physical and manual skills, and interpersonal competence. Competence, as a whole, “reflects people's assessment of their capabilities” (Chickering & Reisser, 1993, p. 53). However, although the competences are interrelated and may overlap, each competence can be considered independent of the others because each one is impacted by diverse experiences and conditions (Chickering & Reisser, 1993).

Table 1

Definitions of Theory Evaluation Criteria

Criterion	Definition
Accuracy	Presents a world view of the culture where it is used and applied (Dudley-Brown, 1997) Related citations: Kuhn, 1977
Consistency	Internal consistency Language, logical order, and connectedness (Newton-Smith, 1981) Clarity – consistency in operational definitions and concepts; consistency in assumptions and propositions (Meleis, 1985) Related citations: Ary et al., 2010; Barnum, 1998; Chinn & Kramer, 1983; Kuhn, 1977; Meleis, 1985; Newton-Smith, 1981
Fruitfulness	“fruitful, bountiful, productive, and prolific” (Dudley-Brown, 1997, p. 80) Reveal new feelings, phenomena, or unknown relationships (Kuhn, 1977) Ideas of further research (Newton-Smith, 1981) Generate hypothesis (Ellis, 1968) Problem-solving effectiveness; research tradition (Laudan, 1977) Related citations: Ary et al., 2010; Barnum, 1998; Ellis, 1968; Hardy, 1974; Kuhn, 1977; Laudan, 1977; Newton-Smith, 1981
Simplicity/Complexity	Dependent on number of concepts, phenomena, and relationships in the theory (Meleis, 1985) Balance of simplicity and complexity (Dudley-Brown, 1997) Simple – “bringing order to phenomenon that in its absence would be isolated and confused” (Kuhn, 1977, p. 322) Can be simple ¹ , complex ² , or pragmatic ³ Related citations: Ary et al., 2010 ¹ ; Barnum, 1998 ² ; Chinn & Kramer, 1983 ¹ ; Ellis, 1968 ² ; Kuhn, 1977 ¹ ; Meleis, 1985 ³ ; Newton-Smith, 1981 ¹

Table 1 Continued

Criterion	Definition
Scope	<p>Dependent on the phenomenon and its context (Barnum, 1998) Conceptualized based on level of theory (e.g., middle range theory; Dudley-Brown, 1997) Increased number of facts and concepts, more significant theory (Ellis, 1968) More general, more useful (Hardy, 1974) Should be focused on developing specific theories (Jacox, 1990) Can be broad¹, narrow², or pragmatic³ Related citations: Barnum, 1998³; Ellis, 1968¹; Hardy, 1974¹; Jacox, 1974²</p>
Acceptability	<p>Adoption of theory by others (Dudley-Brown, 1997) “Circle of contagiousness,” which cannot be influenced by the theorist (Meleis, 1985, p. 159) Critiqued with usefulness of theory (Meleis, 1985, p. 159) Practice (direction, applicability, generalizability, cost effectiveness, and relevance) Education (philosophical statements, objectives, and concepts) Research (consistency, testability (research potential or empirical adequacy), and predictability) Related citations: Ary et al., 2010; Barnum, 1998; Ellis, 1968; Fitzpatrick & Whall, 2005; Laudan, 1977; Meleis, 1985</p>
Socio-cultural Utility	<p>Social congruence and social significance (Fawcett, 1989; Johnson, 1974; Meleis, 1985) Social congruence - “beliefs, values[,] and expectations of different cultures that should shape and direct the type of theory most useful to it” (Dudley-Brown, 1997, p. 82). Social significance - “significance of the practice of the theory to humanity and society” (Dudley-Brown, 1997, p. 82). Does the theory make a difference in people’s lives? (Meleis, 1985) Cultural relativism, relative to the culture of proposal (Meleis, 1985) Theory transferability (Dudley-Brown, 1997) Related citations: Fawcett, 1989; Johnson, 1974; Meleis, 1985</p>

Intellectual competence is the “acquisition of knowledge and skills related to particular subject matter” (Evans et al., 2010, p. 67). Chickering and Reisser (1993) indicated the “ability to process and use new information and to communicate it well” (p. 55) is an important part of intellectual competence. At many universities, students are required to exemplify their intellectual competence by completing a list of courses that the university or state deems necessary to receive a degree within the students’ specialized field. Students’ degree plans often include a set of core curriculum courses intended to broaden the students’ knowledge outside of their field (Chickering & Reisser, 1993). Pascarella and Terenzini (1991) have found that students increase their intellectual ability to more effectively communicate both orally and in writing during their collegiate years on average of 19 percentile points. Foster (1983) claimed writing is an important element in students’ self-discovery, self-development, and social maturation. As students become more intellectually competent, they engage more with the course material, are able to see both sides of a situation, and make adequate conclusions based on their observation and analysis (Chickering & Reisser, 1993). Students are able to actively develop their ideas, questions, and opinions while critically observing and reflecting on their own thinking (Chickering & Reisser, 1993). “Writing assignments not only help students clarify thoughts and assumptions, hone analytical skills, and touch inner feelings; they can also provide vehicles for learning representational thinking—for seeing and naming symbols” (Chickering & Reisser, 1993, p. 61).

In addition to intellectual competence, students develop interpersonal competence as they learn to effectively communicate and collaborate with others (Chickering & Reisser, 1993; Evans et al., 2010). Chickering and Reisser (1993) stated that “success in the world of work involves *interpersonal skills*” (p. 346), which Klemp (1977) wrote includes the fluency of written and spoken communication. Students who have developed interpersonal competence have an increased ability to listen to others, ask questions, contribute to conversation without misleading the group, and effectively facilitate group dialogue (Chickering & Reisser, 1993). Although many students gain interpersonal competence as they progress through their education, some students revert away from the ability to effectively interact with others as a result of negative experiences. Students who lose their ability to interact with others need more positive experiences or training to overturn their negative experiences (Chickering & Reisser, 1993).

Students are interpersonally literate when they have the ability to choose the correct timing, medium, audience, content, and source to achieve specific communication goals and apply this ability to their personal and professional lives (Breen, Donlon, & Whitaker, 1977). Interpersonal skills, which include communication skills (Klemp, 1977), are important in students’ development of successful personal and professional relationships. The conceptual knowledge of writing is that workplace writing, in simple form, “involve[s] the direct telling of something to someone else in writing, and is best achieved by fairly rapid thinking through of what it is you want to say, and then simply saying it” (Davies & Birbili, 2000, p. 444). This type of workplace

communication works well for internal and less formal communication. However, some workplace writing is more in-depth and requires strategies, goals, and plans (Davies & Birbili, 2000). Writing like this “should require writers to respect and struggle to achieve those particular qualities that are unique to writing” (Davies & Birbili, 2000, p. 444). Often times, students find ways to avoid writing because of the difficulties and struggles that accompany its process (Davies & Birbili, 2000).

Colleges and universities should provide students with the opportunity to hone interpersonal skills and develop intellectual and interpersonal competence (Chickering & Reisser, 1993). Bok (2006) suggested

The improvement of an individual student's writing requires persistent and frequent contact between teacher and student both inside and outside the classroom. It requires assigning far more papers than are usually assigned in other college classrooms; it requires reading them and commenting on them not simply to justify a grade, but to offer guidance and suggestions for improvement; and it requires spending a great deal of time with individual students, helping them not just to improve particular papers but to understand fundamental principles of effective writing that will enable them to continue learning throughout their lives. (pp. 83–84)

Models and Model Development

“As a profession grows...—value assumptions are redefined, knowledge is extended, and skill is perfected—but it is the acquisition of knowledge and the organizing of it into meaningful patterns[,] which enriches professional practice”

(McKay, 1969, p. 393). The knowledge that guides practice comes from complex research that is constructed into a graphical representation of perceived reality (McKay, 1969; Phillips, 1996); “every model is a pattern of symbols, rules, and processes” (McKay, 1969, p. 393). Models are assumptions that become conceptualizations, which are tested through further research (McKay, 1969) and bring order to phenomena (Griffiths, 1963).

A model is a way to describe something (Hayes & Flower, 1980b)—“a blue print, a simplification, or an outline” (Alamargot & Chanquoy, 2001, p. 3). “People build models in order to understand how a dynamic system works, and to describe the functional relationships among its parts” (Hayes & Flower, 1980b, p. 390). Models should present a subject in a way that it has never been presented before—they should open a door to new light (Hayes & Flower, 1980b). Models “explain phenomena, predict results of actions, and serve as influences for improved practice” (McKay, 1969, p. 394). A model framework contains ideas, relationships, and elements that a researcher believes guide a specific area of inquiry (Hayes, 2006; Phillips, 1996) and helps scientists plan and develop research projects, scenarios, and plans (Phillips, 1996). The model informs research, and the results of the research inform ways to adapt, change, and modify the original model framework (Hayes, 2006; Phillips, 1996). Scientists develop theoretical frameworks, structure hypothesis, select variables, choose research designs, and develop instruments based on the underlying model chosen for the research project (Phillips, 1996). Models should be the foundation of research and should be under constant criticism and investigation (Phillips, 1996).

Although scientists develop models using their insight about phenomena within a discipline (Fawcett, 1980; Phillips, 1996), using a model as the underlying foundation of a research project does not guarantee that the research is practical (Phillips, 1996).

Although models provide researchers with a foundation of investigating phenomenon, models can also hinder the investigation because they can prevent researchers from “seeing it [the phenomenon] in a different, perhaps more fruitful light” (Phillips, 1996, p. 1012). Models can prevent researchers from investigating the phenomenon from outside the intellectual box of the model and cause researchers to adhere to the philosophical assumptions described in the model (Phillips, 1996).

Social science research and inquiry should also be shaped by mental models, a broader collection of inquiry (Phillips, 1996; Smith, 1997), which provides social science researchers with a more robust framework of investigation (Greene & Hall, 2010). A mental model includes “philosophical assumptions, substantive theories, experience, values, and beliefs” (Greene & Hall, 2010, p. 122). Phillips (1996) said mental models are the “assumptions, analogies, metaphors, or crude models that are held at the very outset of the researcher’s work...[, which] are present even before any theories or models have been constructed” (pp. 1008–1009). Understanding and regarding “philosophical assumptions of paradigms remains critically important to social scientific inquiry” (Greene & Hall, 2010, p. 122) because of their impact on societal decision making.

What one studies and how one makes sense of data and analysis results are also influenced by disciplinary ways of thinking; by the particular theories favored by

the inquirer; by life experience, both professional and personal; by the dynamics of the context; by political factors and personal values; and more. (Greene & Hall, 2010, p. 122).

Geertz (1973) said that, to build something, man needs a conception, idea, or formation of what the object or thing should look like, which can only be obtained from a symbolic source. Models are separated by “models of ‘reality’” and “models for ‘reality’” (Geertz, 1973, p. 93). A model ‘of’ reality is a ‘what is’ or conceptual model, essentially a graphical representation of physical relationships between concepts (Geertz, 1973).

What is stressed is the manipulation of symbol structures so as to bring them, more or less closely, into parallel with the pre-established nonsymbolic [*sic*] system as we grasp how dams work by developing a theory of hydraulics or constructing a flow chart. (Geertz, 1973, p. 93)

Whereas, a model ‘for’ reality is a ‘how-to’ or procedural model, essentially a description of a process or task and how to complete the task (Geertz, 1973).

What is stressed is the manipulation of the nonsymbolic [*sic*] systems in terms of the relationships expressed in the symbolic, as when we construct a dam according to the specifications implied in an [*sic*] hydraulic theory or the conclusions drawn from a flow chart. (Geertz, 1973, p. 93)

Writing model and theory development started as general and descriptive and has become more functional by defining and describing specific sub processes of writing and defining and describing the sub processes in the larger context of writing theories or

models (Alamargot & Chanquoy, 2001). Writing models are necessary because they help writing researchers focus on a specific element of writing while visualizing the larger complex system and providing an analytical definition of writing and the writing process (Alamargot & Chanquoy, 2001). “Apprehend[ing] all the [writing] dimensions, all the [writing] aspects[,] and all the [writing] elements of modelisations [*sic*] that have been, or that are currently, proposed” is difficult (Alamargot & Chanquoy, 2001, p. 27).

Problem Statement

A review of literature for this study did not reveal a conceptual model that adequately represents writing in the social sciences of agriculture. Without a conceptual model or a blue-print of writing in the social sciences of agriculture, teaching writing is hard. Educators have no guidance to inform the practice of using writing to augment critical thinking and create knowledge in the social sciences of agriculture. Yet, colleges of agriculture continuously emphasize that writing is a method of learning and developing students’ critical thinking skills. College administrators want faculty members to use writing to enhance critical thinking skills; however, a conceptual model that connects research with practice is needed.

Both the importance of writing in the applied social sciences and the desired outcome of students’ need to use writing as a method of improving critical thinking skills in the applied social sciences exist, but graphical representations, or pathways, of how to achieve the desired outcomes are limited. English composition theories and conceptual models are so far removed from the practical influence of writing that theoretical assumptions never quite develop into practical applications of writing.

Therefore, the questions remain, can age-old writing models be adapted, modified, and revised to fit the practical needs of the social sciences of agriculture, or does a new model need to be developed to represent the practicality of writing in the social sciences of agriculture?

Purpose/Objectives

The purpose of this study was to develop a model to augment critical thinking and create knowledge through writing in the social sciences of agriculture. Three research questions with multiple objectives guided this study:

1. What are the prominent theories and conceptual models of writing?
 - 1.1. Identify a set of theory evaluation criteria,
 - 1.2. Determine the description, inclusion and exclusion criteria, and typical and atypical exemplars for each evaluation criterion,
 - 1.3. Determine the most documented theories and conceptual models in writing,
 - 1.4. Review theories and conceptual models of writing,
 - 1.5. Evaluate theories and conceptual models of writing, and
 - 1.6. Summarize theories and conceptual models of writing.
2. What are the writing factors that augment critical thinking and create knowledge?, and
 - 2.1. Determine faculty members' perspectives on the writing factors that augment critical thinking and create knowledge using semi-structured interviews,
 - 2.2. Determine students' perspectives on the writing factors that augment

critical thinking and create knowledge using focus groups, and

2.3. Determine faculty members', students', and administrators' perspectives on the writing factors that augment critical thinking and create knowledge using Q-sort interviews.

3. What are the writing factors identified in the literature and through stakeholder interviews that contribute to a model of writing in the social sciences of agriculture?

3.1. Synthesize data from Research Questions 1 and 2 and

3.2. Develop a model for writing in the social sciences of agriculture.

Scope of the Study

In this study, I focused on writing in the social science departments—agricultural economics; agricultural leadership, education, and communications; and recreation, parks, and tourism sciences—in the College of Agriculture and Life Sciences at Texas A&M University. The agricultural communications program was excluded from Research Objectives 2 and 3 because agricultural communications students may have different understandings of writing because of the program's writing requirements. The scope of this study was limited to the social sciences of agriculture because of the broad scientific disciplines and the variety of writing contexts in agriculture at Texas A&M University.

Assumptions of the Study

The study did include contact with at least one faculty member and student in all three of the social science departments. Because each department was represented, an

assumption of this study is that all views and perspectives of writing in the social sciences in the College of Agriculture and Life Sciences at Texas A&M University were represented in this study. Also, it was assumed that the research study participants did have views and perspectives of writing in the social sciences of agriculture and cared about making the writing intensive course program better at Texas A&M University.

Limitations of the Study

The limitations of this study are that it was only conducted in the social sciences of agriculture at Texas A&M University; therefore, the findings cannot be generalized beyond the populations included in this study. Because of this, the study should be replicated in the bench sciences at Texas A&M University and in other colleges of agriculture across the country. Because the study was only conducted in the social sciences of agriculture, it cannot be assumed that the same writing factors augment critical thinking and create knowledge in the bench sciences of agriculture.

Also, because the study only included a limited number of faculty members in each social science department, the findings may not be exhaustive or completely representative of the faculty as a whole. The faculty members included in this study were considered experts in their field but not necessarily experts in writing. However, they were deemed credible by their peers to serve as experts pragmatically through teaching writing intensive courses.

Significance of the Study

In 2004, Texas A&M University implemented the writing intensive course program to combat the issue of graduates entering the workforce who were unable to

meet the communication needs of their industries. However, just implementing a writing intensive course program will not improve students' communication skills. Specific writing factors and methods of instruction can better augment critical thinking and create knowledge. Many students cannot walk into a classroom and be a communicator. Strong communication skills come at a price, and for some students, that price is hard work, long hours, and the completion of numerous writing tasks. For other students, that price is spending countless hours being mentored by a writing instructor or being tutored by colleagues and friends.

Little is known about the writing factors that create knowledge in the social sciences of agriculture; therefore, before students can become writers, research needs to be conducted on what factors help students become better writers. This study sought to determine what writing factors augment critical thinking and create knowledge, so that students not only learn the course content in a writing intensive course but that they also have an understanding of writing in their disciplines and an opportunity to improve their writing ability. The results of this study can be implemented in not only the social science departments in the College of Agriculture and Life Sciences at Texas A&M University but also in colleges of agriculture across the country, which would help produce generations of students who are prepared to meet the communication demands of their industries and to communicate about agriculture.

CHAPTER III

METHOD

This study was divided into three phases, and each phase was reported and analyzed using independent research methods. Not only were the data reported as separate sets of findings, but also the data from each phase of the study were synthesized and reported as a mixed- methods study (Greene & Hall, 2010), which was *a model to augment critical thinking and create knowledge through writing in the social sciences of agriculture*. Five methods were used to collect the data: qualitative theory evaluation, qualitative interviews, qualitative focus groups, Q-sort interviews, and modeling methods. Different research methods were needed to collect data because of the nature and complexity of the investigation.

Social science researchers should have a high respect for and consideration of the philosophical assumptions of research paradigms; however, social science research should be guided by more than just philosophical assumptions and understandings (Greene & Hall, 2010). McLeod (1992a) argued that quantitative research methods alone were not sufficient if the writing program evaluation included “not only students but also faculty, curriculum, and administrative structures” (p. 375). Using quantitative and qualitative research methods provided me with “different ways of looking at the world, different stances, different lenses through which we may examine phenomena” (McLeod, 1992a, p. 379). Therefore, the combination of qualitative and quantitative methods signified a mixed-method study (Greene & Hall, 2010).

Institutional Review Board

Before a study involving human subjects can be conducted, the study must be approved by the Institutional Review Board (IRB) to protect the human subjects involved. Texas A&M University's IRB reviewed and approved all documents that would involve human interaction with the researcher, which included recruitment letters, informed consents, interview protocols, researcher scripts, and demographic surveys. IRB granted approval (Protocol No. 2012-0121; Appendix A).

Research Question 1: What are the Prominent Theories and Conceptual Models of Writing?

For Research Question 1, which was guided by six objectives, I identified, reviewed, evaluated, and summarized the prominent theories and conceptual models of writing. I identified three prominent theories and seven conceptual models of writing. I reviewed and evaluated the writing theories and conceptual models from a qualitative perspective using Dudley-Brown's (1997) theory evaluation criteria; a qualitative coding (Saldaña, 2013) template to state the description, inclusion and exclusion evaluation criteria, and typical exemplars for each of Dudley-Brown's (1997) criterion; and my personal experience teaching and researching writing as the basis for my inquiry. Figure 1 is a graphical representation of the procedures used to address Research Question 1.

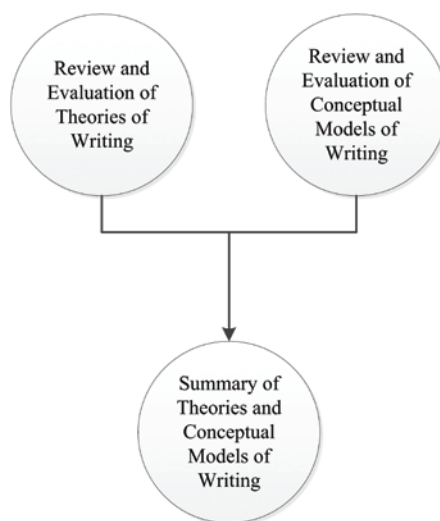


Figure 1. Procedural model of the research methods used to address Research Question 1

Although many criteria exist to evaluate frameworks (e.g., Kuhn, 1977; Laudan, 1977; Newton-Smith, 1981), I chose to use the pragmatic and methodical theory evaluation criteria proposed by Dudley-Brown in 1997 (Table 1; see Chapter II) because of its inclusion of theory evaluation literature and research. Her evaluation criteria provided me the opportunity to evaluate the concrete, explicit theories and the more abstract levels of the conceptual models using the rigor of theory evaluation. I modified Dudley-Brown's nursing theory evaluation criteria to meet the needs of this study. Many of the criteria were transferrable to other disciplines, but some points of the criteria were related directly to nursing. After establishing the evaluation criteria, I used a qualitative coding (Saldaña, 2013) template to state the description, inclusion and exclusion evaluation criteria, and typical exemplars for each of Dudley-Brown's (1997) criterion (Table 2).

Table 2

Descriptions, Inclusion and Exclusion Evaluation Criteria, and Typical Exemplars for each of Dudley-Brown's (1997) criterion

Criterion	Description	Inclusion Criteria	Exclusion Criteria	Typical Exemplars
Accuracy	True representation of writing, incorporating key characteristics and components of the writing process	Audience, critical thinking, content and discourse knowledge, context; author claimed	Transcription, technology	Contains the writing process (e.g., drafting, editing, revising, feedback, planning)
Consistency	Reliable, internally consistent, evidence of reliability	Clear and consistent language; logical order and connectedness; consistent terms, principles, and methods; clear definitions and concepts; coherent; author claimed	Inconsistencies	Uses the same language throughout (e.g., always uses 'generate' instead of using 'generate' on some occasions and 'to come up with' on others).

Table 2 Continued

Criterion	Description	Inclusion Criteria	Exclusion Criteria	Typical Exemplars
Fruitfulness	Exposes new feelings, phenomena, or unknown relationships; explains observable phenomenon; generates hypothesis; examines work that led to the theory or model; contains ideas for further development; addresses essential issues; shows significance of the research potential	Significance, revelation of new phenomena, problem-solving effectiveness, ability to procreate; author claimed	Contains ideas for further development	Does it have the potential for continued research, or are the research opportunities stagnant?
Simplicity/ Complexity	Depends on the number of phenomena, relationships, and concepts identified in the theory; consistent with its proposed simplicity or complexity	Easy to understand; simple or complex graphical representation; contains further explanation of hard-to-understand pieces; author claimed	Fields of study should have balance of simple and complex theories and models	Brings order to isolated, confused, and hard-to-understand phenomenon

Table 2 Continued

Criterion	Description	Inclusion Criteria	Exclusion Criteria	Typical Exemplars
Scope	Dependent on the phenomenon under observation and its context	Level of theory (grand, middle-ranging, substantive); focused on developing specific theories or models; broad (intertwine theory and conceptual framework/model or covering a significant number of related concepts and facts); author claimed	Covering specific information for its purpose	Grand, middle range, or substantive theories
Acceptability	Level to which researchers and professionals have adopted the theory or model; adoption in various contexts in a profession; acceptance by professionals in the discipline	Number of citations according to Google based on the time since publication (e.g., longer it has been in publication, the more citations it should have); critique with usefulness	Administration	Adaptability to use in practice (e.g., direction, applicability, generalizability, cost effectiveness, relevance); education (e.g., philosophical statements, objectives, concepts); and research (e.g., consistency, testability, predictability)

Table 2 Continued

Criterion	Description	Inclusion Criteria	Exclusion Criteria	Typical Exemplars
Socio-cultural Utility	Takes into account the beliefs, values, and expectations of cultures; theory transferability; goals and cultural value systems are consistent; significance of practice (makes a valued difference in the lives of its constituents)	Measured against the criteria of social utility according to the culture of proposal; models and theories adopted for writing in the Western culture may not be relevant to other cultures	Inconsistent among all cultures	Adaption of Western models and theories to Asian cultures

Next, I reviewed the literature to determine the most documented frameworks. I used Google Scholar, Texas A&M University library, and WorldCat.org to search for literature related to writing theories and conceptual models. My literature review yielded three theories and seven conceptual models that were consistent across writing literature. Therefore, I reviewed and evaluated three theories and seven conceptual models related to writing. After determining the most documented theories and conceptual models, I, further, reviewed the literature in attempt to locate the original theory or conceptual model reference. In most cases, I found the original theory or conceptual model and used that to establish my review and evaluation.

Because of the nature of the evaluation framework proposed by Dudley-Brown (1997) and qualitative research's nature of developing and building theory, I evaluated the writing theories and conceptual models from a qualitative perspective using Dudley-Brown's (1997) theory evaluation criteria; a qualitative coding (Saldaña, 2013) template to state the description, inclusion and exclusion evaluation criteria, and typical exemplars for each of Dudley-Brown's (1997) criterion; and my personal experience teaching and researching writing as the basis for my inquiry. "The qualitative analyst owns and is reflective about her or his own voice and perspective" (Patton, 2002, p. 41) as the data collector and interpreter (Merriam, 2009). A researcher's position helps the reader to clarify how and why the data were interpreted (Merriam, 2009).

I critically read and evaluated each theory, conceptual model, and its supporting literature while taking notes on a replica of Table 1. I sought to find criteria and examples that fit the criteria established by Dudley-Brown (1997). In some cases, the

framework authors stated the theory or conceptual model matched one of the criteria and provided an example. I documented this as well. After my critical evaluation of each theory and conceptual model, I formulated a narrative from my notes, which I developed using Table 1 and 2, and documented key characteristics for each particular framework as it related to Dudley-Brown's (1997) theory evaluation criteria.

Research Question 2: What are the Writing Factors that Augment Critical Thinking and Create Knowledge?

For Research Question 2, which was guided by three objectives, I used semi-structured interviews, focus groups, and Q-sort interviews to determine faculty members', students', and administrators' perspectives on the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. I used three methods of data collection to eliminate bias of research methods and establish triangulation. The data for Research Objective 2.3 were analyzed and reported as a mixed-method research design. I used the literature review and data collected from Research Question 1 to develop the semi-structured interview protocol used in Research Objective 2.1 and so on. Therefore, after each phase of the data collection, the data were used to develop and/or modify the data collection instruments for the next phase of the study. Each phase had independent research methods that are described below. Figure 2 is a graphical representation of the procedures used to address Research Question 2.



Figure 2. Procedural model of the research methods used to address Research Question 2

Qualitative research is conducted to better understand human reality through the eyes of the participant (Bradley, 1993). Participants within a specific context provide a concept of reality that only they can provide because of their participation in the lived experience (Bradley, 1993). Lindolf and Taylor (2011) described qualitative research methodologies as a way to explore phenomena. “Evaluability [*sic*] assessments often include interviews and focus groups with diverse program constituencies to determine how much consensus there is among various stakeholders about a program’s goals and intervention strategies and to identify where differences lie” (Patton, 2002, p. 164).

Qualitative research paradigms were chosen to build a foundation of research to better

understand writing in the social sciences of agriculture because no studies were found that investigated writing factors that augment critical thinking and create knowledge from the perspectives of faculty members, students, and administrators in colleges of agriculture.

Context of Study

Texas A&M University is a Tier 1 research university that enrolls more than 50,000 students pursuing bachelors, master's, and doctoral degrees. According to the Texas A&M University Office of Undergraduate Studies (2011), undergraduate students “will have acquired the knowledge and skills necessary to ... communicate effectively, including the ability to ... demonstrate effective writing skills” (para. 1). However, according to the 2011-2012 General Education Assessment Report published by the Texas A&M University Office of Institutional Assessment, the communications learning outcome is the only outcome that at least one achievement target was not met between 2008 and 2012. Therefore, a disconnect exists in the teaching of writing and students' ability to become better writers. The need to improve writing instruction as well as the lack of faculty members' awareness of students' writing weaknesses impacted the need for a study of this caliber in the Texas A&M University College of Agriculture and Life Sciences.

Research Objective 2.1: Determine Faculty Members' Perspectives about the Writing Factors that Augment Critical Thinking and Create Knowledge Using Semi-structured Interviews

Qualitative interviews were used to collect data about faculty members' perspectives of the writing factors that augment critical thinking and create knowledge in social sciences of agriculture. Farr (1981) claimed that research needs to begin with the practicality of teaching writing and that writing instructors should be a part of the research process and question development.

Interviews were conducted to understand faculty members' "experience, knowledge, and worldviews" (Lindolf & Taylor, 2011, p. 173) about the writing factors that augment critical thinking and create knowledge. Interviews provided a more in-depth way of looking at phenomena and caused the interviewees to think more critically about the phenomena under investigation (Hilgers et al., 1995). Interview questions were structured to elicit in-depth, expansive responses that provided a rich description of the writing intensive course phenomena (Hilgers et al., 1995). Interviews were a means of "gathering information about things or processes that cannot be observed effectively by other means" (Lindolf & Taylor, 2011, p. 173). Participants expressed their opinions and ideas through stories, accounts, and explanations during the interview process. Specifically, informant interviews were used for this study because informants provide the researcher with insight of a specific scene or setting and act as gatekeepers of information (Lindolf & Taylor, 2011). Interview questions were developed based on my concerns as a writing instructor and researcher, a review of literature, and theories and conceptual models of writing. The interview questions and protocol were tested in a pilot

study interview and revised and modified based on that interview (Hilgers et al., 1995). The pilot study data were used in this study. Additionally, the interview protocol was revised as necessary after each interview.

Sampling. Purposive sampling was used to do an in-depth study of “sample of information-rich cases” (Wiersma & Jurs, 2005, p. 312), and participants were “selected because the data they can provide are relevant to the research problem” (p. 312). Faculty members who taught a writing intensive course during the fall 2011 and spring 2012 semesters were selected because they had taught a writing intensive course recently. They were identified using the Texas A&M University course registration system. Within that system, an advanced class lookup was conducted, and courses were searched based on the attribute type of *University Required-Writing Intensive*. Additionally, the search was limited to the social sciences of agriculture because of the faculty members work with the institution of human society as it relates to agriculture. The search yielded 22 faculty members’ names. One faculty member was pulled from the population because of the absence of contact information. I randomly selected faculty members from the sub sample because Wiersma and Jurs (2005) recommended randomly sampling the purposive sample if the purposeful number exceeded the number of interviews that need to be conducted. Faculty members were identified using a simple random sample (Wiersma & Jurs, 2005) of the sub sample. I emailed or spoke to 12 faculty members to ensure at least eight would participate in the study (Appendix B). The faculty members included in this study were considered experts in their field but not necessarily experts in writing. However, they were deemed credible by their peers to

serve as experts pragmatically through teaching writing intensive courses.

Data collection. Faculty member interviews were set up and conducted between April 2012 and December 2012 with eight faculty members. The point of data saturation was reached because the eighth interviewee generated no new data (Baker & Edwards, 2012). I determined the faculty members' rank and academic home from the information provided by Texas A&M University. During the interview, faculty members were asked about the writing intensive courses they teach or have taught at Texas A&M University. Each faculty member was assigned a code to maintain confidentiality. The code included a descriptor (NNT = non-tenure track; TT = tenure track) and a unique number. The academic home of the faculty member or level of professorship was not included in the code descriptor to ensure confidentiality. The faculty members were coded as non-tenure track and tenure track because the expectation and teaching responsibilities are different for the two groups. Therefore, the perspectives on teaching writing and the level of involvement with their students could be evidenced in the study's results.

Interviews were conducted in the College of Agriculture and Life Sciences at the respective faculty members' offices. The interviews lasted an average of 35 minutes. Prior to the beginning of the interview, I asked the faculty members if the conversation could be recorded and asked them to sign a consent form (Appendix C). No faculty members declined to be recorded. Faculty members were encouraged to express themselves during the interview because the data would be kept confidential and transcribed using codes. Faculty members were reminded that they could decline to answer a question at any time. I used a semi-structured interview protocol (Appendix D)

and prepared an interview guide in advance. Questions in the interview guide focused on the faculty members' definition of writing intensive courses, description of writing intensive courses in their discipline, experience as a writing intensive course instructor, and perspectives of writing factors that augment critical thinking and create knowledge.

Data analysis. I transcribed, coded, and analyzed the recorded interviews using qualitative research procedures recommended by Lindolf and Taylor (2011). I used an open coding technique to code the interview transcripts (Strauss, 1987). I first read the transcripts, and then I coded and categorized the data based on the research questions. In stage two, I reconciled the categories, codes, and sub codes. After coding the transcripts, I compared the interviews for similarities and differences and developed themes.

Credibility and trustworthiness. Triangulation was achieved through interviews, field notes, my reflective journal, and data collection using other research methods with similar populations because “the use of multiple forms of evidence can bring us closer to a ‘true’ representation of the world” (Lindolf & Taylor, 2011, p. 274). A thick description of the data and exemplars was used as a framework for the narrative (Lindolf & Taylor, 2011). I kept an audit trail of initial analyses, definitions of codes and categories, field notes, and coded samples to maintain dependability (Lincoln & Guba, 1985).

In addition, during the spring and summer 2012 semesters, I kept a reflective journal about my experience as a writing intensive course instructor and reflected back on the experience as I analyzed the findings. “The qualitative analyst owns and is reflective about her or his own voice and perspective” (Patton, 2002, p. 41) as the data

collector and interpreter (Merriam, 2009). A researcher's position helps the reader to clarify how and why the data were interpreted (Merriam, 2009). I collected and analyzed the data based on my experience teaching two sections of AGCJ 203 Media Writing I. I balanced teaching, research, and graduate student responsibilities while maintaining the grading requirements and demands of teaching a writing intensive course. Although I have experience teaching writing, unlike some of the faculty members I interviewed, I did feel the stress of balancing my responsibilities with the increased demand of grading and teaching an essential life skill. Patton (2002) stated a strength of naturalistic qualitative research is that a researcher is part of the phenomena being investigated so the situation can be better understood. My experience helped me to understand the faculty members' perceptions of being a writing intensive course instructor. I used this study to describe and clarify my assumptions (Merriam, 2009) about the demands and uncertainties of being a writing intensive course instructor, which were supported by data collected from interviews with faculty members.

Research Objective 2.2: Determine Students' Perspectives about the Writing Factors that Augment Critical Thinking and Create Knowledge Using Focus Groups

Qualitative focus groups were used to collect data about students' perspectives of the writing factors that augment critical thinking and create knowledge in the social sciences in agriculture. Focus groups are a nondirective form of interviewing that redirects the attention to the respondent and "promotes self-disclosure among participants" (Krueger & Casey, 2000, p. 7). Researchers conduct focus groups to gain an understanding of ideas and perceptions related to a specific topic that only the

selected group of participants can provide (Krueger & Casey, 2000). Focus groups “reveal aspects of experiences and perspectives that would be not as accessible without group interaction” (Morgan, 1997, p. 20). In focus groups, young participants will more openly share “comments and experiences that may not be shared during one-on-one interviews because of the natural, extended interaction that takes place among participants” (Myers, Jahn, Gailliard, & Stoltzfus, 2011, p. 94). Hilgers et al. (1995) believed a lack of qualitative research exists that explores students’ perspectives on and experiences in writing intensive courses and instruction. Additionally, the research base related to writing intensive course requirements and writing factors that augment critical thinking and create knowledge in the social sciences of agriculture is limited.

Barbour (2007) recommended focus groups be used in the exploratory process of a mixed-methods study because the researcher can collect a large amount of information from multiple participants at a particular time. Additionally, Tapper (2004) stated self-reports were a sufficient way to explore and investigate students’ academic performance. Data collected from focus groups can be used to develop questionnaire constructs and hypotheses (Barbour, 2007). Focus groups should be done “to learn things that can guide one’s work, not determine it” (Morgan, 1997, p. 27). Doing focus groups helps the researcher gather information for each construct of a questionnaire (Morgan, 1997). Morgan (1997) said not only can focus groups help in instrument development, but also they can help reduce error in instrument development by identifying specific areas of the topic under investigation, producing statements that adequately cover the topic, and choosing adequate wording for statements that relate to the audience under investigation.

Developing the wording of the instrument using the responses from the focus groups improves both instrument reliability and validity (Morgan, 1997). Therefore, because the data collected from this study were used to develop the Q-sort statements for the third phase of the research study, I concluded that focus groups were an ideal method of investigation. I chose a single-category design focus group because the participants were homogenous and I did not have more than one type of group to compare and contrast (Krueger & Casey, 2000).

Sampling. I contacted the academic advisors in each of the social science departments to obtain a list of senior students who had completed at least one of their writing intensive courses at Texas A&M University and were in good standing with the university. I was unsuccessful in obtaining the list from all departments, but I requested a list of U4 students (students who have completed at least 95 credit hours) from the departments, which was successful. I sent an email outlining the study to all U4 students in the social science departments, and only three students responded to the email. Because the prior approach yielded unsuccessful results, I used a purposive sample to obtain participants. Participants were recruited using email and face-to-face methods.

The students had to meet a set of criteria to be part of the purposive sample. They had to have completed at least one writing intensive course, have a graduation date between May 2012 and May 2014, and be a student in one of the three social science departments. If the students had completed their writing intensive courses at another institution, they could not participate in the study because they could not provide an accurate account of their experience at Texas A&M University. Agricultural

communications students were eliminated from the population because writing is the core component of the agricultural communications program. I concluded that agricultural communications students have completed more writing courses in their program than students in other programs. Writing intensive courses in agricultural communications require students to do the same amount of writing now as they did before the writing intensive course requirements were instated in 2004 by the Texas A&M University Faculty Senate. However, the writing requirements of students enrolled in writing intensive courses in other programs have changed since 2004; courses in other programs were completely restructured to adapt to the writing intensive course requirements.

Students selected for the focus groups shared the common experience of completing their writing intensive course requirements at Texas A&M University, which sharing a common experience was described by Krueger and Casey (2000) as a necessity of focus groups. Because the focus groups were comprised of students who represented three departments, I chose to do three focus groups. However, the focus groups were homogeneous because they included only students who had completed their writing intensive course requirements and heterogeneous because they included representatives from each social science department. Krueger and Casey (2000) recommended conducting focus groups with five to 10 participants. Once the focus group participants were identified and they agreed to participate, I sent a follow-up email thanking them for agreeing to participate and reminding them of the date, time, and location of the focus group. The day before the specified day of the focus group I emailed the participants and

reminded them again (Krueger & Casey, 2000). Students were offered a \$10 Starbucks® gift card for participating in the study (Dillman, Smyth, & Christian, 2009).

Data collection. Student focus groups were completed in January 2013 with those students who attended the focus group. Focus group one had six students, focus group two had six students, and focus group three had three students. Only three focus groups were conducted because data saturation was achieved (Krueger & Casey, 2000). Prior to starting the focus groups, I asked the students to complete a consent form (Appendix F) and a short demographic questionnaire that included gender, major, expected graduation, and course numbers of the writing intensive courses they had taken (see table on p. 182).

Focus groups were conducted in a conference room on the second floor of the Agriculture and Life Sciences Building. As Krueger and Casey (2000) recommended, a moderator and an assistant moderator conducted the focus groups. A current master's student in the Department of Agricultural Leadership, Education, and Communications served as the moderator of the focus groups, and I served as the assistant moderator. The focus groups averaged 65 minutes. Prior to the beginning of the focus groups, students were told that I would take notes about the dialogue and interaction of the participants. Students were encouraged to express themselves during the interview because the data would be kept confidential. The moderator asked the students not to share the focus group discussion with anyone to ensure confidentiality of the participants. Additionally, students were reminded that they could decline to answer any question at any time. The moderator told the students that the goal of the focus group was not to reach consensus

but rather to understand the students' experiences in the writing intensive course program and feelings about the writing factors that augment critical thinking and create knowledge (Krueger & Casey, 2000). The students were encouraged to share their experiences even if they were different from the other participants in the focus group. The data collection instrument was developed using prior research (literature review, Research Question 1, and Research Objective 2.1) and input from experts, and it contained open-ended, reflective questions (Krueger & Casey, 2000). Questions in the focus group focused on students' definition of a writing intensive course, description of the writing intensive courses in their discipline, experiences in the writing intensive course program, and perspectives of writing factors that augment critical thinking and create knowledge.

Data analysis. I transcribed, coded, and analyzed the focus group data based on the procedures recommended by Krueger and Casey (2000) and Lindolf and Taylor (2011). Focus group analysis is a continuous process that begins with the first focus group and continues through the duration of the data collection and analysis (Krueger & Casey, 2000). After each focus group, the moderator and I debriefed and revised the interview protocol as necessary (Appendix G). I transcribed the focus group data before moving on to the next group, so the groups could be continuously analyzed and compared (Krueger & Casey, 2000). I developed an abridged transcript after each focus group to capture the essence of the conversation. I captured the conversation through note taking, and the notes were analyzed after each focus group (Krueger & Casey, 2000). The data were analyzed using the Krueger and Casey's (2000) long-table

approach. I grouped the participants' statements and comments according to themes that emerged from the focus group data (Krueger & Casey, 2000). The data were inductively analyzed to gain "understanding based on the discussion as opposed to testing a preconceived hypothesis or theory" (Krueger & Casey, 2000, p. 12).

Credibility and trustworthiness. Triangulation was achieved through focus groups, moderator and assistant moderator dialogue, field notes, Chickering and Reisser's (1993) theoretical paradigm, and data collection using other research methods with similar populations. "The use of multiple forms of evidence can bring us closer to a 'true' representation of the world (Lindolf & Taylor, 2011, p. 274). Each question and students' comments and statements were used as a framework for the narrative (Krueger & Casey, 2000). I kept an audit trail of initial analyses, field notes, and exemplars to maintain dependability (Lincoln & Guba, 1985).

Research Objective 2.3: Determine Faculty Members', Students', and Administrators' Perspectives about the Writing Factors that Augment Critical Thinking and Create Knowledge Using Q-sort Interviews

The third research objective for phase two of this study was conducted using a mixed-methods research design because Ruth and Murphy (1988) stated researchers (Connors, 1983; Farr, 1981) agreed that new ways to study composition needed to be adopted. Researchers should use mixed methods to gather different kinds of data and to strengthen a study (Greene & Caracelli, 1997). "Various methods are linked to different inquiry paradigms[,]...and each paradigm offers a meaningful and legitimate way of knowing and understanding" (p. 7). The purpose of mixed-method inquiry is to use different research methods "to understand fully, to generate deeper and broader insights,

to develop important knowledge claims that respect a wider range of interests and perspectives” (Greene & Caracelli, 1997, p. 7). Methods are “carriers of different paradigm elements that—when combined—enable us to see our data in enriched and new ways” (Riggin, 1997, p. 87).

Writing instruction is a complex line of inquiry. Greene and Caracelli (1997) stated using multiple paradigms of research methods is important in understanding social complexities. “Given the inherent complexity of social scientific problems—especially applied problems of the field...—what will work best is often a combination of different methods” (Greene & Caracelli, 1997, p. 8). The pragmatic stance is one stance on mixing research methods (Greene & Caracelli, 1997). Pragmatic, as postulated by Datta (1997), indicates that “*the essential criteria for making decisions are practical, contextually responsive, and consequential*” (p. 34). Pragmatists agree that philosophical differences exist between paradigms of inquiry. Because “philosophical assumptions are logically independent” (p. 9), methods can be mixed and matched to attain the highest level of inquiry to investigate the social scientific problem (Greene & Caracelli, 1997).

Two classes of mixed-methods research exist: component and integrated (Caracelli & Greene, 1997). In mixed-method component designs, methods are combined at interpretation and conclusion. Within the component design is three specific designs: triangulation, complementarity, and expansion. One reason for this mixed-method study was to establish triangulation using a combination of inquiry paradigms, which serves as a way to “minimize study biases that derive from inherent design weaknesses” (Caracelli & Greene, 1997, p. 23). Q methodology was selected as the best

method for this study to achieve a mixed-method research design (Newman & Ramlo, 2010) because of its ability to measure human subjectivity (Brown, 1993; McKeown & Thomas, 1988). Additionally, it uses both qualitative (interviews) and quantitative (Q methods) analyses to better develop an understanding of an individual's point of view about a given subject (Tuler, Webler, & Finson, 2005).

William Stephenson developed Q methodology in 1935 to systematically study human subjectivity as it relates to communication, psychology, political science, health, and environmental sciences (Brown, 1993). Q methodology provides researchers a way to systematically analyze individual experiences (McKeown & Thomas, 1988) and “the phenomenological world of the individual (or small numbers of individuals) without sacrificing the power of statistical analysis” (Stephen, 1985, p. 193). It is “a systematic and rigorously quantitative means for examining human subjectivity” (McKeown & Thomas, 1988, p. 7). Q methodology, at its simplest, adds to and increases the power of qualitative data (Shemmings, 2006; Watts & Stenner, 2005). However, the complexity of Q methodology is that it is similar to R methods (traditional correlation research methods) in that it uses factor analysis techniques (Shemmings, 2006; Stephenson, 1935; Watts & Stenner, 2005).

Q methodology is different from traditional factor analysis (or traditional “r” correlation coefficient) in that “Q methodology makes no psychometric claims” (Watts & Stenner, 2005, p. 68) about data gathered from a scale-based questionnaire or survey. Stephenson (1935) differentiated the two types of methods: R methods (the use of tests to measure people) and Q methods (the use of people to measure tests or statements). Q

method is the correlation of people and not tests (Stephenson, 1935). “The method employs a by-person factor analysis in order to identify *groups of participants* who make sense of (who hence Q ‘sort’) a pool of items in comparable ways” (Watts & Stenner, 2005, p. 68).

According to Tuler et al. (2005) and Watts and Stenner (2005), an advantage of Q methodology is, if the researcher is careful in choosing the participants, only a small number of participants are needed because the participants are the variables in the study and not the population. The sample under investigation in Q method studies is the viewpoints of the people and not the people themselves. The population is the collection of comments and ideas that have been made and developed about the topic under investigation (Tuler et al., 2005). “By inquiring of people with unique points of view, Q researchers can reveal patterns in how elements of perspectives are related” (Tuler et al., 2005, p. 250).

Watts and Stenner (2005) stated participants in Q method studies rank each statement compared to the other statements included in the Q sort; the statements are not evaluated independently. When using Q methodology, the researcher does not establish meaning *a priori* as the R method researcher does when using questionnaires and surveys. Rather, Q methodology gives the participant freedom in deciding what is meaningful and what is not based on his or her perception of the phenomena (Watts & Stenner, 2005) and “aims to accurately reproduce an individual’s views in a manner consistent with his/her own experience” (Stephen, 1985, p. 205).

Selection of research participants. The research participants in Q methodology are referred to as the P set. Members of the P set should be selected based on the different perspectives or viewpoints they represent (Tuler et al., 2005). The P set for this study included 10 individuals, four females and six males, who have or have had, since its inception in 2004, a direct involvement in the writing intensive course program at Texas A&M University. Of the 10 participants, four were students in the College of Agriculture and Life Sciences, three were faculty members in the College of Agriculture and Life Sciences, and three were former or current administrators in the College of Agriculture and Life Sciences at Texas A&M University. Webler, Danielson, and Tuler (2009) recommended having three to four persons representing each perspective/viewpoint. P-set members were purposefully chosen (Wiersma & Jurs, 2005) based on the needs of this study, their past or current experience with the writing intensive course program, and their unique perspectives on the writing factors that augment critical thinking and create knowledge. Each participant received a unique identifying number (e.g., S01 = first student to participate in the Q sort; F01 = first faculty member to participate in the Q sort; A01 = first administrator to participate in the Q sort).

The students included in the P set were chosen as a population for the study because of their direct experience in the writing intensive course program. Students do not typically have the opportunity to evaluate a course except through course evaluations at the end of the semester (Hilgers et al., 1995). Therefore, it is important that they have the opportunity to think critically and evaluate their experiences as students in the

writing intensive course program. To obtain students for this study, I contacted the academic advisors in each of the three departments to obtain a list of senior students who had completed at least one of their writing intensive courses at Texas A&M University and were in good standing with the university. I was unsuccessful in obtaining the list from all departments, but I personally visited each department to request a list of its U4 students, which was successful. I sent an email (Appendix H), which outlined the study, to all U4 students in the three departments, and no one responded to the email. Because the prior approach yielded unsuccessful results, I used a purposive sample to obtain participants.

Participants were recruited using email and face-to-face methods. The students had to meet a set of criteria to be part of the purposive sample. They had to have completed at least one writing intensive course, have a graduation date between May 2013 and May 2014, and be a major in one of the three social science departments. If the students had completed their writing intensive courses at another institution, they could not participate in the study because they could not provide an accurate account of their experience at Texas A&M University. Agricultural communications students were eliminated from the population because writing is the core component of their program. Based on my experience as an agricultural communications writing intensive course instructor, I concluded that the agricultural communications students have completed more writing courses in their program than students in other programs. Agricultural communications students in writing intensive courses are required to do the same amount of writing now as they did before the writing intensive course requirements were

instated by the Texas A&M University Faculty Senate in 2004 (University Writing Center, 2013a). However, the writing requirements of students enrolled in writing intensive courses in other programs have changed since 2004. Courses in other programs were completely restructured to adapt to the writing intensive course requirements.

The faculty members included in the P set were purposefully chosen based on their experience teaching writing intensive courses in the three social science departments in the College of Agriculture and Life Sciences. To select the faculty member participants, I set the following criteria: taught one or more writing intensive courses since 2009, be a faculty member or graduate student in one of the three social science departments, and was not a faculty member in agricultural communications. Because the search criteria yielded more than three participants, I conducted a simple random sample of the sub sample to narrow the participant number. I sent an email (Appendix H) to nine faculty members and graduate students and four replied to my email saying they would participate. Only three followed through and set up interview times to conduct the Q sort.

The administration P set of the study were chosen because of their current or former administrative positions in the College of Agriculture and Life Sciences and their role in the planning, development, implementation, management, and evaluation stages of the program. I met with the associate department head of undergraduate programs in Department of Agriculture Leadership, Education, and Communications to determine the most suitable administrators for the Q sort. Five names were generated from this

conversation. I sent the selected participants an email (Appendix H), and three agreed to participate.

The members of these specific groups were selected to better understand their individual points of view and subjectivity (Brown, 1980) as it relates to writing in the social sciences of agriculture because each participant has a unique stakeholder perspective. Each participant was approached either in person or via email about participating in the study. In both instances, I described the study to the participant, how he or she was selected to participate, and the process of Q methodology. Each participant was asked to sign a consent form (Appendix I) if he or she agreed to participate. I set an appointment with each member of the P set to conduct the Q sort in person (van Exel & de Graaf, 2005), so I could take field notes and observe during the interview.

Instrument development. As proposed by Stephen (1985), I developed the concourse—which is all possible perceptions, opinions, or beliefs about a topic (Brown, 1993)—using a review of literature (Lynne, 2004), eight naturalistic interviews with faculty members in the social science departments in the College of Agriculture and Life Sciences, and three focus groups with students in the social science departments in the College of Agriculture and Life Sciences. Interviews and focus groups were conducted in person on the campus of Texas A&M University and were part of a larger study: *A model to augment critical thinking and create knowledge through writing in the social sciences of agriculture*. The ideas and claims collected from the interviews and focus groups were used in the development of the concourse, and the information included in the concourse served as the raw data for the Q-set statements (Brown, 1993; Tuler et al.,

2005). The Q set is the group of statements that the P set was asked to rank-order according to its viewpoints (McKeown & Thomas, 1988) on writing factors that augment critical thinking and create knowledge in the social sciences of agriculture.

Selecting the Q set from the concourse is as important and demanding as constructing and developing the items in a quantitative scale (Stephen, 1985). Each statement represents a unique element of the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. I sought to make the statements as inclusive as possible to represent all perspectives of writing (Tuler et al., 2005). Webler et al. (2009) recommended determining the number of perspectives on a topic before defining the number of statements to be used in the study. I, with the help of my committee co-chairs, determined there were three perspectives about writing intensive courses: students, faculty members, and administrators. Therefore, for three perspectives, Webler et al. (2009) recommended 36 statements. Stephen (1985) recommended 55 to 75 statements because too many statements may get the participants tired and overwhelmed with the sorting process. Because of the shape and structure of the form board, I used 37 statements to represent the Q set (Table 3). I organized the statements by the elements of writing, which I identified through a review of literature, interviews with faculty members, and focus groups with students: audience, critical thinking, context, feedback, mechanics, resources, social context, and writing task. Within each element, I sought to achieve heterogeneity so that all beliefs and opinions about the specific category were included. I generated 58 statements before combining similar statements and condensing the list to 37 statements. After choosing the

statements, I developed the forced-choice, Q-sort distribution (Stephen, 1985; Tuler et al., 2005) form board (see Figure 3) for the participants to sort the cards from the Q set according to the statements that were most like or unlike their beliefs and opinions. The steep middle of the normal distribution gives the participants “room for ambiguity, indecisiveness[,] or error” (van Exel & de Graaf, 2005, p. 6). The factors revealed during the process are representative of the views, opinions, and beliefs of the specific group of people (Brown, 1980).

Table 3

Q-set Statements

Statement #	Statement
1	Help from the instructor should be available and students should take advantage of it.
2	Writing elicits emotions.
3	Strong writers should tailor what is written to their audience.
4	Strong writers should know when to write a lot and when to condense information.
5	Rubrics benefit student writers.
6	Writing is subjective and a more trial by fire approach.
7	Grammar is critically important.
8	Content is critically important.
9	Research increases challenge in a writing intensive course.
10	Students should be given real-world assignments in their disciplines because they will have the necessary topic knowledge.
11	Writing is a chore.
12	Writing should be concrete and applied.
13	Writing augments critical thinking.

Table 3 Continued

Statement #	Statement
14	Many short related written assignments that require data gathering and analysis improve critical thinking skills.
15	Writing intensive courses should be 200-level courses.
16	Writing intensive courses should be 400-level courses.
17	Examples of well-written work help students become better writers.
18	Well-written examples discourage student critical thinking and creativity.
19	Writing should be reflective.
20	Peer review activities promote writing and critical thinking skills.
21	Using writing to apply relevant information to evaluate a problem promotes critical thinking.
22	Writing is a product of critical thinking.
23	Critical thinking is a product of writing.
24	Good research leads to well-thought-out, well-articulated prose.
25	Writing labs support student writing efforts.
26	Lots of writing practice is what students need throughout the four years of their college education.
27	Societal knowledge is a key component of the writing process.
28	Taking a position and making an argument is critical thinking.
29	Writing is the development of clear thoughts and the window to the brain.
30	Timely instructor feedback is critical.
31	Writing is about understanding how things fit together.
32	Writing is important, but writing intensive courses are not.
33	Reading is critical to writing success.
34	Writing is a process.
35	Writing is a stream of consciousness.
36	Writing instructors are coaches and facilitators.
37	Writing instructors are critics and proofreaders.

Q sort. The Q sort is the participant's interpretation and rank of the statements included in the Q set (Stephen, 1985). Brown (1980) described the Q-sort process as "the technical means whereby data are obtained for factoring" (p. 17). Data were collected from the Q sort in February 2013. Each Q sort took approximately 45 minutes, which varied based on the participant's interaction with me during the Q sort. Each statement identified in the Q sample was printed on a small 2 x 2 inch piece of cardstock, and 37 statements comprised the final Q set. I asked the students in the P set to complete a demographics questionnaire (Appendix M) before they started the Q sort. I did not collect demographics on the faculty members or administrators because I could obtain their demographic information using the Texas A&M University website. I presented the cards to the participants to begin the Q-sort process and then provided each participant with a condition of instruction statement (Appendix J) about the context that the participant should sort and interpret the statements (Tuler et al., 2005). The condition of instruction statement was *What writing factors do you believe augment critical thinking and create knowledge in the social sciences in the College of Agriculture and Life Sciences?* The condition of instruction statement was developed to encourage the participants to think critically about their perspectives of the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. I aimed for the participants to sort the Q set based on their personal experiences with writing education and the writing intensive course requirement at Texas A&M University.

After reading the condition of instruction statement, as recommended by McKeown and Thomas (1988) and Tuler et al. (2005), I asked the participants to read

through the cards and become familiar with the statements. Once the participants had become familiar with the statements, they were instructed to sort the cards into three piles based on their beliefs about the statement: (1) statements they agreed with on the right, (2) statements they disagreed with on the left, and (3) statements they neither agreed nor disagreed with but felt neutral about in the middle. After the participants sorted the cards into piles, they distributed the cards on the form board (Baker & Montgomery, 2012; Krysher, 2010; Tuler et al., 2005), which had a distribution range of nine columns ranging from -4 to +4 (see Figure 3). I asked the participants to identify the most important statements and place them on the extreme right (+4), identify the least important statements and place them on the extreme left (-4; Baker & Montgomery, 2012; Krysher, 2010; Tuler et al., 2005; Watts & Stenner, 2005), and identify the neutral statements that they neither agreed or disagreed with and place them in the middle (Webler et al., 2009). The participants continued the process moving back and forth from the right to the left until the distribution was completed with the middle being the last part of the distribution to complete. The statements that fell in the middle were not viewed as irrelevant or unimportant (Tuler et al., 2005).

After the participant completed the form board, I recorded the responses on to a response sheet for data analysis (Appendix L), which I checked for accuracy. I sat with each participant while he/she sorted the statements to take notes during the sorting activity, to encourage the participant to talk about his or her experience and ideas, and to observe the participant sorting the Q sample (Baker & Montgomery, 2012; Watts & Stenner, 2005). “[A] completed Q sort indicates only that a set of items have been

differentially valued by a specific participant according to some face valid and subjective criterion” (Watts & Stenner, 2005, p. 69).

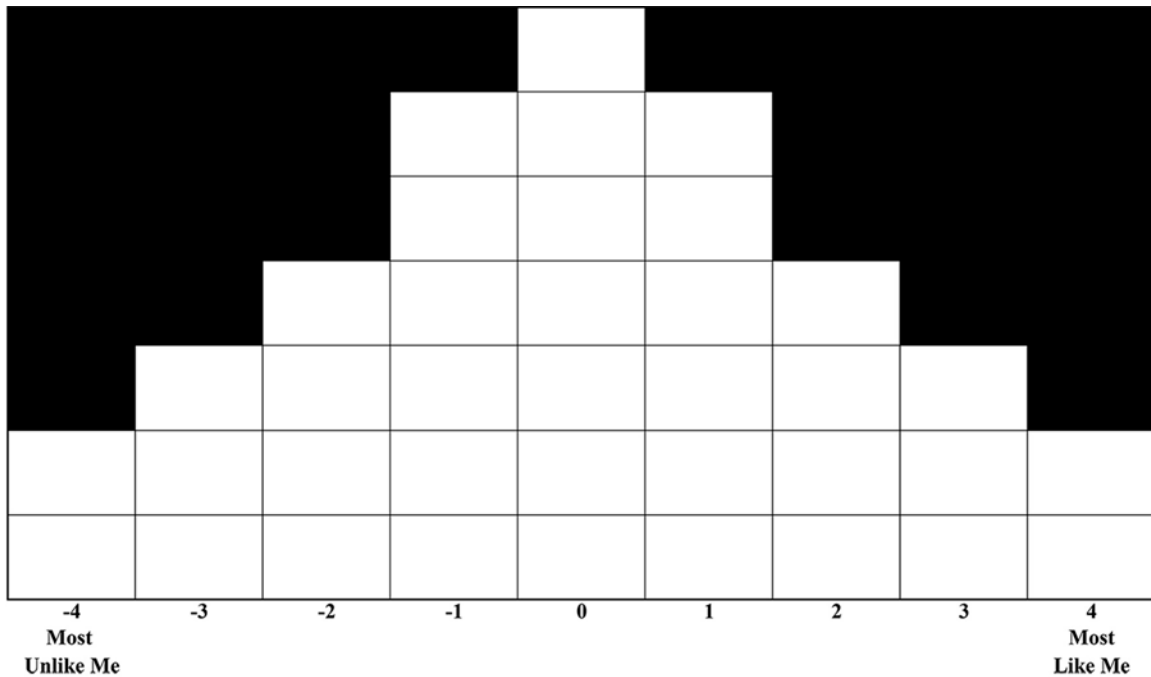


Figure 3. Q-sort Form Board

Data analysis. “The analysis of the Q sorts is a purely technical, objective procedure—and[,] therefore[,] sometimes referred to as the scientific base of Q” (van Exel & de Graaf, 2005, p. 8). The data collected from the 10 Q sorts were analyzed using PQmethod 2.32, which was downloaded from qmethod.org. I conducted three statistical procedures as part of the analysis: a correlation matrix of Q sorts, factor analysis of the correlation of Q sorts, and the calculation of factor and difference scores (Baker & Montgomery, 2012; Krysher, 2010; McKeown & Thomas, 1988; Shemmings, 2006; van

Exel & de Graaf, 2005). A frequent concern related to factor analysis is adequacy of sample. Typically, Kaiser-Meyer-Olkin is used to verify the sampling adequacy for the analysis (Field, 2009). Unlike typical factor analysis, Q methodology is not dependent on sampling adequacy because the number in the P set can still be low and yield the same results (McKeown & Thomas, 1988). Therefore, KMO values will not be reported. In addition to the factor analysis, I used the notes I collected during each Q-sort interview to add a deeper interpretation of the statistical data and to establish triangulation of the results, which eliminated researcher bias because the P set served as additional interpreters of the findings.

Correlation coefficients. As part of the Q sort, each participant rank-ordered a set of statements according to his/her internal perspectives about the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. Because the Q methodology is based on the “relationship between cases,” (Stephen, 1985, p. 200), a correlation matrix is first constructed to represent the correlation coefficients and similarities of the Q-sort patterns (Krysher, 2010). The analysis yielded a 10 x 10 correlation matrix (Appendix N). A high, positive correlation represents the participants’ similarities of internal viewpoints, opinions, and beliefs, and a low or negative correlation represents the dissimilarities of internal viewpoints, opinions, and beliefs (Krysher, 2010; Shemmings, 2006; van Exel & de Graaf, 2005).

Factor model. Next, a factor analysis of the correlation matrix was completed. PQMethod 2.32 gives the researcher two options to perform the factor analysis: centroid factor analysis and principal components analysis (PCA). Although different factor

analyses exist, the results of those analyses seldom differ (Brown, 1980). McKeown and Thomas (1988) stated PCA is a mathematically defined and precise way to factor the Q-sort correlation matrix; therefore, the researcher chose the PCA as the factor analysis model for this study. “Principal component analysis [PCA] is concerned only with establishing which linear components exist within the data and how the particular variable might contribute to that component” (Field, 2009, p. 638).

Unlike R methods, participants in the Q method classify themselves when expressing their viewpoints, which results in the factors (Brown, 1980). Using PCA in PQMethod 2.32, the data yielded eight factors, which resulted in a PCA unrotated factor matrix (Appendix O). According to Field (2009), factor analysis is “identifying groups or clusters of variables ... to reduce a data set to a more manageable size while retaining as much of the original information as possible” (p. 628). Before a researcher can conduct a factor rotation, he or she must decide what factors to retain.

Factor retention. Much debate exists about the criteria needed to determine factor retention and the statistical significance of a factor (Field, 2009). McKeown and Thomas (1988) claimed that retaining methods are not straightforward and both statistical and theoretical bases should be deliberated before making a decision. “[C]ommon sense offers the best counsel when determining the importance of factors ... their contextual significance in light of the problems, purposes, and theoretical issues in the research project” (McKeown & Thomas, 1988, p. 52).

However, the most statistically common method for determining factor retention is analyzing each factor’s eigenvalue, its squared factor loadings sum (Brown, 1980;

McKeown & Thomas, 1988). The eigenvalue is the “substantive importance of that factor” (Field, 2009, p. 639). The researcher used the PQMethod software to determine the eigenvalue of each original factor. McKeown and Thomas (1988) recommended that, for an eigenvalue to be significant, it should be greater than or equal to 1.00; therefore, if the eigenvalue is less than 1.00, it should be rejected because it is considered weak. Although eigenvalues are a preferred method of determining the statistical significant factors in a study, the statistical procedure can sometimes overlook theoretically important factors or determine factors significant that are without meaning (McKeown & Thomas, 1988). “Any extracted factor should be highly significant in a statistical sense” (Gorsuch, 1983). I analyzed the factors and determined that, although Factor 5 had an eigenvalue of 0.8662, it contained three significant loadings and a higher explanation of variance than Factors 3 and 4 did. Therefore, I retained Factors 1, 2, and 5 and discarded Factors 3, 4, 6, 7, and 8.

Factor rotation. I rotated the three factors to a terminal factor solution. Leaving the factors in original form—with both high loadings and low loadings scattered—makes factor interpretation difficult (Field, 2009). “Factor rotation effectively rotates these factor axes such that variables are loaded maximally to only one factor” (Field, 2009, p. 642) to simplify the data into a more clear structure according to high and low loadings (McKeown & Thomas, 1988). In the end, each factor served as an interpretation of the characteristics that comprised the factor (Watts & Stenner, 2005).

McKeown and Thomas (1988) stated factors can be examined from any angle the researcher chooses. Brown (1980) clarified that the preferred rotation technique should

be based “on the *nature of the data* and upon the *aims of the investigator*” (p. 238). A varimax, an orthogonal rotation, was chosen as the factor rotation method because I sought to objectively rotate the data (Brown, 1980) and rotate each factor independent and uncorrelated with the others (Field, 2009). A varimax “tries to load a smaller number of variables loading highly onto each factor resulting in more interpretable clusters of factors” (Field, 2009, p. 644). Additionally, Tuler et al. (2005) and Watts and Stenner (2005) stated that varimax rotation explained the most variance. A final factor solution ensued the varimax rotation, which yielded the same three factors but were rotated to more clearly distinguish each one from the other factors. Each factor represented a distinct viewpoint of the individuals in the group.

Factor loading. I conducted a factor loading to classify the Q sorts according to the factor (Krysher, 2010), which helps the researcher identify the factors to be interpreted (Watts & Stenner, 2005). A Q sort loads significantly high on a factor when only one factor has a high correlation coefficient. Therefore, because the factor rotation may have altered the Q-sorts correlation coefficient, the coefficients needed to be reassessed. If the Q sort significantly loaded on more than one factor or did not load on any factors, it was rejected (Krysher, 2010; Watts & Stenner, 2005). Individual statements with a value of less than 0.40 were suppressed and eliminated from the sort.

Factor reliability and validity. Because the Q-sorting process is based on the respondent’s internal frame of reference, the traditional validity and reliability in R method research is nonessential in Q methodology (McKeown & Thomas, 1988). However, Brown (1980) stated test/retest is an acceptable method to measure reliability

because it measures the consistency of the person with himself/herself. Test/retest assumes the participant will sort the same, or near the same, way every time. The Q correlation should be positive and significant (Brown, 1980). According to Brown (1980) and McKeown and Thomas (1988), the test/retest reliability coefficient should remain stable and high at .80, which is built into the Q method data analysis software to calculate each factor's composite reliability (Krysher, 2010). Based on replicability, the reliability coefficient for Q methodology (van Exel & de Graf, 2005), each factor of this study was considered reliable: Factor 1 (0.89); Factor 2 (0.89); and Factor 3 (0.92). Because the "relationship between a variable (such as a preference or significance) and a stimulus (such as a Q statement)" (Brown, 1980, p. 174) is the focus of Q methodology, the need for validity does not exist. Q methodology is subjective and only represents the participant performing the Q sort (Brown, 1980; McKeown & Thomas, 1988).

Research Question 3: What are the Writing Factors Identified in the Literature and Through Stakeholder Interviews that Contribute to a Model to Augment Critical Thinking and Create Knowledge Through Writing in the Social Sciences of Agriculture?

For Research Question 3, which was guided by two objectives, I documented common statements and themes about writing in the social sciences that consistently emerged throughout the review of literature and in Research Objectives 1.4, 2.1, 2.2, and 2.3. Common statements and themes were condensed and restructured for the best possible presentation. The condensed statements and themes were placed into a graphical representation, as suggested by Morecroft (1985), to portray the writing factors that augment critical thinking and create writing in the social sciences of agriculture.

Figure 4 is a graphical representation of the procedures used to address Research Question 3.

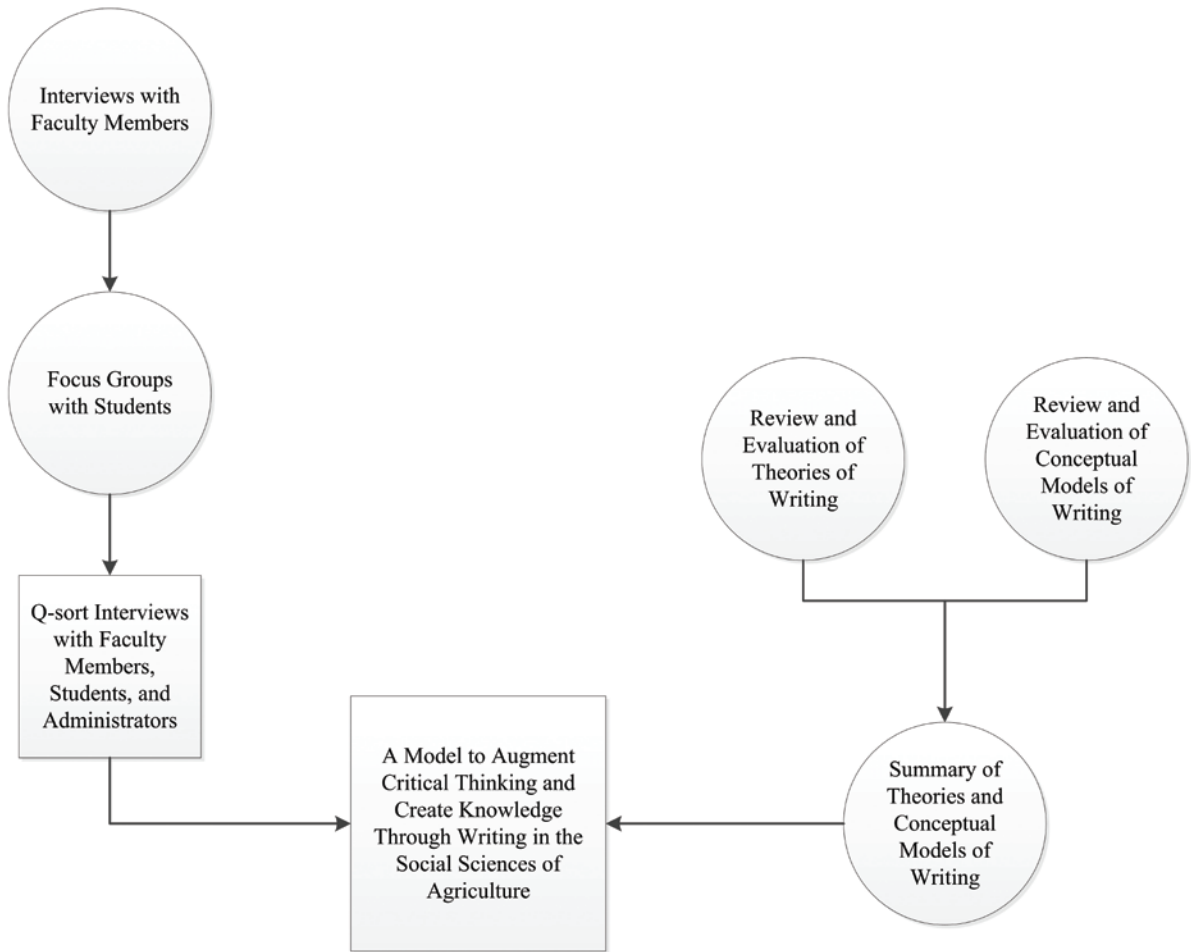


Figure 4. Procedural model of the research methods used to address Research Question 3

Frameworks help people organize thinking by “providing a common language for communication [and] supplying cues to memory” and “acquire new knowledge by highlighting commonalities[,], embodying predictions[, and] providing a basis for

research programs” (Hayes, 2006, p. 37). As noted in the theoretical framework of this study, Geertz (1973) explained that two types of models exist—models “of” reality and models “for” reality. For the purpose of this study, a model “of” reality was developed.

A useful and credible model should include information elicited from experts (Ford & Sterman, 1998; Morecroft, 1985; Morecroft & van der Heijden, 1992).

However, many of the methods used to obtain information for model development have only contributed material for the early phases of the modeling process—“problem articulation, boundary selection, identification of variables, and qualitative causal mapping” (Ford & Sterman, 1998, p. 309), which are methods used to develop a conceptual model. The best way to develop a model of reality (Geertz, 1973) is to obtain knowledge from contextual experts (Ford & Sterman, 1998; Morecroft, 1985; Morecroft & van der Heijden, 1992). The development of mental models requires tacit knowledge, which is “subjective, personal, ... context-specific[, and] ... difficult to describe, examine, and use” (Ford & Sterman, 1998, p. 310). To develop conceptual models, a researcher must use “elicitation, articulation, and description of knowledge ... [of] system experts” (Ford & Sterman, 1998, p. 310).

Morecroft and van der Heijden (1992) claimed that one of the first steps to developing a model is defining the problem and then using consistent stories as the basis for model development. “Models that are used to construct consistent stories need to be understood by the ‘story writers’ ... [and] be communicated effectively to the story readers” (Morecroft & van der Heijden, 1992, p. 103). Developing models is the pooling of knowledge into a framework that can be applied to a scenario and used to interpret

real events (Morecroft & van der Heijden, 1992). Phase 1 of modeling is descriptive and qualitative in nature (Morecroft, 1985).

First, an issue or problem is defined (Morecroft, 1985; Morecroft & van der Heijden, 1992). Second, a team of experts is assembled, so that their knowledge can be used as the basis for the model development, which is conducted using field work and interviews. The team should have a wide range of expertise, which will provide researchers with varying perspectives to guide the model development process (Morecroft, 1985; Morecroft & van der Heijden, 1992). Third, a diagram is constructed based on the field work and interviews “to illustrate the connections ... and to interpret the system’s likely behavior” (Morecroft, 1985, p. 14).

Evaluators often find that programs are not effective and do not do what they were designed to do (Chen & Rossi, 1980). The same could be true about writing models developed in the 1980s—they do not fit the needs of the 21st century educational system and the way students use writing. The teaching of writing and writing research has grown and developed since its seedling stage in the late 1960s (Nystrand, 2006). Although writing research has become diversified in the past 35 years, heterogeneity of models is a problem in writing research. The diversified and multiplied writing models provide the writing research profession with the opportunity to progress toward the development of writing theory (Alamargot & Chanquoy, 2001). Just as the outcomes of a program can be derived from the goals of a program and the knowledge and theory that exists about it (Chen & Rossi, 1980), a model can be developed using existing knowledge and theory as well as new research. Models, grounded in research, are still

needed by not only researchers to further the research base of teaching writing but also practitioners who rely on researchers to discover new ways to enhance student writing performance (Pritchard & Honeycutt, 2006). Additionally, Fulwiler and Young (1990) argued that no one model of writing in the disciplines can function in all college and university settings. Writing programs are institution specific because each institution is unique. However, certain factors and characteristics must exist across all programs for writing instruction to be successful and foster learning.

A model to augment critical thinking and create knowledge through writing in the social sciences of agriculture grew out of the idea that certain writing factors increase students' ability to think critically and create knowledge. For the first phase of developing the model, I conducted a review and evaluation of writing theories and conceptual models using the pragmatic and methodical theory evaluation criteria proposed by Dudley-Brown in 1997. I searched Google Scholar, Texas A&M University library, and WorldCat.org to determine the most documented theories and conceptual models in writing research. My search revealed three theories—cognitive process theory of writing (Flower & Hayes, 1981); sociocultural theory of writing (developed from Vygotsky's work on the development of higher psychological processes); and social cognitive theory of writing (Flower, 1994)—and seven conceptual models—a model of the writing process (Hayes & Flower, 1980a); two writing development models (Bereiter & Scardamalia, 1987); the new model of the writing process, revision of the Hayes and Flower's 1980 model (Hayes, 1996); a model of working memory in writing (Kellogg, 1996); a conceptual model of writing expertise (Beaufort, 1999); and writing proficiency

as a complex integrated skill (Deane et al., 2008). I reviewed and evaluated the writing theories and conceptual models from a qualitative perspective using Dudley-Brown's (1997) theory evaluation criteria; a qualitative coding (Saldaña, 2013) template to state the description, inclusion and exclusion evaluation criteria, and typical exemplars for each of Dudley-Brown's (1997) criterion; and my personal experience teaching and researching writing as the basis for my inquiry. For a summary of the review and evaluation of writing theories and conceptual models, see Table 4.

For the second phase, I conducted qualitative interviews with faculty members in the social sciences of the College of Agriculture and Life Sciences, focus groups with students in the social sciences of the College of Agriculture and Life Sciences, and Q-sort interviews with faculty members, students, and current and former administrators in the College of Agriculture and Life Sciences. For the first objective of Research Question 2, I sought to determine faculty members' perspectives of the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. Interview questions were developed based on the researcher's concerns as a writing instructor and researcher, a review of literature, and the theoretical paradigms and conceptual models of writing identified in phase one of the study. Faculty members were identified using a simple random sample (Wiersma & Jurs, 2005) of the purposive sample, and eight faculty members agreed to participate in the study.

For the second objective of Research Question 2, I used student focus groups to determine students' perspectives of the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. Barbour (2007) recommended

focus groups be used in the exploratory process of a mixed-methods study because the researcher can collect a large amount of information from multiple participants at a particular time. The questions used in the focus groups were based on the researcher's concerns as a writing instructor and researcher, a review of literature, and the theoretical paradigms and conceptual models of writing identified in phase one of the study. The questions were reviewed and modified, if needed, after each focus group. I used a purposive sample to identify the participants. Focus group one had six students, focus group two had six students, and focus group three had three students. A total of 15 students participated in the focus groups.

To address the third objective of the second phase, I conducted Q sort interviews with faculty members, students, and current and former administrators in the College of Agriculture and Life Sciences. Q methodology was selected as the best method for this type of study because it uses qualitative and quantitative analyses to better develop an understanding of an individual's point of view about a given subject (Tuler et al. 2005). The qualitative data collected from the review and evaluation of writing theories and conceptual models, the faculty member interviews, and the student focus groups were used to develop the Q-set statements for the Q-sort interviews. Q methodology was the bridge between the qualitative research paradigm and the quantitative research paradigm. Three faculty members, four students, and three administrators sorted 37 specific statements related to writing factors that augment critical thinking and create knowledge in the social sciences of agriculture.

After conducting each phase of the research study and making notes of key components of and factors related to writing, I developed a model of writing for the third phase of this study. The research conducted for Research Question 1 and 2 of this study as well as my experience as a writing intensive course instructor guided the final phase of my dissertation. The majority of this study was qualitative with a small component using quantitative research methods. Each phase of my dissertation was analyzed independently, and each phase was structured using the prior collected data. Additionally, I reviewed, analyzed, and reported the data as one study. When developing the model, I revisited each phase of data collection to determine what elements and concepts needed to be included in the model. Based on my experience with teaching and researching writing, I did not incorporate each statement of the Q-sort into the writing model because prior research showed evidence otherwise.

CHAPTER IV

FINDINGS

Research Question 1: What are the Prominent Theories and Conceptual Models of Writing?

I found three prominent theories and seven conceptual models of writing in my review and evaluation of writing theories and conceptual models. The first writing models were developed with theoretical underpinnings of cognitive processes but without the inclusion of society and culture (Prior, 2006). The early cognitive models focused on writing as problem-solving (McCutchen, Teske, & Bankston, 2008), which was a narrow paradigm that lacked an important part of the writing process: context (Prior, 2006). The cognitive processes models do not address the specific modes or problems associated with each genre or writing task, and because each writing assignment and mode is different by nature and social context, writers will encounter specific problems associated with that genre or writing task (Deane et al., 2008). This cognitive approach views writing as a function of what occurs in the writers' minds and not as a function that is encouraged and impacted by the social contexts and situations that occur in the world where writers exist (Deane et al., 2008). Prior (2006) argued that writing is situated within the social context of the writer and impacted by communities of practice that occur as a part of the situated social context.

Theories and models of writing focused on the writing process and cognitive processes of writing as separate entities with little emphasis on the two acting in the same domain (Stein, 1986) until 1994 when Flower published a theory combining the

two domains. However, more studies need to be conducted using her social cognitive theory of writing as a research framework.

Cognitive Process Theory of Writing (Flower & Hayes, 1981)

When writing research movements began in the 1970s, research focused on the cognitive processes of writing (Bereiter & Scardamalia, 1987; Hayes, 1996; Hayes & Flower, 1980a; Kellogg, 1996). Flower and Hayes (1981) developed the cognitive process theory of writing as a foundation to inform research and practice about the thinking processes in writing. The theory has four points: (a) "... writing is best understood as a set of distinctive thinking processes which writers orchestrate or organize during the act of composing" (Flower & Hayes, 1981, p. 366); (b) the processes are hierarchical and can be embedded within each other; (c) "composing itself is a goal-directed thinking process, guided by the writer's own growing network of goals" (p. 366); (d) writers should set goals and sub-goals that represent their purpose by modifying current goals or creating new goals based on experience. Writing is a robust process because different ways exist to complete the process, and it is not completed in a step-by-step instructional approach (Marzano et al., 2001).

The cognitive process theory of writing is not a traditional stage model (Flower & Hayes, 1981). A stage model articulates that writers move through linear stages of development before completing a product (Flower & Hayes, 1981). Flower and Hayes (1981), authors of the cognitive process theory, postulated that writers move through units of mental processes that are situated within a hierarchical structure, which has embedded components. For example, generating ideas is a mental sub process of

planning. If the writer encounters a problem at any process, he/she could retreat back to one of the earlier processes and work through it for that particular problem (Flower & Hayes, 1981). Flower and Hayes (1981) referred to the mental processes as the writer's tool kit, which could be used at any point in the process without specifications of when and where to use the individual tools. The writing process is directed by goals, which are created and modified during the process. Goal-directed thinking, as described by Flower & Hayes (1981), could be describing goals, developing plans to meet those goals, and evaluating the success of those goals. This goal-directed process is a hierarchical structure, also, and writers often refer back to their goals. As writers write, their knowledge develops, and they create, retrieve, modify, and consolidate their goals based on their discovery of new knowledge (Flower & Hayes, 1981).

Evaluation. After evaluating the cognitive process theory of writing, I found it to meet five of the seven criteria—consistency, fruitfulness, complexity, scope, and acceptability—proposed by Dudley-Brown (1997). The theory was not accurate because it did not include context's influence on writing. Although it included the writing process, it failed to discuss audience and critical thinking components as key inputs into the writing process. The cognitive process theory was consistent with clear language, connectedness, consistent terms, and coherence. According to the Flower and Hayes (1981), the theory was fruitful because it revealed new phenomena and generated hypothesis. The authors discussed ideas for potential research opportunities and addressed essential issues related to the theory. The complex structure of the theory

shows a hierarchical, in-depth look at writing processes. It portrays writing as a hierarchical structure with multiple sub processes, concepts, and relationships.

Based on the substantive theory definition cited by Adelman in 2009, the cognitive process theory of writing is a substantive theory because it does not explain or state a causal relationship. It is more descriptive and provides an understanding of the phenomenon. Because of the number of citations for the cognitive process theory of writing and its “circle of contagiousness” (Meleis, 1985, p. 159), it has been accepted by writing researchers. As of March 2013, Google Scholar listed the theory as having 2,219 citations. Further, it is useful because it can be applied to practice, education, and research. Last, the theory did not meet the criteria of socio-cultural utility because it did not include transferability or its relationship to society.

The cognitive process theory of writing has been the research base for several writing models; however, the theory is missing a key component—context. With the addition of context, this theory could be stronger.

A model of the writing process (Hayes & Flower, 1980a). Linda Flower and John R. Hayes are the forefathers of writing model development (Alamargot & Chanquoy, 2001) and are among the first to conduct funded writing research (Nystrand, 2006). Hayes and Flower (1980b) viewed writing as a process and not as a product because they focused on the act of writing and what occurred when the writer was writing. Hayes and Flower believed writing included cognitive factors of composition (Kellogg, 1996). The writing product was not completely ignored, but it was more important to investigate how the writer created the product (Hayes & Flower, 1980b).

Therefore, “Flower and Hayes ... developed a cognitive model of writing processes, identifying components and organization of long-term memory, planning, reviewing, and translating thought into text” (Nystrand, 2006, p. 18). The model emphasized what activities occurred during the writing process, how the steps in the process were connected to one another, and how the writer thought during the process (Hayes & Flower, 1980b). Hayes and Flower (1980a) acknowledged that not all writers approach the writing task in the same manner, recognizing that some writers consider audience and others do not. Therefore, they developed the model based on competent writers.

The Hayes-Flower model has three major components: task environment, cognitive writing processes, and long-term memory (Hayes, 1996; Hayes & Flower, 1980a; Hayes & Flower, 1980b). The task environment, the “world outside of the writer’s skin,” included text production up to that point in the process, the rhetorical situation, and writer’s motivation (Hayes & Flower, 1980b, p. 391). The cognitive writing processes are planning (generating, organizing, and goal setting), translating, and revising (reading and editing), which the writer participates in as part of the composition process (Hayes, 1996; Hayes & Flower, 1980a; Hayes & Flower, 1980b). Each process is monitored as the writer progresses to control the sequence (Hayes, 1996; Hayes & Flower, 1980a; Hayes & Flower, 1980b). The writer’s long-term memory, the last component in the model, is the writer’s knowledge of, audience, topic, and genre (Hayes, 1996; Hayes & Flower, 1980a; Hayes & Flower, 1980b; see Hayes & Flower, 1980a, pp. 12-19 for a complete breakdown of the writing processes). Although audience was included in the model, it was not an important element (Nystrand, 2006). Hayes and

Flower (1980b) developed the model in a top-down approach, showing the complete process first. Using the writing process model, Hayes and Flower (1980b) made five conclusions about writing: It is goal directed, it is hierarchically organized, the writing sub processes that are a priority interrupt the overarching process, it has recursive processes, and writing goals can be modified during the overarching process (see Hayes & Flower, 1980a for the complete model).

Evaluation. When evaluating the Hayes & Flower (1980a; 1980b) model, I found the model to include five of the seven evaluation criteria—consistency, fruitfulness, complexity, scope, and acceptability—postulated by Dudley-Brown (1997). The model was not accurate because it lacked the true representation of writing. It presented writing as a process but lacked critical thinking and recognition of contextual knowledge. The model was consistent with its language and showed a clear connectedness between its concepts. It's clear definitions and concepts were easy to follow, and it appeared to be internally consistent. However, Hayes and Flower (1980a) did not provide evidence that the model was reliable. Hayes and Flower (1980a) claimed the model provided new phenomena. Therefore, the model met the fruitfulness criteria because it provided specific detail about the individual writing processes and it was specific in denoting the organization of the processes. The model contained ideas for further development and continued research. Again, Hayes and Flower (1980a) claimed the model was complex. The model was derived from several protocols and portrayed a number of concepts and relationships. The model was easy to understand and contained further explanation of hard to understand concepts.

The model was a substantive theory, so it was narrow in scope. It was an in-depth look at the writing process and contained further explanations of the intricate parts of the model. As of March 2013, Google Scholar listed 1801 citations for Hayes and Flower (1980a); therefore, the conceptual model has been accepted by writing researchers and instructors. The model is applicable to practice and provides direction in the writing process; however, the model did not have evidence of its applicability to education. Additionally, the model had potential for additional research and hypothesis development. Although the theory included evidence of theory transferability, it did not meet the socio-cultural utility criteria because it was not adaptable to different cultures and it did not tie back to society and social development, which was also a critique by Bizzell in 1982.

Based on the criteria proposed by Dudley-Brown (1997), this model provided the writing researchers a basis for empirical research, but it needs to be revised to include context and to meet the needs of the 21st century. However, Hayes and Flower were criticized for their model and its lack of addressing key concerns in writing (Alamargot & Chanquoy, 1991), but they argued that the first writing model was an effort to depict the writing process.

Writing development model (Bereiter & Scardamalia, 1987). According to Bereiter and Scardamalia (1987), there is more to writing than the often stagnant views of it is hard or it is easy. Bereiter and Scardamalia, according to Alamargot and Chanquoy (2001), proposed that writing development had two main strategies: novice and expert. The writing process is not the same for novice writers as it is for expert

writers, and that different developmental stages of life go through different writing stages (Bereiter & Scardamalia, 1987; Grabe & Kaplan, 1996). For some, writing is natural and, to others, is problematic (Bereiter & Scardamalia, 1987).

An expert writer can perform or write at a level that an unskilled writer does not have the ability to do, which is why Bereiter and Scardamalia (1987) proposed two models of writing composition and process (Grabe & Kaplan, 1996). Bereiter and Scardamalia (1987) focused on the differences between how skilled and non-skilled writers develop prose; compose for different audiences; master genres; learn how to develop purpose, topic, and language variation; and transfer writing skills. Additionally, they sought to understand why writing is hard for some and easy for others, how writing is taught, why some people can never become skilled writers, how writers revise, and how prose is shaped. Skilled, studied writers deliberately attend to and have strategic control over pieces of the writing process that do not come naturally (Bereiter & Scardamalia, 1987).

Knowledge telling strategy and knowledge-transforming strategy, the two models of writing strategy discussed by Bereiter and Scardamalia (1987), are not steps in writing development but rather extremes on the writing continuum (Alamargot & Chanquoy, 2001). One model describes writing as a natural task, which helps writers “make maximum use of already existing cognitive structures and that minimize the extent of novel problems that must be solved” (Bereiter & Scardamalia, 1987, p. 5). The other model presents a writing process that develops with the writer—“writing [is] a task that keeps growing in complexity to match the expanding competence of the writer”

(Bereiter & Scardamalia, 1987, p. 5). Therefore, as writing ability and skill increases, writing difficulties and challenges are no longer lower order but are higher order, which helps writers develop more critical thinking and cognitive thinking skills (Bereiter & Scardamalia, 1987).

The major difference between the two writing strategies is the problem-solving system that occurs between mental representation and the knowledge telling process (Alamargot & Chanquoy, 2001). The problem-solving system includes three components: problem analysis and goal setting, content and rhetorical problem space, and problem translation (Alamargot & Chanquoy, 2001). Essentially, the contrast is the knowledge-telling strategy is a natural ability acquired by many and the knowledge-transforming strategy is a studied ability acquired by few (Bereiter & Scardamalia, 1987).

Knowledge-telling strategy. Knowledge telling is the “psychology of the natural...[, which] makes maximum use of natural human endowments of language competence and of skills learning through ordinary social experience, but it is limited to them” (Bereiter & Scardamalia, 1987, p. 5). The focus of writing for an unskilled writer is telling the information they received (Alamargot & Chanquoy, 2001; Grabe & Kaplan, 1996). “The *knowledge-telling* model of writing used by less-skilled writers provides a streamlined set of procedures[,] which allow[s] writers to bypass the sorts of complex problem-solving activities often seen in the composing of skilled writers” (Grabe & Kaplan, 1996, p. 119). Writing, to less-skilled writers, is basic and uncomplicated; they convert oral language into written prose (Alamargot & Chanquoy, 2001; Grabe &

Kaplan, 1996). Their writing is more like the stream of consciousness (Bereiter & Scardamalia, 1987). Less skilled writers start developing prose sooner and often spend less time on planning. Their pre-writing notes are not as elaborate as skilled writers, and the less skilled writers are more concerned with content generation than with the goals, plans, and problems of the work (Bereiter & Scardamalia, 1987). The less skilled writer cannot incorporate major revisions in their work and reorganize content. They often use less complex information and routes to develop ideas and content (Bereiter & Scardamalia, 1987; Grabe & Kaplan, 1996) and work to avoid cognitive tasks (Grabe & Kaplan, 1996).

When less skilled writers hear a topic or receive an assignment, they retrieve or extract information from their memory, which is developed and organized through experience, and identify with the cues (Bereiter & Scardamalia, 1987). To generate content, the less skilled writer will think about the topic and genre, decide what level of knowledge they have, read the text they have generated to that point, and based on prior prose, generate more content (Bereiter & Scardamalia, 1987; Grabe & Kaplan, 1996). Before less skilled writers include information in the manuscript, they put it through a test of appropriateness to decide if the information fits the topic and the assignment (Bereiter & Scardamalia, 1987).

The knowledge-telling model showed that text is generated through the topic, discourse schema, and already produced text, which is continuously repeated until the composition process is finished (Bereiter & Scardamalia, 1987). The model has three components that guide text production: mental representation of assignment, content and

discourse knowledge, and the knowledge telling process (Alamargot & Chanquoy, 2001). The mental representation of the assignment guides and defines the writing process; whereas, the content and discourse knowledge component guides the topic and ideas developed in the text and the linguistic of the text. The last component, the knowledge telling process, is the actual writing process of the model, which has seven stages (Alamargot & Chanquoy, 2001). However, the simplicity of the knowledge-telling strategy does not include the complex decisions of the writing process (e.g., organization, audience expectations, masses of information; Alamargot & Chanquoy, 2001; Grabe & Kaplan, 1987; see Bereiter & Scardamalia, 1987 for the complete model).

Evaluation. In my evaluation of the knowledge-telling strategy model (Bereiter & Scardamalia, 1987), I found the model to be consistent, fruitful, simple, broad, and acceptable. The model did not meet the criteria for accuracy and socio-cultural utility. Bereiter and Scardamalia (1987) discussed the model's reliability and validity and the research used to establish the model. The model had clear and consistent language and was connected and logical. The knowledge-telling strategy was fruitful. Bereiter and Scardamalia (1987) presented a history of research that they used to develop and test the model. They generated hypothesis and provided ideas of further research. The model was simple because it discussed a limited number of concepts and phenomena, and it was a simple-to-understand graphical representation of a writing process for less skilled writers. The model was broad in scope because it described unskilled writers as a larger whole. I found Bereiter and Scardamalia's (1987) knowledge-telling strategy model to

be adopted by others because, as of March 2013, Google Scholar cited it 2,581 times. Additionally, it is useful and can be applied to practice, education, and research.

Bereiter and Scardamalia's (1987) knowledge-telling strategy model is a simple look at the writing process of the less skilled writer. Although it meets five of the seven criteria proposed by Dudley-Brown (1997), it fails to meet two important criteria. However, Bereiter and Scardamalia's (1987) did include accuracy in their more complex knowledge-transforming strategy model. It is a great start to describing how an less skilled writer composes, but critical thinking, audience, problem solving, goal setting, and socio-culture need to be included.

Knowledge-transforming strategy. Knowledge transforming is the “psychology of the problematic ...[, which] involves going beyond normal linguistic endowments in order to enable the individual to accomplish alone what is normally accomplished only through social interaction—namely, the reprocessing of knowledge” (Bereiter & Scardamalia, 1987, p. 5). In the knowledge-transforming strategy, thoughts and ideas are created during the composing process and the small pieces of information developed through rethinking and restating become a complete, thoroughly developed thought (Bereiter & Scardamalia, 1987). The knowledge-transforming strategy explained two things: “how the process of writing can lead to growth in knowledge” and “how writing could be such hard work for some people, even though they are highly skilled at it” (Bereiter & Scardamalia, 1987, p. 340).

Once writers become aware of the writing assignment, they first analyze the problem and set goals before working to resolve problems, from content to audience to

genre (Grabe & Kaplan, 1996). The knowledge- telling strategy does not go away in the higher level thinking model of the knowledge-transforming strategy (Bereiter & Scardamalia, 1987). Rather, it is embedded as a problem-solving process between two problem spaces—content and rhetorical. Content problems are the information problems (beliefs, knowledge, and attitudes about specific content), and rhetorical problems are related to composition (Bereiter & Scardamalia, 1987). The two problem spaces work back and forth to form an argument through initiating and creating dialogue and solving problems, which is reflective thought (Bereiter & Scardamalia, 1987). The knowledge forming strategy is based on “formulating and solving problems ... with a two-way interaction between continuously developing knowledge and continuously developing text” (Bereiter & Scardamalia, 1987, p. 13). Writers who fall into this model, frequently teenagers and adults (Alamargot & Chanquoy, 2001), may not be the best at expressing thoughts, but they can rework their thoughts and use writing as a development of knowledge (Bereiter & Scardamalia, 1987; see Bereiter & Scardamalia, 1987 for the complete model).

Evaluation. When I evaluated Bereiter and Scardamalia’s (1987) knowledge-transforming strategy model, it met six of the seven criteria proposed by Dudley-Brown (1997). The knowledge-transforming strategy model did not meet the socio-cultural utility criteria. The model was accurate and a true representation of the writing process. It included content and discourse knowledge and incorporated context, audience, and goal setting. Just like the knowledge-telling strategy model, the knowledge-transforming strategy model was fruitful and revealed new phenomena and relationships. Bereiter and

Scardamalia (1987) discussed the research tradition of the model and ideas for further research. The model was complex with a number of different concepts embedded within it and broad because of its increased number of facts and concepts. The knowledge-transforming strategy model is more general and, therefore, can be applied to different situations. As of March 2013, Google Scholar stated the knowledge-transforming strategy model had been cited 2,581 times. Additionally, the model is useful and could be used in practical, educational, and research paradigms.

Bereiter and Scardamalia's (1987) knowledge-transforming strategy was a more complex depiction of the writing process. Adding socio-culture to this model would make this model more acceptable in the 21st century. However, it is a thorough description of the composing process and transforming knowledge using writing.

New model of the writing process, revision of the Hayes and Flower's 1980 model (Hayes, 1996). More than a decade after the original Hayes and Flower (1980a) model was developed, Hayes (1996) revised the model based on critiques of the original model, additional research on writing, and what an up-to-date model should include. The new model provided a better description of the writing process and a broader look at the activities in the writing process (Hayes, 1996). Additionally, the model provided more suggestions for continued research and showed more relationships among phenomenon (Hayes, 1996). The revised model (Hayes, 1996) included two main components: task environment and individual. Hayes (1996) proposed his model as an individual-environmental model instead of a social-cognitive model because it focused on the individual and his or her environment. Writing is dependent on "cognitive, affective,

social, and physical conditions” (Hayes, 1996, p. 5); it is a “communicative act that requires a social context and a medium...generative activity requiring motivation and...an intellectual activity requiring cognitive processes and memory” (Hayes, 1996, p. 5).

According to Hayes (1996), there are four differences in the Hayes and Flower (1980a) model and the Hayes (1996) model. First, Hayes (1996) added working memory as a major part of the model; it is centrally situated within the model to represent its impact on the activities and sub processes of the writing process. Second, the model not only included linguistic representations but also visual spatial representations because of the number of documents and manuscripts that include visual representations to clarify or enhance the meaning of the text. Third, Hayes expanded on motivating cues and included motivation/affect as an essential part of the model. Fourth, Hayes restructured the cognitive processes in the model (Hayes, 1996).

The task environment has two subcomponents: social environment and physical environment. Social environment is a major part of the model because writing is social (Hayes, 1996). “What we write, how we write, and who we write to is shaped by social convention and by our history of social interaction” (Hayes, 1996, p. 5). Culture influences the writing process, from audience to words, images, and forms used to write and develop text (Hayes, 1996). The physical environment is impacted by the text production up to that point and the medium used to compose the text. As writers write, they continually read the already produced text to formulate ideas for and develop new

text (Hayes, 1996). Further, the medium used to produce the text can impact how the text is produced and revised.

The individual component of the model has four subcomponents: motivation/affect, working memory, cognitive process, and long-term memory (Hayes, 1996). Motivation/affect operates as the component that guides writers' goal setting, predispositions, beliefs and attitudes, and cost/benefit estimates of the writing process (Alamargot & Chanquoy, 2001). Many activities are driven by goals and motivation, and writing is not any different. However, some would argue that motivation should not be included in a writing model (Hayes, 1996). "Motivation is manifest, not only in relatively short-term responses to immediate goals, but also in long-term predispositions to engage in certain types of activities" (Hayes, 1996, p. 9). The working memory subcomponent is a new component to the model (Hayes, 1996). It is an essential component to all writing activities, an information storage place with limited space, and the component that connects the others three components of the model (Alamargot & Chanquoy, 2001; Hayes, 1996). Working memory is "dedicated to the maintaining and to the processing of phonological..., visuospatial [*sic*]...[,] and...semantic...representations" (Alamargot & Chanquoy, 2001, p. 17).

The cognitive processes component of the Hayes (1996) model has three processes: text interpretation, reflection, and text production. Text interpretation "creates internal representations from linguistic and graphic inputs" (Hayes, 1996, p. 13). Reading, listening, and scanning graphics are key tasks within the text interpretation function. Reflection "operates on internal representations to produce other internal

representations” (Hayes, 1996, p. 13) and accounts for the problem solving, decision making, and inferences in the writing process (Hayes, 1996). The last process of cognitive processes is text production, which “takes internal representations in the context of the task environment and produces written, spoken, or graphic output” (Hayes, 1996, p. 13). Spoken language is included in the model because, often times, writers depend on dialogue to produce text for written work (Hayes, 1996).

Long-term memory uses five types of knowledge that the writers possesses: task schemas, topic knowledge, audience knowledge, linguistic knowledge, and genre knowledge (Alamargot & Chanquoy, 2001; Hayes, 1996). Task schema is the “procedures to guide and control the effective realisation [*sic*] of the text production” (Alamargot & Chanquoy, 2001, p. 17). Task schema is stimulated by environmental stimuli and reflection (Hayes, 1996). Topic knowledge is the knowledge of the content (Alamargot & Chanquoy, 2001). Writers need to understand the content through prior knowledge or through extensive research of the topic. Audience knowledge is the group who will read the text (Alamargot & Chanquoy, 2001; Hayes, 1996). If writers are writing to a familiar audience, then they should have an understanding of the audience’s needs. However, if writers have no prior knowledge of the audience, they will have to take on the role of the audience and research its needs before writing the text (Hayes, 1996). Genre knowledge and linguistic knowledge draws on writers’ experience with the various types of text and “linguistic components necessary for the realisation [*sic*] of the text” (Alamargot & Chanquoy, 2001; p. 17). Hayes (1996) classified the two as outcomes of extensive writing practice. With practice, “writers may acquire more

effective writing strategies, more refined standards for evaluating text, more facility with specific genre, and so on,” which are all important if a writer is to reach an expert level of writing (Hayes, 1996, pp. 26-27; see Hayes, 1996, for the complete model).

Evaluation. In my evaluation of the Hayes (1996) revision of the Hayes and Flower (1980) model of the writing process, I found the Hayes (1996) model to meet all seven of the criteria—accuracy, consistency, fruitfulness, complexity, scope, acceptability, and socio-cultural utility—proposed by Dudley-Brown (1997). The Hayes (1996) model was accurate because it proposed a true representation of the writing process and incorporated key characteristics and components of the writing process. It included audience, context, and content and discourse knowledge. Consistency is defined as the state that the model incorporates clear and concise language, presents reliable and valid information, and is consistent with its terms, principles, and methods; therefore, Hayes’ (1996) model met the consistency criteria. The revised model was fruitful because it proposed new relationships between the working memory and the other three subcomponents of the individual component. Additionally, Hayes (1996) examined research that led to the development of the model and presented ideas for future research, as well as addressed essential issues.

The Hayes (1996) model was complex because it defined a large number of relationships and concepts and it had a complex graphical representation. It brought order and understanding to hard-to-understand material. As for scope, the model was broad in scope because it focused on a number of related concepts and facts about writing and the cognitive processes and working memory concepts involved with

writing. The model presented writing as one whole process guided by many components and processes and did not dissect each process to the core. The Hayes (1996) model has been widely accepted by others. As of March 2013, it was cited 896 times on Google Scholar. Further, it has potential to be useful in practice, education, and research. Lastly, the model met socio-cultural utility criteria because it had social congruence and significance and can be transferred to other cultures. Implementing the model into education and practice could make a difference in people's lives and help people become better writers and thinkers.

In summary, the Hayes (1996) model of the writing process incorporated all of the seven criteria presented by Dudley-Brown in 1997. It was one of the first models to include the working memory as a central component of the writing process. Also, it introduced a social aspect that was not included in other models, which is a beginning look at what models today must include to portray accurate and in-depth observations of what the writing process should look like.

A model of working memory in writing (Kellogg, 1996). Kellogg's model "precisely locate[s] the different writing processes in each of the Working Memory registers" (Alamargot & Chanquoy, 2001, p. 20). Kellogg defined the relationship between writing and working memory (Alamargot & Chanquoy, 2001; Hayes, 2006). Kellogg believed that working memory was an important part of the writing process and should be included in writing process models (Hayes, 2006).

The model of working memory in writing, as depicted by Kellogg (1996), drew on the three systems of text production described by Brown, McDonald, Brown, and

Carr (1988): formulation, execution, and monitoring. Kellogg (1996) described each one of the categories as having two processes (formulation – planning and translating; execution – programming and executing; monitoring – reading and editing). Therefore, Kellogg (1996) claimed there are six processes of writing. For example, planning leads to translating, translating leads to programming, and so on. Kellogg's (1996) model did not imply that writers move through phases. Rather writers can, and will, simultaneously participate in the activities as long as the capacity of central executive is not pushed beyond its limitations (Kellogg, 1996). Each system (formulation, execution, and monitoring) interacts with each other. For example, "the execution of a word or phrase may take place simultaneously with the formulation of new material or monitoring of already written material" (Kellogg, 1996, p. 59). Editing, according to Kellogg (1996), can occur before or after a sentence is composed, which is why formulation and monitoring have a bidirectional arrow. Writers can edit ideas, goals, and sentences before executing the text, and they can edit the already produced text as well.

In addition to the six processes of writing, Kellogg (1996) explained that the model includes three working memory resources: visuo-spatial sketchpad, central executive, and phonological loop. Each one of the systems of text production is linked to at least one of the working memory resources (Kellogg, 1996). The formulation system, which includes planning and translating, places a heavy burden on the working memory because it requires all three of the resources (Kellogg, 1996). Writers engage in the planning process by "visualizing ideas, organizational schemes, supporting graphics, appearances of the orthography and layout" (p. 62), which employs the visuo-spatial

sketchpad and the central executive (Kellogg, 1996). Using the central executive during the translating stage, writers “struggle to find just the right words and sentence structures” (Kellogg, 1996, p. 63), and the phonological loop “gives rise to the phrases, clauses, and sentences of pre-text” (Kellogg, 1996, p. 63). Programming, which requires only the central executive working memory resource, is the muscle movements used to type or handwrite the text. Executing does not use any of the working memory resources. Reading requires the central executive and phonological loop. However, editing is more demanding than reading, and editing engages the central executive through “detection of a motor programming error to a revision in the organization of ideas in a text” (Kellogg, 1996, p. 65; see Kellogg, 1996, for the complete model).

Evaluation. The model of working memory in writing (Kellogg, 1996) met five of the seven criteria—accuracy, fruitfulness, complexity, narrow in scope, and acceptability. The model was accurate because it connected the writing process with specific cognitive processes. Kellogg’s (1996) model was not consistent because it was hard to understand and lacked clear terms, principles, and methods. However, it is fruitful, and it revealed new relationships between writing processes and cognitive processes and the connection between the three working memory resources and each phase of the writing process. Kellogg’s (1996) graphical representation of the working memory resources and writing processes is complex because it describes the many relationships and concepts and the writing processes connected to different working memory resources at different times and places during text production.

The model is narrow in scope, and it is a substantive level model because it is focused on developing and defining specific information. As of March 2013, Google Scholar listed 309 citations of the model. Although it had more than 300 citations, it had a relatively low number of citations when compared to other models including the Hayes and Flower (1980a) writing process model. Kellogg (1996) did not discuss much about applying the model to practice, but he did discuss the research that has been done and the research that needs to be done. Further, it can be applied to education. Kellogg's (1996) model did not meet the criteria for socio-cultural utility because it failed to have social significance.

Although the model of working memory in writing (Kellogg, 1996) met five of the seven criteria proposed by Dudley-Brown (1997), it failed to explain the writing process beyond the working memory resources. The working memory resources are an important part of the writing process. However, writing includes more concepts, ideas, and activities than Kellogg (1996) proposed in his model of working memory in writing.

Sociocultural Theory of Writing

The 1980s brought a more social look at writing, and the inclusion of audience and socio-culture became an intricate part of model development (Nystrand, 2006). Research showed evidence that “social, historical, and political contexts” should be included in the writing process (Prior, 2006, p. 54). Therefore, writing researchers began using sociocultural theories as the basis for their research (Prior, 2006). According to Deane et al. (2008), socio-culture stresses that “community practices deeply influence what sort of writing tasks will be undertaken, how they will be structured, and how they

will be received, [which] emerge in specific social contexts and exist embedded within an entire complex of customs and expectations” (p. 13).

The sociocultural theory of writing drew on Vygotsky’s work on the development of higher psychological processes (Prior, 2006). Dewey (1916) claimed that society plays a key role in people’s education and their development of understandings, dispositions, and skills.

Sociocultural theory argues that activity is *situated* in concrete interactions that are simultaneously *improvised* locally and *meditated* by prefabricated, historically provided tools and practices, which range from machines, made objects, semiotic means (e.g., languages, genres, iconographies), and institutions to structured environments, domesticated animals and plants, and, indeed, people themselves. (Prior, 2006, p. 55)

Meditated activity includes three things: externalization (e.g., writing), co-action (e.g., interaction with the people and the environment), and internalization (e.g., learning). During activity, people form institutions, and the world is personalized through their beliefs and values, which leads to a socialized and individuated individual (Prior, 2006). According to Englert, Mariage, and Dunsmore (2006), “sociocultural theory views meaning as being negotiated at the intersection of individuals, culture, and activity” and not as “knowledge as existing inside the heads of individual participants or in the external world” (p. 208).

Writing, as a sociocultural approach, is “chains of short- and long-term production, representation, reception, and distribution” (Prior, 2006, p. 57). Writing is a

collaborative task (Prior, 2006). Even the individual writer takes part in activities that extend beyond the individual (e.g., knowledge, distribution, reading). In a school setting, teachers are just as much involved in the writing process as the student is because teachers set the deadlines and guidelines while mentoring the students in the writing process (Prior, 2006). Further, writing, as proposed by Vygotsky in 1978, facilitates memory and problem solving. Using a sociocultural approach, learning to write, as explained by Daiute (2000), is “being socialized into a set of values, practices, and symbol systems” (p. 256), where the activities are group specific and not universal practices.

According to Prior (2006), the studies in the sociocultural theory of writing can be categorized into three areas: “redrawing the oral-literate divide, emerging schooled literacies, and writing in college and beyond” (p. 58). Studies (e.g., Scribner & Cole, 1981) within the oral-literate divide category have focused on writing in the home and community and on writing as an organized production and use of text in a social, purposeful, and contextual paradigm. Writing categorized into emerging school literacies is “a mode of participation in worlds of peer, group, school, and society” (Prior, 2006, p. 61), going beyond the home and community and defining writing as an even deeper sociocultural practice (Prior, 2006). Writing in college is much like emerging school literacies in that it is focused on the classroom practices. However, it is very genre specific, which is produced by the teacher, students, discipline, and institution (Prior, 2006). “Writers [need] to continually learn new genres and textual practices” (p. 63)

because of the complexity of literacy and the need to transfer knowledge and adapt to new situations (Prior, 2006).

Evaluation. The sociocultural theory met six of the seven criteria proposed by Dudley-Brown (1997)—consistency, fruitfulness, simplicity, scope, acceptability, and socio-cultural utility. Research studies since the 1980s have shown evidence that social context has a noteworthy impact on writing and writing development. The sociocultural theory incorporates context, but it fails to incorporate as much cognitive impact, research, and writing process. Therefore, the theory may not be accurate for the present-day writing paradigm. The theory was fruitful because it presented a potential to generate hypothesis, thoroughly examined the literature that led to its development, showed potential to solve problems, and provided ideas for further research.

The underlying theory of Vygotsky was not as easy to understand as the sociocultural theory. Again that may be because the sociocultural theory has not undergone a rigorous amount of testing as did Vygotsky's theory. I categorized the sociocultural theory as being a simple writing theory that was easy to understand and brought order to individualized, isolated studies. The sociocultural theory was broad in scope and covered writing in multiple contexts, from home to school to workplace. The theory is general. I found the sociocultural theory to meet the criteria of acceptability. Vygotsky's original theory, *Mind in Society: The Development of Higher Psychological Processes* (1978) is clearly the foundation literature for socio development with 12,298 Google Scholar citations. Prior's sociocultural theory of writing (2006) had 87 Google Scholar citations, which is beginning to influence not only writing research but also

writing instruction research. Further, both theories showed usefulness to practice, education, and research paradigms. Last, the theory met the criteria for socio-cultural utility because it takes into account different contexts within the writing community and looked at research that had been conducted in other countries. The theory is transferable and consistent with the cultural values and beliefs systems.

Overall, with more research, theory testing, and modifications to include a deeper understanding of cognitive development, this theory has potential to become a more broadly used theory in writing and writing instruction.

A conceptual model of writing expertise (Beaufort, 1999). Although writing expertise does not transfer from one context to another, writers can become experts in particular knowledge domains that relate to writing (Beaufort, 2007). Therefore, do knowledge domains help writers transfer writing skills from one context to another (Beaufort, 2007)? Many college writing instructors teach students writing process knowledge, rhetoric knowledge, audience awareness, voice, style, grammar, and mechanics; however, they leave out subject matter or contextual knowledge and, often times, critical thinking and research skills (Beaufort, 2007). Beaufort (1999) constructed her model based on the idea that no one model was an inclusive view of the multiple domains that are part of expert writing. The conceptual model of writing expertise includes five context-specific knowledge domains that expert writers should participate in: discourse community knowledge, subject matter knowledge, genre knowledge, rhetorical knowledge, and process knowledge (Beaufort, 1999). Beaufort (1999) argued that each of the domains is distinct but overlaps with the others to generate text, which is

situated in the middle of the model. Each one of the knowledge domains should begin as general knowledge and move to a specific knowledge as it relates to the context (Beaufort, 1999).

The conceptual model of writing expertise draws on the theory of discourse community that writers become a part of a community and build on each other's ideas and developments (Beaufort, 2007). The discourse community establishes norms, values, beliefs, and environments that are specific to that community or are shared with overlapping communities and defines and stabilizes boundaries relative to that particular community (Beaufort, 1999; Beaufort, 2007). As part of this community, writers use existing knowledge in the discipline coupled with critical thinking skills to arrive at new knowledge (Beaufort, 2007). "Critical thinking includes knowing how to frame the inquiry, what kinds of questions to ask or analytical frameworks to use in order [*sic*] to 'transform' or inscribe documents with new meaning(s)" (Beaufort, 2007, p. 19). Genre knowledge is, again, defined by the discourse community (Beaufort, 2007). For example, a grant proposal for a project in chemistry would be different than a grant proposal for a project in agricultural communications. The grant proposal is the same genre, but it is different as defined by the discourse community (Beaufort, 2007).

In addition to discourse community knowledge, subject matter knowledge, and genre knowledge, a writer needs to possess rhetorical knowledge (i.e., knowledge of the audience and purpose of the document). The rhetorical situation is influenced by the social context of the community. Last, the writers need to have knowledge of the writing

process, which is knowledge about text generation, transcription, and reviewing (Hayes & Flower, 1980a, 1980b; see Beaufort, 1999, for the complete model).

Evaluation. After evaluating the conceptual model of writing expertise (Beaufort, 1999), I found the model to be accurate, consistent, fruitful, simple, broad, accepted, and have socio-cultural utility. Beaufort's (1999) model was accurate because it depicted a true representation of writing and included knowledge domains that encompassed important aspects of writing. Although Beaufort (1999) discussed each knowledge domain in text, her model would have been more encompassing if she would have elaborated more on each knowledge domain in the graphic. She included the writing process, which is a strong piece of this writing model. The model was consistent because Beaufort (1999) provided definitions and examples throughout the explanation, and she discussed the studies reliability and validity. The model revealed unknown relationships and further explained the relationships between the five knowledge domains. Beaufort (1999) did not discuss ideas of future research, and, other than the ethnography, the model did not have research tradition. However, the model would help with problem-solving effectiveness because of its ability to assist writing instructors with what to teach in the classroom.

Further, the model was easy to understand because it was simple. Kuhn (1977) stated a simple model was one that brought order to phenomenon. This model shows writing more as it relates to business writing and writing within a specific community. Beaufort (1999) presented a broad concept in this model. She included many of the writing factors, but more discussion about the writing factors and how they contribute to

the overall picture of writing would have been helpful. As of March 2013, according to Google Scholar, Beaufort (1999) had been cited by 124 publications. Therefore, members of the writing community are beginning to accept her model. The model has only been in publication for 14 years, which may be the reason that only 124 other publications have cited Beaufort's (1999) work. Beaufort (1999) has outlined several levels of applicability. She discussed the difference between novice and expert writers, and she compared the type of writing between high school, college, and workplace. Although this model needs more empirical evidence to support its structure, Beaufort's (1999) conceptual model of writing expertise is applicable to practice, education, and research. Lastly, Beaufort (1999) discussed the different roles writing has in an organization and realized there are different contexts of writing. However, she did not discuss theory transferability.

Overall, Beaufort's (1999) conceptual model of writing expertise is an adequate representation of the factors included in writing. However, critical thinking should be included in every domain and not just at the subject matter domain. Additionally, critical thinking should be depicted in the graphic. The model is a great start to conceptualizing writing in the real world but should be modified to include instruction and critical thinking.

Social Cognitive Theory of Writing

“Neither social nor cognitive theory makes genuine sense without the other” (Flower, 1994, p. 33); Flower (1994) called for an integration, especially in education, of social and cognitive theory in her book *The construction of negotiated meaning: A social*

cognitive theory of writing. Student's performance in rhetorical, social, and cultural contexts can shed light on their thinking. Flower (1994) defined the constructing process as "the presence of disparate discourse conventions and their transformation into an integrated literate act, guided by a network of purposes" (p. 52). Although writing is a constructive process, it is not always a peaceful process. It is often shaped and carried out in a complex environment guided by the attitudes and feelings of not only the writer but also the society and people who surround him or her (Flower, 1994). This construction becomes moments of active meaning negotiation that causes the writer to deal with multiple forces while bringing meaning to a situation. "The forces clustered around the poles of self and society, public and private, convention and invention, social and cognitive, [*sic*] are all forces that can give structure to a writer's meaning, guide composing, or set criteria ..." (Flower, 1994, p. 34).

Flower (1994) contended that meaning is socially shaped through reproduction, conversation, and negotiation. Readers can produce meaning through the section, organization, and connection of information to prior knowledge (Flower, 1994). "New texts can be defined as a reconfiguration of prior texts" (Flower, 1994, p. 56) through the process of connecting prior meaning with new information to develop new meaning, which is an example of knowledge transformation (Bereiter & Scardamalia, 1987). Meaning making "supports learning, manifests itself in intertextuality [*sic*], and contributes to the cultural continuity of both dominant and resistant subcultures" (Flower, 1994, p. 58). Knowledge production using reproduction is an unconscious process of text production. Reproduction is one-way communication; whereas,

conversation and negotiation are both dialogic processes (Flower, 1994). “Conversation creates and maintains a consensus based on what people agree about” (Flower, 1994, p. 59). Constructing meaning in written conversation is “shared knowledge upon which the people whom a community comprises construct their collective life” (Clark, 1990, p. 48). Conversation is involvement (Brandt, 1990); “it is a product of interaction” (Flower, 1994, p. 60). Partners in conversation use discussion and dialogue to construct meaning—at points clarifying where the conversation stands and agreeing to move forward. Meaning by conversation “draw[s] attention to a relatively undirected process, in which meaning is nourished, shaped, and expanded by existing within a stream of possibilities” (Flower, 1994, p. 65).

However, Flower (1994) postulated that meaning is best shaped through negotiation. “Negotiation draws our gaze to a dilemma-driven and goal directed effort to construct meaning in the face of forces” (Flower, 1994, p. 66). Writers can negotiate meaning both internally and externally. In the presence of negotiated meaning, individuals are freethinkers with a unique understanding and conceptualization of information who are ready to share (Flower, 1994). Construction of negotiated meaning occurs at two unique times:

When the process of meaning making is subject to pressure, to converging constraints and options, or to conflict among goals; *and* when writers turn their attention at some level of awareness to managing or negotiating this problematic cognitive and rhetorical situation. (Flower, 1994, p. 66)

The process of constructing negotiated meaning is influenced by outside forces (e.g., language, teachers, collaborators, discourse convention) and voices or knowledge (e.g., goals, constraints, opportunities, experiences, wisdom, conflict).

Evaluation. In my evaluation of the social cognitive theory of writing, I found that it met all seven of the criteria proposed by Dudley-Brown (1997)—accuracy, consistency, fruitfulness, complexity, broad in scope, acceptability, and socio-cultural utility. The social cognitive theory of writing (Flower, 1994) was an important theory for writing because it emphasized the role that society and community play in writing construction as well as cognitive process' role in writing. Research studies have shown that writing and writing development is influenced by society and the cognitive process; however, theorists have failed to recognize such a relationship until Flower did so in 1994. Therefore, I believe that Flower's social cognitive theory of writing is accurate for the present-day writing paradigm. Although Flower (1994) did not provide a synopsis of the reliability and validity of the theory, she did present a theory that was consistent, logical, and connected as well as being consistent in assumptions and propositions (Meleis, 1985).

Flower's theory is fruitful because it revealed new phenomena and the undocumented relationship between social context and cognitive processes in writing (Kuhn, 1977), thoroughly examined the literature that led to its development, showed potential to solve problems, and provided ideas for further research (Newton-Smith, 1981). Flower (1994) claimed her theory was complex and described an intricate number of concepts, phenomena, and relationship in the theory, which Meleis (1985) described

as a complex theory. Also, Flower's (1994) theory is broad in scope because it covered a significant number of related concepts and facts.

Additionally, I found the social cognitive theory of writing to meet the criteria of acceptability. As of March 2013, Flower's (1994) theory has been cited 393 times according to Google Scholar; thereby, presenting a "circle of contagiousness" (Meleis, 1985, p. 159). The theory also has potential of usefulness in practice, education, and research paradigms. Last, the theory met the criteria for socio-cultural utility because it represents a significant practice in society and has the potential to make an impact on society's writing education outcomes. The theory is transferable and consistent with the cultural values and beliefs systems within education.

Overall, the social cognitive theory of writing is the most complete theory evaluated as part of Research Question 1. Its structure included both society's influence on writing as well as the cognitive processes involved in writing development.

Writing proficiency as a complex integrated skill model (Deane, Odendahl, Quinlan, Fowles, Welsh, & Bivens-Tatum, 2008). The writing proficiency as a complex integrated skill model

places a strong emphasis on writing as an integrated, socially situated skill that cannot be assessed properly without taking into account the fact that most writing tasks involve management of a complex array of skills over the course of a writing project, including language and literacy skills, document-creation and document-management skills, and critical-thinking skills. (Deane et al., 2008, p. i)

Therefore, the cognitive processes that are part of writing are inserted within the social situations and contexts of writing (e.g., audience, writing practices, social conventions and institutions) to depict the writing process (Deane et al., 2008). Although the different elements are included in the model of writing proficiency as a complex integrated skill, each element will receive varying levels of attention for different writing assignments and is not equally important for each assignment (Deane et al., 2008). Deane et al.

(2008) postulated that the four most important components of writing are

(a) methods of text organization and their relationship to domain knowledge and working memory, (b) the role of the audience, (c) mastery of textual cuing skills and other writing schemas appropriate to specific modes of writing, and (d) the role of reasoning skills. (p. 17)

First, the art of organizing text and text's connection to domain knowledge and working memory is dependent on the type of writing. The organization of text is dependent on the type of story and the content of the story (Deane et al., 2008). In most cases, stories should follow a natural conceptual organization, which is impacted by the story's content (Deane et al., 2008). For example, a how-to story would be organized by the steps to complete a task. Additionally, domain knowledge provides support in the "planning stage (when the writer must decide how to structure the text) and in reading (when the reviewers or the reader must decide how the material is in fact organized)" (Deane et al., 2008, p. 19). Domain knowledge can increase writing quality because the writer is familiar with the topic of the story, which is connected to the working memory, and the two together are a key component of the writing process (Deane et al., 2008).

“Writing performance depends critically upon being able to recall relevant knowledge and manipulate it in working memory” (Deane et al., 2008, p. 20). The writing proficiency model demonstrates that prior knowledge relevant to the topic as well as working memory affect the quality of students’ writing. Because of the cognitive skills that writing demands, “writers...[with] well-organized knowledge of a domain and concomitant interest in it may have significant advantages and be able to demonstrate their writing abilities more easily” (Deane et al., 2008, p. 20).

Second, the role of the audience is a common problem for many writers (Deane et al., 2008). How writers connect with their audience is dependent on the mode of writing and the writers’ expectations of the audience or readers. Some modes of writing depend more on the audience than others. The audience’s influence and expectations guide the writing process (Deane et al., 2008). For example, if the writing assignment is an argument, then the writer may be writing for an audience who may or may not have the same viewpoint on a specific topic. Therefore, writers must not only develop an argument but they must also provide reasons and evidence that support and refute the viewpoints, objections, and prejudices that members of the audience might have (Deane et al., 2008). Two dimensions of audience exist with the writing proficiency model: audience awareness and adapting content and presentation to an identified audience (Deane et al., 2008). “Awareness of the audience ranges from immediate knowledge of a present audience through intermediate degrees to abstract knowledge of the expectations of an entirely hypothetical, absent audience” (Deane et al., 2008, p. 19). Whereas, adjusting to the audience is dependent on the mode of writing, but typically, it is

adjusting the content of the assignments to the audience's understanding of or interest in a topic (Deane et al., 2008).

Third, writers should master textual cuing skills that are specific to writing genres. Mastery of textual cuing includes conceptual domains (e.g., time reference, event relationships, and points of view) and grammatical categories (e.g., verb tense and discourse connectives; Deane et al., 2008). Mastering textual cuing skills is not automatic; it is something that is learned and developed throughout school. Students cannot be expected to master textual cuing skills without being continually exposed to that specific genre through reading and writing. "Argumentation entails attention to audience reaction and uses cues and patterns not necessarily mastered early in the process of learning to write" (Deane et al., 2008, p. 21). To be well written, persuasive text

requires that the author be able to read his or her own writing from the point of view of a critical reader and to infer where such a reader will raise objections or find other weaknesses or problems in the argumentation. (Deane et al., 2008, pp. 21–22)

Fourth, reasoning skills are a key component of clear, well-developed writing (Deane et al, 2008, p. 22). "Sophisticated writing tasks often pose complex problems that require critical thinking to solve...writing should be used as a vehicle for critical thinking and assessed in ways that encourage teachers to integrate critical thinking with writing" (Deane et al., 2008, p. 22). Being able to reason is to understand both local and global relationships among information. Reasoning skills, as postulated by Deane et al.

2008, are the “ability to generalize over examples,...to compare and contrast ideas, to recognize sequences of cause-effect relationships, to recognize when one idea is part of a larger whole, [and] to estimate which of the ideas is most central and important” (p. 22). Students who possess reasoning skills can connect facts and sources that are otherwise disconnected. Writing is interdependent of critical thinking, reasoning, and argumentation (Deane et al., 2008).

After considering the four important components of writing, Deane et al. (2008) presented the model of writing proficiency as a complex integrated skill, which has five prominent components: audience, automatic processes, strategic problem-solving, underlying cognitive processes, and social context, which are all guided and influenced by the writers’ critical thinking skills. Within each component are activities specific to that part of the writing process. The writing process should be “sensitive to purpose, genre, and context” and should not be generic for all types of writing. Writing is a recursive social activity used as a means of learning and discovery. An experienced writer spends substantial time on the invention and revision steps in the writing process, and they are aware of their audience, purpose, and context. Writing instruction should provide students with opportunities to practice writing and have their materials reviewed by peers. Students should be graded on not only the finished product but also on the process, and the instructor should intervene when necessary (Olson. 1999; see Deane et al., 2008, for the complete model).

Evaluation. After evaluating the writing proficiency as a complex integrated skill model (Deane et al., 2008), I found the model to be accurate, fruitful, complex, narrow,

and acceptable as well as having sociocultural utility, which are six of the seven criterion proposed by Dudley-Brown (1997). Deane et al.'s (2008) model was accurate because it provided a true representation of the culture where the model was designed to be used. In the graphical representation of the model, Deane et al. (2008) used great detail and intricacies to explain writing. Additionally, Deane et al. (2008) incorporated the writing process into the model but did not center the model on the writing process.

Deane et al. (2008) did not provide information about the reliability or validity of the model; therefore, it is hard to determine if the model is consistent. They, however, did provide clarity throughout the model and thoroughly explained the complexities and connectedness of its intricate pieces, but without discussion of validity and reliability, the model did not meet the consistency criteria. The model is capable of being fruitful, but because it was proposed in 2008, it has not established the research notoriety like older process models (e.g., Hayes & Flower, 1980a). Also, if Deane et al. (1980) would have discussed the potential for future research, it would have helped establish the fruitfulness of the model. However, because the Deane et al. (2008) model exposes new phenomena and builds on prior models, I classified this model as fruitful. It has the potential to solve writing problems and improve writing instruction.

Further, the Deane et al. (2008) model was complex because of its intricacies and number of relationships and concepts that were included in the model. Writing proficiency is dependent on numerous concepts and relationships, which were included in the Deane et al. (2008) model. Deane et al. (2008) presented a narrow concept in this model. They stated in the model that writing proficiency is specific to genre and context.

Although graphical representation of this model is more generic and broad, Deane et al. (2008) did discuss factors of writing proficiency for each genre in the model description. Therefore, the model is narrow in scope. According to Google Scholar, Deane et al. (2008) had been cited 11 times as of March 2013, which could be the result of it being published just five years ago. Although it has only been cited 11 times, I do consider the Deane et al. (2008) model to meet the acceptability criteria because it is useful to writing instructors and researchers (Meleis, 1985). The model has the potential to become a part of practice, education, and research, and it can be applied to a variety of writing genres.

Lastly, the Deane et al. (2008) model meets the socio-cultural utility criteria because of its social significance (Dudley-Brown, 1997). Social context is the overarching concept that ties this model together, and it considers society as a key in the development of writing proficiency. This model has the potential to impact writing instruction, and it is transferable to many different writing contexts.

Overall, Deane et al.'s (2008) writing proficiency as a complex integrated skill model is an adequate representation of writing proficiency. It is, by far, the most complete theoretical and graphical representation of writing identified in this study. The writing proficiency as a complex integrated skill model includes critical thinking and social context, two important components of writing, as well as the writing process and the underlying cognitive process that impact writing proficiency. With a few modifications and adaptations to specific contexts, the Deane et al. model has great potential in the improvement of writing instruction.

Summary of the Prominent Theories and Conceptual Model of Writing

My search revealed three theories and seven conceptual models. The Flower and Hayes' (1981) *cognitive process theory of writing* met five of the seven criteria: consistency, fruitfulness, complexity, narrow in scope, and acceptability. Beaufort's (1999) *conceptual model of writing expertise* met all seven of the criteria: accuracy, consistency, fruitfulness, simplicity, broad in scope, acceptability, and socio-cultural utility. Kellogg's (1996) *model of working memory in writing* met five of the seven criteria: accuracy, fruitfulness, complexity, narrow in scope, and acceptability. Hayes and Flower's (1980a) *model of the writing process* met five of the seven evaluation criteria: consistency, fruitfulness, complexity, narrow in scope, and acceptability. Hayes' (1996) *new model of the writing process, revision of Hayes and Flower's 1980 model* met all seven of the criteria: accuracy, consistency, fruitfulness, complexity, broad in scope, acceptability, and socio-cultural utility. Flower's (1994) *social cognitive theory of writing* met all seven of the criteria: accuracy, consistency, fruitfulness, complexity, broad in scope, acceptability, and socio-cultural utility. *Sociocultural theory of writing* met six of the seven criteria: consistency, fruitfulness, simplicity, broad in scope, acceptability, and socio-cultural utility. Bereiter and Scardamalia's (1987) *writing model development, knowledge-telling strategy* met five of the seven criteria: consistency, fruitfulness, simplicity, broad, and acceptability. Bereiter and Scardamalia's (1987) *writing model development, knowledge-transforming strategy* met five of the seven criteria: accurate, fruitful, complex, broad, and acceptable. Deane et al.'s (2008) *writing proficiency as a complex integrated skill model* met six of the seven criteria: accuracy,

fruitfulness, complexity, narrow, and acceptability and had sociocultural utility (Table 4).

Although each writing theory and model brought a unique perspective to writing research, Flower's (1994) social cognitive theory of writing was the most complete writing theory that incorporated an in-depth look at writing as a product of cognitive processes situated in the society. Additionally, Deane et al.'s (2008) writing proficiency as a complex integrated skill was the most complete model because it addressed critical thinking, audience, cognitive processes of writing as well as situating the intricate pieces of writing proficiency into a social context.

Research Question 2: What are the Writing Factors that Augment Critical Thinking and Create Knowledge?

Research Objective 2.1: Determine Faculty Members' Perspectives about the Writing Factors that Augment Critical Thinking and Create Knowledge Using Semi-structured Interviews

Eight interviews were conducted to determine faculty members' perspectives of the writing factors that augment critical thinking and create knowledge. At least two faculty members represented each of the three social science departments in the College of Agriculture Sciences, and one department had four representatives because of the diverse programs in the department. Five faculty members were non-tenure track, and three faculty members were tenure track. The faculty members included in this study were considered experts in their field but not necessarily experts in writing. However, they were deemed credible by their peers to serve as experts pragmatically through teaching writing intensive courses.

Table 4

Summary of the Review and Evaluation of the Prominent Writing Theories and Conceptual Models

Framework	Accuracy	Consistency	Fruitfulness	Simplicity/ Complexity	Scope	Acceptability	Socio-cultural Utility
Cognitive process theory of writing (Flower & Hayes, 1981)		X	X	Complex	Narrow	X	
Conceptual model of writing expertise (Beaufort, 1999)	X	X	X	Simple	Broad	X	X
Model of working memory in writing (Kellogg, 1996)	X		X	Complex	Narrow	X	
Model of the writing process (Hayes & Flower, 1980a)		X	X	Complex	Narrow	X	
New model of the writing process, revision of Hayes and Flower's 1980 model (Hayes, 1996)	X	X	X	Complex	Broad	X	X
Social cognitive theory of writing (Flower, 1994)	X	X	X	Complex	Broad	X	X

Table 4 Continued

Framework	Accuracy	Consistency	Fruitfulness	Simplicity/ Complexity	Scope	Acceptability	Socio-cultural Utility
Sociocultural theory of writing	X	X	X	Simple	Broad	X	X
Writing development model, knowledge-telling strategy (Bereiter & Scardamalia, 1987)		X	X	Simple	Broad	X	
Writing development model, knowledge-transforming strategy (Bereiter & Scardamalia, 1987)	X		X	Complex	Broad	X	
Writing proficiency as a complex integrated skill model (Deane et al., 2008)	X		X	Complex	Narrow	X	X

Because the purpose of the study was develop a model to augment critical thinking and create knowledge, I focused on analyzing the qualitative interview data from the perspective of writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. After analyzing the focus groups, six prominent themes emerged—*importance of writing, writing factors, improving students' writing, characteristics of strong writers, teaching writing, and writing and critical thinking.*

Importance of writing. Faculty members reiterated the importance of students developing writing skills and learning to write because employers have high expectations (NTT01, NTT02, TT03). “Our employers always tell us how important being able to write is...even just to be able to write a memo and an email” (NTT01). NTT02 echoed the importance of writing “[The] first impression in the business is your writing ability—to establish professionalism, to establish diligence, to establish patience in what you want to communicate. Not so much what you are writing but how you come across.” One faculty member (NTT03) said, every student should be able to write comfortably, know what a subject and a verb is, and know what a proper sentence is. “I think that it [writing] is a very undervalued skill but is valued once you get out in the work world” (NTT03).

However, students, many times, do not have the confidence in themselves to get started or revise their work, to state ideas and thoughts clearly, to make decisions or judgments, or proofread a paper (TT02).

Draft one is never good enough[, and they don't] proofread a paper copy. You can't proofread an online copy. Print it out and go away. Read it later. Hand in a paper copy. You notice typographical problems when you print it out. (TT02)

Even though writing is important, students do not know how to write something, set it aside for a day or two, and come back to it later (TT03). “[They need to] read it later as if they were a different person; essentially, they are a different person than they were yesterday” (TT03). Students need to ask themselves, does this really say what I am trying to communicate to the reader? (TT03).

I think students today lack that patience. They lack the ability to leave it, come back to it, and look at it to make sure there are no errors.... The trick is to figure out that time balance. The importance of patience; yet, we live in this multitasking world. How do you balance the patience of ‘let’s bang this out real quick and let’s make it good and revisit it next week’ without that repetition of doing it over again and without getting them to be negative toward it [and saying] wow a lot goes into what you said to where you want it to be what you said. (NTT02)

TT01 echoed that statement:

Time management. They do not spend time outlining and prewriting (They sit down and write as they think. Stream of consciousness. Regurgitating their thoughts. Not planning how they are going to say it). They [students] think because it is an academic paper they have to use as big of words as possible and as many words as possible to sound smarter. They need to understand research

and writing. And going out and finding these resources. Cite and incorporate into your own argument. Finding the balance between making the article personal and using only other peoples thoughts.

Additionally, writing is a “multicircular process” (TT03). One faculty member (NTT03) said it is absolutely about the process of writing. “Writing is always the process. You are never going to get it absolutely right the first time. Writers always need editors. It comes from multiple revisions. If you go through the right process, the end product will be there” (NTT03). The steps in the process are important as well (NTT03). Writing is, also, the “transfer of knowledge from their [students] thoughts to paper and trying to communicate a vision” (NTT02)

I tell them I can’t read your mind so you are going to have to take what is in that mind and put it on paper [to achieve] an universal understanding that I can understand as well as you can understand. (NTT02)

Factors that augment critical thinking and create knowledge. Factors that augment critical thinking and create knowledge included ability to present and defend a topic to a variety of public audiences; opportunities for writing repetition; and rich, timely feedback.

Ability to present and defend a topic to a variety of public audiences. A key writing factor that augments critical thinking and creates knowledge is the ability to present a topic and defend it to a variety of public audiences (NTT01, NTT02, TT01, TT02). Students need to be able to write for explanation (NTT01). “Writing is wonderful, but if you can’t present and communicate it succinctly to a business

professional, then the writing will just sit on a desk forever. Summary is a gift upon itself” (NTT02). Students need to learn to write for a larger audience than their instructors, which was evidenced in the literature (Aaron, 1996; Bereiter & Scardamalia, 1987; Kaufer, 1986; Walker, 2011). Students need to see their writing from others’ point of view (TT03). “[I] try to get the students to put themselves in the shoes of the reader and say how is the reader going to interpret this. What does this say to the reader?” (TT03).

Bring their writings to a public place—not a private place to show them this is what they said. Is this what you meant? Show them how important their writing can be to someone they don’t even know is reading it. (NTT02)

Students need to be able to express themselves and their opinion, make an argument, and support that opinion with facts and evidence (TT01). “We don’t have any strong evidence of student success if we don’t expect them to communicate it back to us. We don’t have the resources and time to get that feedback from students in any other way than writing” (TT02). Students need to be able to realize the things they can and cannot say and understand tone, media training, audiences, and both sides of an argument (NTT02).

Opportunities for writing repetition. Writing repetition is also a key writing factor that augments critical thinking and creates knowledge in the social sciences of agriculture (NTT01, NTT02, NTT03, NTT04, NTT05, TT02, TT03). Writing should be constant, and students should have to write using various scenarios (NTT04) and produce multiple writing assignments (NTT05). Students become better writers by

spending more time writing (NTT02; TT02). The more opportunities students have to write and be critiqued by their instructors, the better writers they will become (NTT01, NTT04). “The more papers you write, the better you get at it” (NTT01), which was reiterated by NTT03 with the “best way for students to become better writers is to write more; it takes doing it over and over again so it becomes second nature.” Students should write at least once a week while completing other writing assignments (NTT03).

The most important thing is just doing it. I don’t believe in writer’s block. You have to start putting words on paper then you can start to work it. Tell me what you want to say and then write what you say. Once it is written, you just have to keep doing it and keep practicing it. (NTT03)

Rich, timely feedback. Writing and feedback should be constant (NTT03). “Constant writing and constant feedback. Every assignment should be graded and explained heavily” (NTT03). Repetition alone does not improve students’ writing abilities—they must also receive timely feedback (TT03). Feedback is an important component of writing (NTT01, NTT03, NTT05, TT01, TT02). “The amount of time spent writing improves student writing only if there is feedback. If I don’t get feedback, I am repeating the same mistake over and over. Limited improvement without feedback” (NTT05).

Instructors should provide students with explicit feedback through rewrite options and recommendations on how to become better writers (NTT05, TT01, TT02, TT03). “Revisions should be better than the original. Sometimes rewrites are a revision of the old paper and an adaption to a new assignment and audience” (NTT01). Another

faculty member (NTT01) said “I don’t want them to just rewrite and make corrections. I want them to think a little bit.” Telling students they can revise can be dangerous because they can turn anything in and fix it later (TT02). “Don’t tell them what to fix. Just tell them it needs fixed” (TT03). Writing intensive courses are opportunities for instructors to provide students with feedback on what they are doing wrong (e.g., grammar, APA style; NTT05). “Help students learn by reviewing because reviewing is what they will do when they are a boss. They will review work more than write when they are bosses. Give feedback in a constructive way” (TT02).

Small courses provide faculty members with the opportunity to have a stronger relationship with their students, which helps faculty members provide more individualized feedback (TT01). Further, faculty members should assign students small writing tasks that build on each other because faculty members can provide more focused feedback throughout the process. Assignments should be like a scaffold—small assignments culminate into larger assignments (NTT01, TT01).

I do the two big [assignments], and they have the mini assignments that lead up to them. Students are working toward a goal of having this big paper. We break it up and are making it manageable enough that they aren’t writing this big paper at one time. Biting off chunks and getting feedback on those chunks as they go. Students write a reflection paper at the end, and it really allows them to see the process retrospectively. They can see ‘wow’ I did learn so much. Reflection about what they liked and didn’t like. Assignments are important. Content may not be as important. (TT01)

Improving students' writing. Instructors can coax students through motivation and guidance (NTT02). It is about embracing the technology they use and using their interests as teaching tools (NTT02).

Motivate them [students] to see a different angle. Bring them [students] into us and say we [instructors] can work with you. Gradually giving students a little bit until they have the whole thing. Not tackling it all at once. (NTT02).

Teaching a one-hour course that introduces students to specific writing styles, document sections, and formats would help students improve their writing. The course content should be taught using a guest lecture series format in a 14-week semester and should provide students with guidance in style, citations, etc., and explain writing components and subcomponents (NTT01). Other instructors recommended providing students with basic grammar sheets (NTT03) and reviewing expectations and tips related to writing at the beginning of the semester (TT01).

Problems are basic fundamental English. I know I said it is important to critically analyze, but we can teach that. I think lots of people don't like to write papers because they don't know how to use English properly. It has been so long since they learned how to properly put grammar into a sentence or they didn't have a good teacher in high school or they tested out of English 104. Requiring two real English courses would be a way to help students. (NTT01)

Characteristics of strong writers. A strong writer can understand the big picture of a document, communicate the information using correct sentence structure, correct grammar, and proper punctuation. Most importantly, they should know how to

use terms and how to spell correctly (NTT02). “Clear writers communicate what it is they are trying to say to the reader. Saying what they are intending to say and avoiding noise” (TT03). Strong writers can organize paragraphs and understand terminology and phrasing, which signifies they are making the right judgment and inferences about the data. They can explain information using evidence; summarize data; be clear, concise, and precise; document thought, and report the basics (NTT02, TT01, TT02). Essentially, they can condense information (NTT01, TT02). A strong writer should be able to

critically analyze a piece of information, a problem, or a question, which is more important than being able to write with correct grammar, spelling, etc. Grammar, spelling, all that is great, but being able to take a question or a problem and figure out the answer first then figure out how to convey that answer to the audience is more important. Being able to critically think and critically analyze a paper would be most important. (NTT01)

Writing is about the thought process (NTT02, NTT03)—“the ability to make the questions flow into a big picture” (NTT02).

Build this pretty picture. Start here and flow to your point. Thought process is big in that. Students are so all over the place. They are micromanaging while they are writing. They don’t take the time to visually build that picture in their head and how they want to communicate it from A to B to C to D. They just go from A to D and then fill in the Bs and Cs. It is the thought process of the continuum—the logical flow. (NTT02)

Another faculty member (TT01) echoed that writing is about logical flow.

Writing is an expression of thinking. First you have to be able to think thorough and plan arguments. Plan responses to things in a clear way. You have to start there. Then you have to be economical with your words, succinct, brief, say everything you need to in as few words as possible. Students think they need to regurgitate words. They think they need to vomit as many words as they can on to the page. I explain to them that it takes away from their main points. It makes points weaker when you try to throw everything in there. Be rational, logical. B logically flows to A. Organize your thoughts. (TT01)

Strong writers, according to NTT03, should be able to do two things—process information (decide what the most important information is and transfer that information into a story) and be grammatically correct. “The most important thing to me is—out of all that information out there—can they figure out what the story is and what is the best way to tell the story so you can relate to your audience?” (NTT03). Also, NTT03 said that strong writers can develop an argument and pick out the most important topic.

Being able to visualize what the story is. You can learn grammar. What makes it news worthy? Editors can work with bad grammar. If someone missed the whole point of the story, you can’t really do anything with that story. If it’s bad grammar, you can fix it as long as the story is there. (NTT03)

Strong writers can analyze information and write an outline. They have an imagination, a dedication to communicate, an understanding of style, a framework, an inquisitive mind, motivation, and a want to know more (NTT04). They can present information from an objective perspective (TT01). Yet, the baseline of strong writing, according to TT01, is

basic grammar rules (e.g., knowing where an apostrophe goes, knowing where a comma goes, knowing how to spell words, knowing what a subject and a verb are, knowing not to mix singular and plural). Developing content for strong arguments is built on an understanding of basic writing skills (TT01).

Teaching writing. Teaching writing included types of assignments and resources. Reading information and material related to the disciplines should be assigned to students (NTT03, TT01). “Reading is a huge component of becoming a better writer” (NTT03). More reading should be required in writing intensive courses because it forces students to read the type of style they are expected to write (NTT03). The more students write and the more they read, the better writers they become (TT01).

One faculty member (NTT01) said he designs assignments so students understand structure, organization, and writing for a specific audience.

In class writing gets students started. I focus on one thing. Learning how to write a major point. Define what the major point is. Get students to understand paragraphs and sections. The introduction is where you set up the paper, and clarity is so important in that first couple of paragraphs. If your introduction isn't setup well and it doesn't clearly define what you want to say, it is not a good introduction. Introduction is the roadmap paragraph of exactly what you are going to say. It just gives clarity to the paper. ... I usually have some research papers, but I also have policy papers. I want them to be able to take a question, make an analysis using math and computers, and be able to explain what they did to an audience and not just one audience but to different audiences. You can

write a paper that is very easy, but you can write it differently for three or four different groups. I want them to be able to do the work and interpret it and tell different groups what they did. (NTT01)

According to TT01, assignments should be applied and not abstract. For example, students in his class research an organization and write about a specific topic related to that organization. The students are guided by their defined organization, and at the end of the project, they present their project to the organization's board of directors. Also, students in his class take a problem or case study and write a solution to the problem as a group as well take two essay exams that require them to articulate a clear, coherent argument, which builds into two big writing assignments.

Writing intensive courses also provide students with resources to improve their writing abilities (NTT05). The agricultural economics writing lab provides support for students because they can come in for help with writing and developing course assignments (NTT01). Purdue Owl is a great online resource that helps students properly use APA style because it provides clear, concise examples of proper grammar. One faculty member (TT01) said he provides his students with examples of good papers and leaves gaps to let them think about how to do things, which makes them come to office hours to get feedback and help. TT03 stated he provides his students with experience in, resources about, and instruction on peer evaluation and how to be their own editor, specifically instruction on how to get someone else to edit it before turning it in for feedback from the instructor.

Writing and critical thinking. Writing is a method of thinking critically (TT01).

“Writing papers is the best way to assess somebody’s knowledge of a topic” (TT01)

because writing assesses many things (i.e., research, communication skills) that other methods cannot. In writing intensive courses, students think about things in deeper, more complex ways, and they think more thoroughly about the application of their course and their setting (TT01). Writing helps students understand the content of the course.

“Writing is the assessment. Writing instruction is the byproduct of that. I want higher quality products. I want higher quality papers being turned in” (TT01).

[Writing is a] window into the brain in terms of how people think, how they make and support arguments, and how they solve problems and use resources.

Writing assignments give students the opportunity to use their resources and to find support and answers and then articulate those. We are not putting students

on the spot. Giving students enough rope to hang themselves. Essentially they get the opportunity to demonstrate everything they can do. And there are no excuses.

It’s time management. It’s the ability to use resources. It’s the ability to

communicate, to figure out the priorities, and to position different ideas and concepts in terms of making an argument. Positioning students to do that not

only helps them to learn but also positions them better for work force

preparation. Being able to communicate and think critically about things and fill in the gap of getting students to be critical thinkers and communicators. (TT01)

Students should be able to demonstrate with they learn in a written form (TT02).

Writing requires students to spend time struggling with their own ideas and putting those

ideas on paper in an organized way. “To succeed students are going to have to write. The writing part is what gets the students from a number cruncher to a good decision maker” (TT02).

Research Objective 2.2: Determine Students’ Perspectives about the Writing Factors that Augment Critical Thinking and Create Knowledge Using Focus Groups

Three focus groups were conducted to determine students’ perspectives of the writing factors that augment critical thinking and create knowledge. A total of 15 students participated. Students ($N = 15$) who participated in the focus groups had a GPA mean of 3.16 on a 4.00 scale. The GPA mean was 3.21 for focus group one, 2.86 for focus group two, and 3.64 for focus group three. Two-thirds of the participants were males, and 50% of the participants were agricultural leadership and development majors. The majority of the participants planned to graduate in 2013; therefore, most of them had met both writing intensive course requirements (Table 5).

Table 5

Student Demographics and Writing Intensive Courses Taken

	Focus Group One ($n = 6$)	Focus Group Two ($n = 6$)	Focus Group Three ($n = 3$)	Total ($N = 15$)
Gender				
Male	2	5	3	10
Female	4	1	0	5
Major				
Agricultural Business	2	1	0	3
Agricultural Economics	0	2	0	2

Table 5 Continued

	Focus Group One (<i>n</i> = 6)	Focus Group Two (<i>n</i> = 6)	Focus Group Three (<i>n</i> = 3)	Total (<i>N</i> = 15)
Agricultural Leadership and Development	4	3	1	8
Agricultural Science	0	1	2	3
Expected Graduation				
2012	0	0	2	2
2013	5	5	1	11
2014	1	1	0	2
Courses Taken				
AGEC 217	1	4	0	5
AGEC 429	2	4	0	6
AGSC 384	0	0	2	2
AGSC 402	0	0	2	2
ALED 340	4	1	1	6
ALED 440	3	3	1	7

Note. One student was a double major in agricultural economics and agricultural leadership and development.

Because the purpose of the study was to develop a model to augment critical thinking and create knowledge, I focused on analyzing the qualitative focus group data from the perspective of writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. After analyzing the focus groups, five prominent themes emerged—*definition of writing, characteristics of strong writers, writing instruction, critical thinking and learning, and writing intensive course experience.*

Definition of writing. Students defined writing as the act of communicating thoughts (M007), a clear message, and a point of view (M003). Ultimately, writing is “taking everything you know [about a topic] and putting it into cohesive format” (T001). Writing is the ability to explain situations (M005) and express thoughts in an organized manner (M010). Another student (M003) expressed that writing is a layering process that starts with the basic ideas of the topic while continuing to write down ideas, build on existing ideas, and add more information to the structure. Writing is about synthesizing and collaborating thoughts (M001); “research everything then write, edit later (really just taking away not adding)” (M010). Writing is using letters to convey a message (T103) and putting thoughts on paper in a clear, concise way (T101, T105). “Words create a worldview” (T001), which is constructing the world using words and helping someone see the world in a new way.

However, one student (T001) said the definition of writing is hard to describe because writing concepts are subjective and it depends on the context. The definition of writing is different for creative writing and academic writing according to one student (T004). With creative writing, one expresses feelings; whereas, academic writing is writing about research and research findings. Additionally, academic writing includes writing about facts and theories for research manuscripts and journals (T004).

Characteristics of strong writers. Characteristics of strong writers included adapting prose to fit the audience, applying writing to real-world scenarios, developing a strong argument, having a specific voice, and understanding grammar and mechanics.

Adapting prose to fit the audience. Another main characteristic of strong writers, according to students (M003, T001, T009, T010, T103, T105), is the ability to adapt prose to an audience. Writers should be able to connect with their audience (M003) and tailor what they write to a specific audience (T001). First, writers should identify to whom they are writing before moving forward with the process (T001). Often times, the audience determines the length of the document because the length has to fit the needs of the audience. Therefore, good writers know when to condense information to the underlying message and when to write a lot (T009, T010). “Do not bore [your] readers. Say something. Get to the point” (T105).

Applying writing to real-world scenarios. Agricultural business and economics students use writing to plan, design, execute, and evaluate real-world examples and apply writing skills to agriculture policy and current event issues (T010). Writing tasks should be applicable to the real world. For example, agricultural journalism students should write things specifically for journalism. “It is not about academia writing but about real-world writing. We should apply what we learn to the real world” (T010). Agricultural business and economics courses (AGEC 217 and AGEC 429) provide students with real-world writing assignments. For example, students have to write a concise three-page memo. Students are expected to condense it to a one-page memo for a different audience (T004, T008, T010). “It’s just like the real world” (T004). AGEC 217 helps students learn to write cover letters and memos, which are the types of writings that students will do in the real world (T008, T010).

Developing a strong argument. Students believe that they have gotten better at developing arguments, a characteristic of strong writers, since starting college (M001, M010). “Now I feel I can gather information to develop a well-supported argument—one that is more based on facts” (M010). “I use to develop an argument based on emotions. Writing intensive courses have taught me how to use facts to make arguments and logical fallacies” (M001). Strong writers have the ability to write based on fact and opinion and use writing to formulate ideas and solve problems (T010). Developing an argument is researching a topic, pulling facts and statistics, applying it to an argument, making it flow, and summarizing it (T009).

Having a specific voice. Writers should have a specific voice (M010), the ability to elicit emotions from their readers (T002), and use a variety of resources in their writing (M003). “Writing should be skills based” (M003), which includes writing process knowledge, industry and discipline knowledge, writing conventions and editing knowledge (T001, T103), and the ability to convey a message using an introduction, body, and conclusion (T008, T009). One student said (T105), “you have to have knowledge of what you are writing about.”

Understanding grammar and mechanics. Good grammar skills are necessary for strong writers (M001). Strong writers should be able to avoid blatant mistakes like “you, you’re, your” and “their, they’re, and there” (T105). “There should not be those types of errors; those errors make people sound uneducated” (T101). Reading papers for friends helps students to learn about and avoid common mistakes and pitfalls (T101). “I have read so many papers for friends and peers. I can’t believe the amount of people who

have a hard time spelling. It blows my mind. It just throws me off—I don't get it” (T101).

However, students believed that college students consistently make several writing mistakes: commas (M004, T008, T101, T103, T105), grammar (T002, T008), style (T103), organization (M004), format and structure (M004), references (M010), citations (T004, T101, T103), capitalization (M001), and punctuation (T010). One student (M001) said the hardest things for him to understand was the inconsistencies of instructors' thoughts on grammar and mechanics. Another student struggles with getting carried away with a thought and getting off topic (T002).

Writing instruction. For the purpose of this study, writing instruction included teaching strategies, faculty interaction, clearly articulated examples of written tasks, types of writing tasks, faculty- or peer-provided feedback, as well as writing resources.

Teaching strategies. Teaching strategies and methods of delivery can affect what students learn in the writing classroom (M001, M003, M004, M005). One student (T008) said he likes to be given general freedom in a course because he does much of his own exploration before the class period so he knows the material and is prepared for class. An agricultural business major (T010) said he likes to read industry-related materials because “you can learn the vernacular and the industry's style.” Another student (M003) said “[It is] the teachers who have my attention early and I am willing to listen to what they have to say. The ones I can pick up tricks to make [writing] better. For example, sentence structure and how it makes the message better for the audience” (M003).

An instructor who builds a rapport is important. “[I like] a teacher who builds rapport. I take value in the criticism from teachers who have built rapport with me. If the teacher has not built a rapport with me, I don’t take the criticism as important” (M010). Communication is another valued teaching strategy.

I like when the professor talks about it [the writing task], so it isn’t as hard, where they don’t just throw you in it. It is like at the beginning of the semester, and they say you have all of these papers to write. Then, when it comes time to write them, they give you help and examples—I like that. (T105)

M004 said she appreciated an instructor who pushes her and sets high expectations. “I didn’t care what I was researching, but if the level of expectation was there, it helped me learn the subject matter. It [200-page conservation report] was a challenge because the assignment prepared us to go to work for a consultation company” (M001). M003 said he liked instructors to have expectations, but if they were high and the guidelines were too extravagant, than that defeated the purpose of a learning assignment because unrealistic writing assignments hinder students writing and affect their effort. “Over-the-top expectations where no one can succeed put you down. When teachers have expectations, they are rigid on grading. I like the flexibility with lots of professors” (M001).

Writing repetition is important (M007, T009), and instructors should continue to push quality writing (M003). “It is about quality over quantity” (M007). The amount of time students spend writing can impact how much they learn in a course and how much they improve as writers. “When I procrastinate, I don’t learn as much. When I spend

time writing and build on it, I have a product” (T008). “You have to keep at it. One photograph does not make you a good photographer. [It is] the same with writing. To be good you have to have feedback and build on it” (M007).

Faculty interaction. M003 said he likes one-on-one interaction from his professors; however, he has only had one professor who provided him that interaction. “Most professors are not helpful; they don’t care enough to put forth the effort. You get a grade; that’s it (M003)” Although ALEC 380 was not a writing intensive course, it required many writing tasks. “McKim’s [class, ALEC 380,] is the only one I enjoyed [writing in] because he was helpful” (M003). “It is the structure. In ALED, we know the professors and can talk to them about ideas, and that helps” (M004). However, T002 disagreed “ALED 440 was pretty bad ... not going to lie. [There just] wasn’t any interaction about papers.”

Another student (M010) said she did not like one-on-one faculty interaction because the lack of interaction better prepares her for her career.

We only had two days to turn around assignments. The quickness of the turnaround did not allow us time to get help, but it prepared us for the industry.

Help from the professors was available, but we didn’t always get it.

Students will not have as much opportunity for supervisor interaction in the workplace, but at the learning stage, faculty interaction helps because students are trying to learn new things every day (M003). However, several students (T004, T008, T103) said that, although faculty interaction may have been available, they did not use it much. Large

classes hindered faculty interaction for one student (T004). “He gave us assignments. We wrote it. We got the grade back.”

Clearly articulated examples of written tasks. Students (M001, M005, M010) said, if faculty members provided examples, they did not gain as much from the course. “I didn’t excel in classes that had formats. Without examples, I am not tempted to follow a format. My work is more original and creative without examples” (M001), which was echoed by M010—“Having examples hindered my creative thinking. I work better in no example environments.” One student (T009) said classes with examples are easier. “I like it to be spelled out. It is easy when it is spelled out, but it doesn’t produce the best paper. Writing about a topic is more about what you know, but it is hard. That way causes you to research and learn information” (T009). M005 said she preferred broader requirements because specific requirements caused her to not want to do research. “I liked the examples, but messing up and then fixing it helped me learn” (T103).

We did not get one example of a 150-page paper, which was overwhelming at first, but then guidance wasn’t necessary. Not all groups excelled without guidance, but ours did. We had a plan of attack, but some groups did not. It was a very science method. (M001)

However, some students (M003, T101) believed that examples helped them become better writers and that instructors did not provide enough concrete examples. “Everybody is afraid when it has to be a cookie cutter format. That’s why I always want to see examples” (M003); “I like teachers that show me a good example of what they expect. Even if it is different, show me what you want” (T101). Some students just need

a template (T101). One student (T004) said she liked good and bad examples. However, not all students were fortunate enough to get good and bad examples (T002).

Another student (T008) said, “if I get an assignment with just a couple of specifics, it is tough. Roll the dice, see what comes out.” The first paper in a class is always to see how the instructor grades (T004). “It is a trial by fire. You learn by doing. If you get an email from the instructor, you learn to fix it” (T008). “I really think it depends on the department. I feel like our professors [ALED professors] help lead you to the final step. When I took a class in agricultural economics class, I didn’t get examples. I didn’t even get deadlines for papers” (M004). Also, it depends on what the writing task includes. Examples of APA formatting are helpful although it seemed boring at the time (T101, T105).

Rubrics help the students make sure the final paper includes all the pieces (T001, T010). Some instructors provide rubrics that students look at before they turn in the assignment (T010).

I guess it depends on what you are comfortable with as a student and a professor. Slight rubric with just enough guidance or lots of interaction with having the option of the professor looking at it. Writing concept is subjective, and rubrics provide points. Without them, it [writing] is chatter. (T001)

Types of writing tasks. Students in the social sciences of agriculture were asked to complete different kinds of writing tasks—research papers (T103, T008, T010, T105), informative papers (T008, T010), résumés (T010), memos (T010), policy papers (T008), reflection papers (M004, T002, T103), autobiographies (T103), lesson plans (T103), and

philosophy statements (T103). Some students believed that certain writing tasks helped them become better writers (T004, T103). “I liked AGSC 384 and writing lesson plans. It seemed like a lot, but it prepared me” (T103). “AGEC 429 [helped me] take a stance, persuade a senator, and learn more about how policy makers do their work” (T004). Whereas, other students believed that they learned how to write outside of the social sciences because they had to do research and spent less time regurgitating information (M004, T002, T009). “We talk about our feelings so much in ALED. The papers outside of ALED are the best—like the research papers. I work harder on the papers I am passionate about” (M004). “Stupid papers have no meaning. For example, what does a leader mean to me?” (M003).

Developing one writing task that continues to build on smaller projects throughout the entire semester is a great way to learn writing (T002, T008, T009). “Working on a project all semester is better than short assignments” (T002). “Doing research and writing until you have a project helped me learn about my project and about writing” (T008). One student (T009) said he took a learning organizations course, and he had one-on-one interaction with his peers and instructor. He really enjoyed it because they researched topics, wrote papers about the topic, and then taught their peers.

Faculty-, teaching assistant-, or peer-provided feedback. Feedback is important if the instructor is going to require so many writing tasks (M005). “The biggest thing I expect is to have feedback in a timely manner. Don’t give it back to me too close to when another assignment is due because then I won’t have time to incorporate the feedback before the next one is due” (T101), which was echoed by T105. Students

(M001, M007) reported they liked all kinds of feedback because it “is a learning experience” (T009) and it is nice to know what would have made it an A (M007). However, most of the feedback students received was about grammar and conciseness (T101, T103) and not as much about clarifying statements (T105). “Professors need to give more feedback related to thoughts and not as much about grammar—the kind of feedback that improves the quality of the paper” (M003), which was echoed by M001. “Correcting my grammar doesn’t help. I want them to say develop thought here. Take away here to help” (M003). “It is great to know how to spell things right, but I would have liked more on material and content. I want to know how I am doing on my content” (T101).

Some students (M010, T105, T103) said they never get feedback. “In ALED 340, we didn’t get any feedback, so I would take it in to the professor before it was due to have him look at it. In 440, we got to do rewrites” (T105). “As long as you understand APA and citations, you are good most of the time.” Some of the professors grade hard, but the suggestions were positive and we knew the expectations (M001). However, T010 commented, “feedback was good on both AGEK courses, and the professor was approachable.” Another student (T101) said “it is important to not shoot your students in the foot though. Make it [feedback] a constructive exercise. Lots of students don’t participate in class for fear of being shot down” (T101). M010 said that, if she wants feedback, she has to visit her professor because she only gets grades in class. “Having the professor look at the graded assignment and explain it was the most helpful” (T004).

Teaching assistants are a major source of feedback in writing intensive courses; however, students did not believe they are the best source of feedback (T002, T009). “The graders in the agricultural economics writing center would grade the grammar and sentence structure and the TA would grade the content. They did not understand the rubrics, so the professor would just raise the grade without providing feedback” (T009). One student (T004) said she takes professors’ grades more serious. “No offense against TAs, but when they grade my papers, I think they believe they have a point to prove and they just mark stuff up. Professors give good feedback. Good thoughts, like do this do that. I didn’t feel motivated with the feedback from the TAs.” (M004). “In ALED, the TAs give papers back with feedback, which helped me see what was wrong so I could fix it” (T001).

Writing resources. Students reported that they use a variety of resources to help them with their writing tasks: library database because it is comprehensive and the most essential tool to filter information (T001, T002); peer-reviewed journals (T004); Google Scholar (T004, T101, T103); library books (T002); outside resources that are related to course material (T008); how-to reference books (T101); credible resources on the Internet (T009); references and tasks from prior courses (T101); Worldcat.org (T103); and experts on the topic (T101, T105). “Yes, [there are] so many resources we get in classes. I have several books I have kept from classes to use as guides. The greatest book ever is a little blue format book we had for a textbook” (T101). However, some resources, like easybib.com, are great, but they can cause issues with writing (T105).

I remember resources like Google Scholar from those classes [where instructors explain writing tasks]. Resources like that make it so much easier when it comes to researching and finding stuff online—any journal articles or anything. Also, you can find papers on there that professors from Texas A&M wrote. (T101)

Critical thinking and learning. Some students believed that writing intensive courses helped them to think critically (M001, M010) and others did not (T001, T002, T008, T103). Writing may help students think critically because “when you write, you defend the information, and when you have to defend the information, you have to know your stuff” (M001). “We have always been told to think critically. I hate that term. There is no right answer to the things they ask us to think critically about” (T105). With writing, students have an end goal; with testing, students only learn the basics (M001). One student (T001) is more willing to write than take an exam because study guides stress her out.

One student (M003) said that the writing assignments that made him think were the most engaging. “I had the drive to complete the paper. It was my own pursuit” (M003). Another student (M001) echoed he liked the challenge of discovery assignments. Agricultural business students (T004, T009) said they appreciated assignments that required them to research a topic and present the topic’s opposing viewpoint because it helped them realize more than one view existed. The assignments helped the students think critically and learn more about the topic. One student said (T009) “I still believe the way I did, but it altered my thinking some. My thoughts are closer to the middle than they were before the assignment” (T009).

For one student (T004), it was not the writing assignments but the overall college experience and the questions professors have asked in both writing intensive and non-writing intensive courses. Another student (T002) said, “I feel I was exposed to thinking critically sooner than some. It [critical thinking] hasn’t increased or weakened in my agriculture courses; it has sustained.” T001 said his critical thinking skills have not developed much in college. He learned to think critically when he was on the debate team in high school because he had to take positions and make arguments. “During this [focus group], I just wrote down that writing develops critical thinking. In college, I have developed critical thinking” (M007).

Writing intensive course experience. “I enjoyed the classes [writing intensive courses], but I am not better because of them” (M010). Improvement comes from specific feedback. Vague feedback, like yes, it is good or no, it is bad, does not help a student improve. Specific feedback helps students improve (M010). Feedback in writing intensive courses has not helped one student (T002) become a better writer; however, feedback in non-writing intensive courses has helped her become more comfortable with her writing ability. “It is ok to have a professor look at it I guess. I mean to get feedback from a Texas A&M professor. It did broaden my writing” (T101). Although students do have the opportunity to broaden their writing experience and write often in writing intensive courses, one student (T105) said he still uses Google for formal writing.

Writing intensive courses do provide students with writing resources they can use as guides in the future (T101). “I want to be a lawyer or go into government relations, which are two of the careers more focused on writing. [It is important] for me to write,

understand research, and [form] cohesive sentences” (M001). Writing intensive courses have helped students learn ways to effectively portray thoughts, learn the diction of the discipline, overlook the fluff, and get to the point (M001, M004, T001). One student (M004) said writing intensive courses provide her with writing opportunities that challenged her and helped her discover the vocabulary used in her discipline, but she does not feel confident writing about research. “I learned material because I wrote about it. I understand it [material] because I wrote it” (M010).

However, often times, the instructors were so busy trying to teach to the less advanced students that the course material and writing instruction was not as advanced as it could have been (T101, T103, T105). “It was more like English” (T103); “we never got to the next step. I would have liked more about the content” (T101). Because some students were not as advanced as others, the advanced students just had to sit and listen to what they already knew (T101). “When other kids are lost because of the expectations, then I don’t feel like I get the instruction I should because we are having to hold up class for those who don’t know what it going on” (T101).

“Writing intensive courses went more into the areas I didn’t learn in high school and opened my eyes to types of writing instead of research” (T010). In high school, students were not expected to be as specific in their writing as they have been in college (T001, T009). Even if the writing task was wordy, students would get a good grade and the teacher was pleased. Whereas, writing in college is about being specific and using the diction and structure designated by the discipline (T001). “I learned mechanics my junior year, which helped because I have had no trouble in college” (T103). T105 said

“we didn’t get as much feedback in high school. Dual enrollment courses were where I learned how to write.” One student (T101) believed he was well prepared in high school. “When we started he [high school writing teacher] gave us a foundation in line with the Texas tests. We started writing paragraphs, and then we would write a page and then multiple pages. We built on what we needed. I love writing teachers like that because I am a person who likes order, and learning to write like that helped me” (T101).

Another student (T010) believed he could use information accurately and effectively because he had a high school teacher who challenged him to write and think critically. “Writing in high school gave me everything I needed to write. College helped hone in on the skills instead of skipping four years of writing instruction and then being thrown into a job and not know what is going on” (T101).

Research Objective 2.3: Determine Faculty Members’, Students’, and Administrators’ Perspectives about the Writing Factors that Augment Critical Thinking and Create Knowledge Using Q-sort Interviews

Data analysis. To accomplish Research Objective 2.3, I interpreted the three extracted factors as *writing as a process*, *writing as an application and a development of thought*, and *writing as an advanced skill guided by complex reasoning*, which were the P-set’s overarching perspectives of writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. Each one represents a perspective held by stakeholders in the College of Agriculture and Life Sciences. Each perspective was described in narrative form as well as in tabular data form to define the specific perspectives held by the stakeholders. For each factor, specific statements that describe

the factor were presented as well as the statement number (SN), z-score (z), and factor array position (FA) for each statement discussed.

Correlation matrix. The final factor rotation showed low correlations between the three factors (Table 6), and the three factors explained 51% of the variance at the $p < .05$ level. The low correlations represented dissimilarities among the three factors, which denotes that each factor represents unique perspectives (Brown, 1980). Correlations were determined on a scale of 0.00 to 1.00, where 0.00 is representative of no correlation and 1.00 is representative of a perfect correlation.

Table 6

Correlations Between Factors

	Factor 1	Factor 2	Factor 3
Factor 1	—		
Factor 2	.22	—	
Factor 3	.44	.24	—

Factor solution. A factor is considered significant if its factor loading is ± 0.40 (Field, 2009). Therefore, the Q-sorts with at least a significant factor loading of ± 0.40 or higher were considered a defining factor. With ± 0.40 as the defining significance level, seven of the 10 sorts loaded on one of the three retained factors. Two sorts defined Factor 1, two sorts defined Factor 2, and three sorts defined Factor 3 (Table 7). Three Q-sorts were determined as non-significant to the sort and were not used as part of the factor interpretation. Non-significant Q-sorts (S01, F01, & F03) did not meet the criteria

set forth as significant criteria, concluding that the three participants have perspectives different from those represented in the factors of this study, and were not used in the interpretation of the study. Only those Q sorts that loaded purely on a single factor with a significance level of ± 0.40 , which are flagged and bolded in Table 7, were used as defining sorts for interpretation of factors.

Table 7

Factor Solution

Q-Sort	Factor 1	Factor 2	Factor 3
A02	.8776X	.0793	.1317
A03	.7504X	.0709	.2229
S03	.2132	.8959X	.0360
F02	.0858	.8287X	.1360
A01	.0639	.0863	.7940X
S04	.2064	.2674	.7472X
S02	.4079	.1818	.5826X
S01	.4079	.0561	.0219 non-sig.

Table 7 Continued

Q-Sort	Factor 1	Factor 2	Factor 3
F01	.2078	.2192	.1148 non-sig.
F03	.1126	.0616	.1625 non-sig.
No. of defining sorts	2	2	3

Note. Factor loading $> .40$ are in boldface; an “X” indicates a defining sort.

Factor scores. PQmethod 2.32 was used to calculate the factor scores (z scores) for each statement within the specific factor. A z score, which measures how far the statement is from the center of the distribution (Field, 2009), was used to generate a factor array for each factor. A factor array is a graphical description of how a Q set with a 100% loading on a factor would be arranged (van Exel & de Graaf, 2005). Statements with the highest z scores are situated on the far right of the factor array, representing a position of +4, and statements with the lowest z scores are situated on the far left of the factor array, representing a position of -4.

Interpretation of factors. The interpretation of the factors was achieved through a thorough analysis of the factor arrays, which describe the level of statements from positive (“most like I think”) to negative (“most unlike I think”) with neutral statements in the middle. The statements were interpreted individually as separate statements and holistically as a part of a larger factor. After interpreting the z scores and factor arrays, I reviewed the qualitative comments that the participants provided during the Q-sort interviews. The Q-sort qualitative interview data provided triangulation to the statistical z score tests.

Distinguishing statements. A distinguishing statement has to have a statistically different placement in one factor array than it did in the other factor arrays, which helps to further define the perspectives of the stakeholders. Even though the z scores of the distinguishing statements may not be an important piece of the study, they were statistically different between the perspectives at the $p < .05$ level.

Factor 1: Writing as a process. *Writing as a process* was defined by two Q sorts and accounted for 17% of the variance. The *writing as a process* perspective has an emphasis on the statements that define writing as a process guided by society. Although it includes statement no. 27, holistically the statements represent different defining steps of writing process models (e.g., Hayes & Flower, 1980a). Participants with this view believed that writing is developing content using examples and application of relevant information while receiving peer and instructor feedback and using proper grammar. The writing process should be guided by societal knowledge and lots of writing during students' collegiate career. Unique to this factor is the inclusion of grammar in the "most like" statements. A3 said that writing intensive courses should help students with proper grammar and mechanics of writing and provide them tips on how to avoid grammar and mechanics pitfalls.

Two of the 10 participants loaded on Factor 1, and they were current or former administrators in the College of Agriculture and Life Sciences during the planning, development, implementation, management, and evaluation stages of the writing intensive program. The core beliefs of *writing as a process* are the application of relevant information to a problem is critical thinking (SN = 21, FA = +4, $z = 1.78$) and applying this information requires knowledge about society (SN = 27, FA = +4, $z = 1.62$). In addition, writing that is focused on students' development of content and grammar should be included in writing curriculum for all four years of students' college education (SN = 26, FA = +3, $z = 1.58$; SN = 7, FA = +3, $z = 1.38$; SN = 8, FA = +3, $z = 1.26$). One participant (A2) said the issue is not the level of the course—it is that

students need practice writing. A secondary belief of the *writing as a process* perspective is that assistance and feedback are important writing factors (SN = 30, FA = +2, $z = 1.22$; SN = 17, FA = +2, $z = 1.10$; SN = 36, FA = +2, $z = 0.73$; SN = 20, FA = +2, $z = 0.69$). Overall, this perspective included statements that defined and represented the traditional writing process.

Table 8 provides a tabular representation of the statements with an array position of 4 to 2 and -2 to -4, which are the top 10 statements for “most like I think” and “most unlike I think” for Factor 1. For a complete factor array of Factor 1, see Appendix P.

Table 8

Factor 1: Writing as a Process

No.	“Most Like” Statements	Array Position	z score
21	Using writing to apply relevant information to evaluate a problem promotes critical thinking	4	1.78
27	Societal knowledge is a key component of the writing process.	4	1.62
26	Lots of writing practice is what students need throughout the four years of their college education.	3	1.58
7	Grammar is critically important.	3	1.38
8	Content is critically important.	3	1.26
30	Timely instructor feedback is critical.	2	1.22
17	Examples of well-written work help students become better writers.	2	1.10
36	Writing instructors are coaches and facilitators.	2	0.73
20	Peer review activities promote writing and critical thinking skills.	2	0.69

Table 8 Continued

No.	“Most Unlike” Statements	Array Position	z score
9	Research increases challenge in a writing intensive course.	-2	-0.89
24	Good research leads to well thought out, well-articulated prose.	-2	-1.02
35	Writing is a stream of consciousness.	-2	-1.09
19	Writing should be reflective.	-2	-1.22
6	Writing is subjective and a more trial by fire approach	-3	-1.26
16	Writing intensive courses should be 400-level courses.	-3	-1.38
15	Writing intensive courses should be 200-level courses.	-3	-1.58
18	Well-written examples discourage student critical thinking and creativity	-4	-1.78
32	Writing is important, but writing intensive courses are not.	-4	-1.78

Factor 2: Writing as an application and a development of thought. *Writing as an application and a development of thought* was defined by two Q sorts and accounted for 17% of the variance. The *writing as an application and a development of thought* perspective had an emphasis on the statements that defined writing as a technique to apply information and thought and as a technique to transform thought into information. Participants with this view believed that writing is using real-world scenarios to apply relevant information, solve problems, develop an understanding of systems, and target specific audiences.

Two of the 10 participants loaded on Factor 2. One was a student in one of the three social science departments in the College of Agriculture and Life Sciences, and

one was a faculty member in one of the three social science departments in the College of Agriculture and Life Sciences. The core beliefs of *writing as an application and a development of thought* are the application of relevant information to solve a problem is critical thinking (SN = 21, FA = +4, $z = 1.76$) and students should use writing as a way to solve problems throughout their college education (SN = 26, FA = +4, $z = 1.71$). One student (S3) stated that writing is a product of critical thinking.

In addition, writing is an analytical technique that writers should use to develop thought, understand systems, and convey specific information (SN = 29, FA = +3, $z = 1.71$; SN = 31, FA = +3, $z = 1.24$; SN = 4, FA = +3, $z = 1.19$). One faculty member (F2) loved the concept of writing is the window to the brain and the mental picture portrayed by that phrase. A secondary belief of the *writing as an application and a development of thought* perspective is that reading is an important part of writing success as well as using knowledge about society to understand and write to a specific audience using real-world scenarios (SN = 10, FA = +2, $z = 1.10$; SN = 33, FA = +2, $z = 0.91$; SN = 27, FA = +2, $z = 0.80$; SN = 3, FA = 2, $z = 0.85$). S3 noted that societal knowledge is key because “the best writers are the smartest writers.”

An interesting note of observation was that one student said (Q03) grammar should be important, but it is not because argument is more important, which would provide some explanation of why grammar loaded as a -4. Overall, this perspective included statements that defined writing as a tool to apply and develop thought, which promotes critical thinking. Table 9 provides a tabular representation of the statements with an array position of 4 to 2 and -2 to -4, which are the top 10 statements for “most

like I think” and “most unlike I think” for Factor 2. For a complete factor array of Factor 2, see Appendix Q.

Table 9

Factor 2: Writing as an Application and a Development of Thought

No.	“Most Like” Statements	Array Position	z score
21	Using writing to apply relevant information to evaluate a problem promotes critical thinking	4	1.76
26	Lots of writing practice is what students need throughout the four years of their college education.	4	1.71
*29	Writing is the development of clear thoughts and the window to the brain.	3	1.71
31	Writing is about understanding how things fit together.	3	1.24
4	Strong writers should know when to write a lot and when to condense information.	3	1.19
10	Students should be given real-world assignments in their disciplines because they will have the necessary topic knowledge.	2	1.10
33	Reading is critical to writing success.	2	0.91
3	Strong writers should tailor what is written to their audience.	2	0.85
27	Societal knowledge is a key component of the writing process.	2	0.80
8	Content is critically important.	-2	-0.66
30	Timely instructor feedback is critical.	-2	-0.66
16	Writing intensive courses should be 400-level courses.	-2	-0.85
25	Writing labs support student writing efforts.	-2	-1.38
12	Writing should be concrete and applied.	-3	-1.38
20	Peer review activities promote writing and critical thinking skills.	-3	-1.43
11	Writing is a chore.	-3	-1.76

Table 9 Continued

No.	“Most Like” Statements	Array Position	z score
15	Writing intensive courses should be 200-level courses.	-4	-1.90
*7	Grammar is critically important.	-4	-1.90

*Denotes a distinguishing statement; $p < .05$.

Factor 3: Writing as an advanced skill guided by complex reasoning. *Writing as an advanced skill guided by complex reasoning* was defined by three Q sorts and accounted for 17% of the variance. The *writing as an advanced skill guided by complex reasoning* perspective had an emphasis on the statements that defined writing as an advanced skill that includes a consideration of audience to guide the research process and content development. Participants with this perspective believed that content should be developed through research and that writing, which should be taught in upper-level courses, is one way of understanding complex information. “Research sparks interest in thinking and background. It gives you a foundation for your own ideas. You need to know what is out there about your topic” (S4). Further, audience is an important factor that should guide the research and content development stages of writing.

Three of the 10 participants loaded on Factor 3. Two were students in one of the three social science departments in the College of Agriculture and Life Sciences, and one was a current or former administrator in the College of Agriculture and Life Sciences during the planning, development, implementation, management, and evaluation stages of the writing intensive program. The core beliefs of *writing as an*

advanced skill guided by complex reasoning are the ability to understand the target audience is important (SN = 3, FA = +4, $z = 2.14$) and writing instruction should be in advanced, senior-level courses (SN = 15, FA = +4, $z = 1.41$). High school writing is basic, and students should learn more about writing as part of their undergraduate curriculum. However, a master's program is when students really start learning how to write and connect concepts. Writing instruction is important, but the writing intensive courses are not important (SN = 31, FA = +3, $z = 1.31$). Research increases the rigor in a writing course, which contributes to the content of the course (SN = 7, FA = +3, $z = 1.16$; SN = 8, FA = +3, $z = 1.10$).

A secondary belief of the *writing as an advanced skill guided by complex reasoning* perspective is that writing can be a chore because of its complexity of understanding how things fit together. However, students should take advantage of help from the instructor to mitigate this challenge (SN = 10, FA = +2, $z = 1.10$; SN = 30 FA = +2, $z = 0.79$; SN = 1, FA = +2, $z = 0.98$). One student (S4) said his favorite assignment is understanding a policy and writing a paper about it because it fits together like a puzzle. "When you write, you can transfer the information. What is the point of knowing something if you can't convey it to someone else?" (S4). Additionally, writing is a stream of consciousness (SN = 34, FA = +2, $z = 0.93$). Overall, this perspective included statements that defined writing as an advanced skill that includes research and the construction of complex content.

One student (S2) said she never reads enough, but she thinks she is a good writer. Another student (S4) said reading is definitely critical to writing success. However,

“reading is critical to writing success” loaded on an array position as “most unlike” (SN = 32, FA = -2, $z = -0.88$). Additionally, S4 said the proper use of grammar shows your intelligence, but it is something that can be fixed (SN = 6, FA = -2, $z = -1.10$). Table 10 provides a tabular representation of the statements with an array position of 4 to 2 and -2 to -4, which are the top 10 statements for “most like I think” and “most unlike I think” for Factor 3. For a complete factor array of Factor 3, see Appendix R.

Table 10

Factor 3: Writing as an Advanced Skill Guided by Complex Reasoning

No.	“Most Like” Statements	Array Position	z score
*3	Strong writers should tailor what is written to their audience.	4	2.14
*15	Writing intensive courses should be 400-level courses.	4	1.41
31	Writing is important, but writing intensive courses are not.	3	1.31
7	Content is critically important.	3	1.16
8	Research increases challenge in a writing intensive course.	3	1.10
10	Writing is a chore.	2	1.10
1	Help from the instructor should be available and students should take advantage of it.	2	0.98
34	Writing is a stream of consciousness.	2	0.93
30	Writing is about understanding how things fit together.	2	0.79
32	Reading is critical to writing success.	-2	-0.88
2	Writing elicits emotions.	-2	-0.93
6	Grammar is critically important.	-2	-1.10
12	Writing augments critical thinking.	-2	-1.15
19	Peer review activities promote writing and critical thinking skills.	-3	-1.31

Table 10 Continued

No.	“Most Like” Statements	Array Position	z score
18	Writing should be reflective.	-3	-1.37
35	Writing instructors are coaches and facilitators.	-3	-1.59
16	Examples of well-written work help students become better writers.	-4	-1.76
11	Writing should be concrete and applied.	-4	-2.14

*Denotes a distinguishing statement; $p < .05$.

Similarities among perspectives. Although three perspectives of writing factors that augment critical thinking and create knowledge in the social sciences of agriculture were different, they did have similarities (referred to as consensus statements in Q methodology). Consensus statements had similar placing in each factor but are not significant statements because they do not distinguish any one factor. However, they help define all three factors.

This study had seven consensus statements that were ranked similar by participants of the Q sort (Table 11). The z scores of the consensus statements for each factor (Factor 1; Factor 2; Factor 3) were reported. The participants agreed with five statements: 1 - “help from the instructor should be available and students should take advantage of it” ($z = 0.69$, $z = 0.05$, $z = 0.98$); 13 - “many short related written assignments that require data gathering and analysis improve critical thinking skills” ($z = 0.65$; $z = 0.19$; $z = 0.17$); 14 - “writing intensive courses should be 200-level courses” ($z = 0.16$; $z = 0.47$; $z = 0.28$); 33 - “writing is a process” ($z = 0.53$; $z = 0.91$; $z = 0.22$); and

36 - “writing instructors are critics and proofreaders” ($z = 0.73$; $z = 0.00$; $z = 0.43$).

Statement 1 and 36 provide evidence that faculty should assist students with becoming better writers and improving their writing ability and that instructor feedback is an important component of writing in the social sciences. Also, writing is a process that should include short, related assignments that require students to gather and analyze data. The participants rejected two statements: 16 - “examples of well-written work help students become better writers” ($z = -1.38$; $z = -0.85$; $z = -1.76$) and 23 - “good research leads to well-thought-out, well-articulated prose” ($z = -0.33$; $z = -0.14$; $z = -0.72$).

Table 11

Consensus Statements

No.	Consensus Statement	z score		
		Factor 1	Factor 2	Factor 3
1	Help from the instructor should be available and students should take advantage of it.	0.69	0.05	0.98
13	Many short related written assignments that require data gathering and analysis improve critical thinking skills.	0.65	0.19	0.27
14	Writing intensive courses should be 200-level courses.	0.16	0.47	0.28
16	Examples of well-written work help students become better writers.	-1.38	-0.85	-1.76
23	Good research leads to well thought out, well-articulated prose.	-0.33	-0.14	-0.72
33	Writing is a process.	0.53	0.91	0.22
36	Writing instructors are critics and proofreaders.	0.73	0.00	0.43

Research Question 3: What are the Writing Factors Identified in the Literature and Through Stakeholder Interviews that Contribute to a Model to Augment Critical Thinking and Create Knowledge Through Writing in the Social Sciences of Agriculture?

A review of literature related to writing in the social sciences of agriculture revealed that much of the writing research conducted in social sciences of agriculture and life sciences is not built on a theoretical base. Rather, it is researched from a more practical stance without using a model grounded in research. The social sciences of agriculture needs a strong theoretical framework to base writing research on and to use as a guide for further writing research in the academy as well as a conceptual model that guides writing instruction in the social sciences of agriculture. Without a conceptual model, which is developed through research, writing instructors do not have guidance to improve writing practice.

To create a general conceptual model of writing for agriculture would be detrimental to writing instruction in agriculture and to the agricultural industry because different disciplines in the industry use different genres and are situated within different contexts and cultures. Deane et al. (2008) stated one writing model cannot be adapted to each situation or social context because the cultural context of the situation plays a significant role on the focus of the writing. A writing model should be a graphical representation of the “skills [that] may be called upon in particular writing situations [to specify]...how different writing occasions will draw differentially upon these skills” (Deane et al., 2008, p. 16). This specific model should be tested and used in the social sciences of agriculture before one can be built and tested in the bench sciences of agriculture. Several of the elements within this model will remain consistent across

agricultural disciplines; however, many of the elements vary by discipline and industry.

A Conceptual Model to Augment Critical Thinking and Create Knowledge Through Writing in the Social Sciences of Agriculture

Because expert writers and communicators must be successful in a variety of contexts and be able to adapt to many audiences, a detailed graphical representation of the skills and activities involved in the writing process is valuable. The conceptual model introduced here postulates that students in the social sciences of agriculture can develop critical thinking skills and learn through writing if certain factors exist (see Figure 5).

Each one of the concepts within the *conceptual model to augment critical thinking and create knowledge through writing in the social sciences of agriculture* are intertwined and linked together by the social context of the writing task (Flower, 1994; RO 2.3). “Neither social nor cognitive theory makes genuine sense without the other” (Flower, 1994, p. 33). It is often shaped and carried out in a complex environment guided by the attitudes and feelings of not only the writer but also the society and people who surround him or her (Flower, 1994).

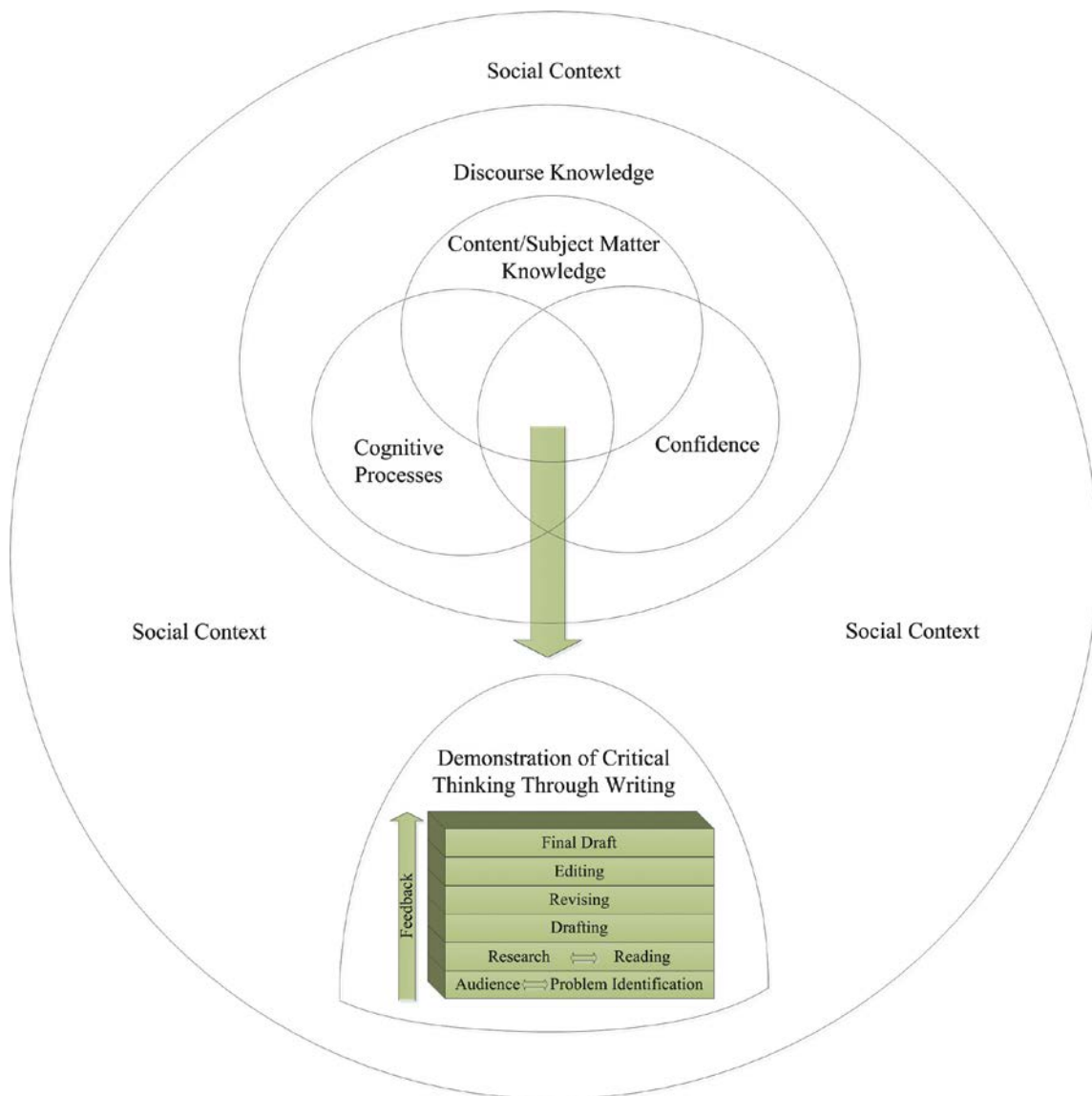


Figure 5. Conceptual model to augment critical thinking and create knowledge through writing in the social sciences of agriculture.

Writers can negotiate meaning both internally and externally. In the presence of negotiated meaning, individuals are freethinkers who are ready to share a unique understanding and conceptualization of information (Flower, 1994). Additionally, National Council of Teachers of English (2009) stated that new model of writing needed

to include social awareness and audience. Each of the individual pieces of writing are joined together in an overarching social context because of its impact on the development, presentation, and understanding of text (see Figure 6).

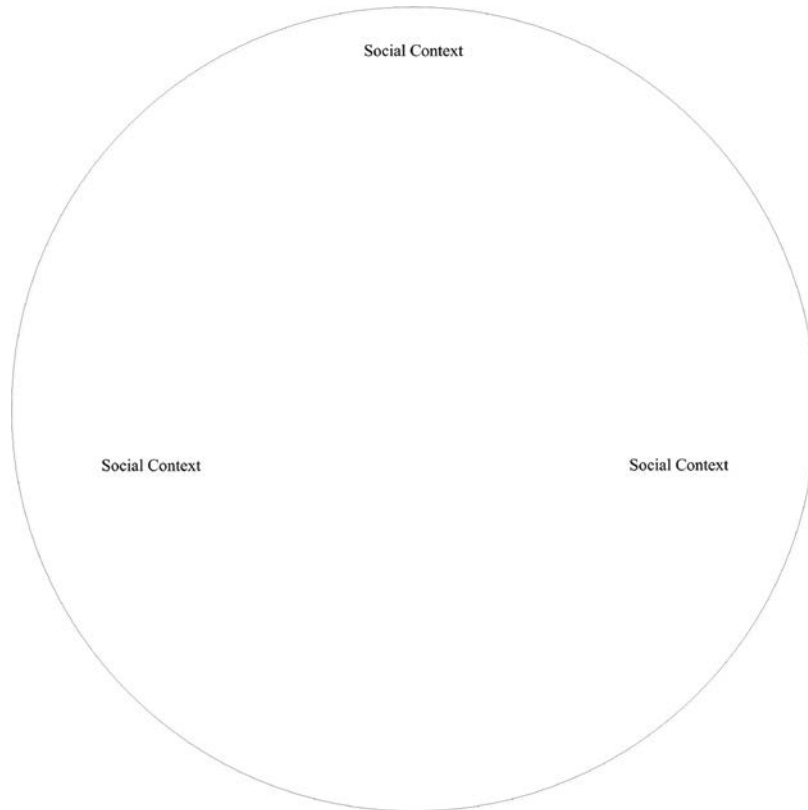


Figure 6. Social context element of the conceptual model to augment critical thinking and create knowledge through writing in the social sciences of agriculture.

The three circles of writing factors are situated within discourse knowledge. It is a common misconception that writing is a general skill that can be used across disciplines and professions without some level of adaptation and modification (Beaufort, 1999). Therefore, students should not only have an understanding of their specific

subject area within agriculture, but they should also have an understanding of agriculture in general and its contribution to society. “Discourse communities exhibit a particular network of communicative channels, oral and written, whose interplay affects the purposes and meanings of the written texts produced within the community” (Beaufort, 1999, pp. 18–19). The discourse community defines the types of writings that occur within the boundaries of the environment (Beaufort, 1999). A discourse community could be different for two writing tasks in the same discipline because the discourse community is defined by the audience (Beaufort, 1999), which is again why it is important for the students to clearly and correctly identify their audience at the beginning of the writing task (see Figure 7).

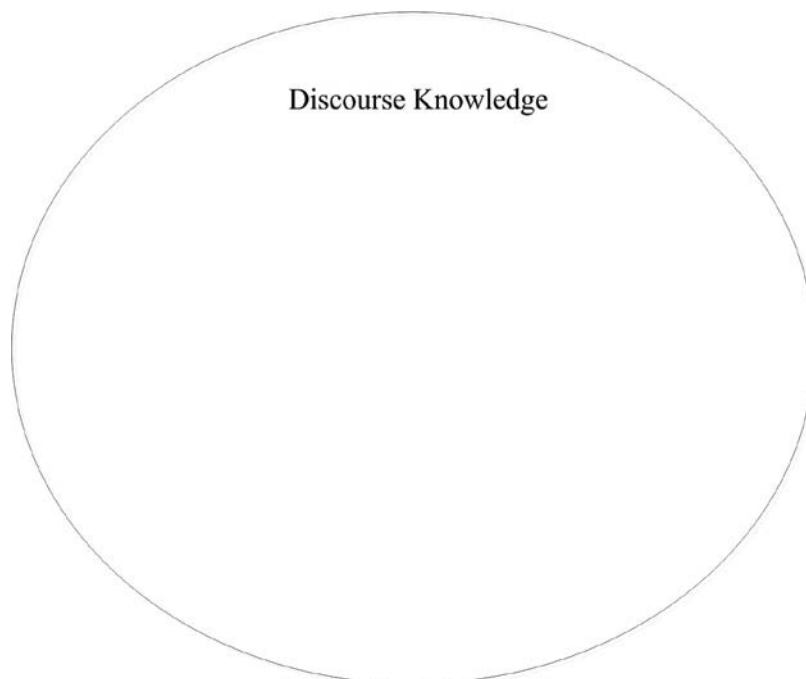


Figure 7. Discourse knowledge element of the conceptual model to augment critical thinking and create knowledge through writing in the social sciences of agriculture.

The three circles that surround the writing process embedded in critical thinking are content/subject matter knowledge (Beaufort, 1999), cognitive processes (Hayes, 1996; Hayes & Flower, 1980a; Kellogg, 1996), and confidence (RO 2.1).

Content/subject matter is important in understanding the topic and the context of the topic. The first thing a student must do when writing about a topic is become an expert on the topic. Without knowing and understanding everything there is to know about a topic, students cannot convey information to a larger, specific audience. Employers seek employees who not only have the technical agriculture knowledge but also the ability to creatively and effectively communicate agriculture information using simple language (Walker, 2011).

Cognitive processes, as defined by Deane et al. (2008), are domain knowledge, working memory, informal/verbal reasoning, linguistic skills, and social evaluative skills. Additionally, domain knowledge provides support in the “planning stage (when the writer must decide how to structure the text) and in reading (when the reviewers or the reader must decide how the material is in fact organized)” (Deane et al., 2008, p. 19). Domain knowledge can increase writing quality because the writer’s familiarity with the topic of the story connects with the working memory, and together they are a key component of the writing process (Deane et al., 2008).

“Writing performance depends critically upon being able to recall relevant knowledge and manipulate it in working memory” (Deane et al., 2008, p. 20). Prior knowledge relevant to the topic as well as working memory affect the quality of students’ writing. Because of the cognitive skills that writing demands, “writers...[with]

well-organized knowledge of a domain and concomitant interest in it may have significant advantages and be able to demonstrate their writing abilities more easily” (Deane et al., 2008, p. 20). Students “should understand that most of it does not involve putting words on paper but consists of setting goals, formulating problems, evaluating decisions, and planning in the light of prior goals and decisions” (Bereiter & Scardamalia, 1987, p. 363).

Students’ confidence, as evidenced in Research Objective 2.1, is an important part in students’ ability to write and think critically. Students’ competence is guided by their confidence in their abilities to perform complex writing tasks. Bereiter and Scardamalia (1987) recommended that instructors “involve students in investigations of their own strategies and knowledge because ... students should see it as their responsibility to help each other develop their knowledge” (p. 363). Part of becoming better is struggling to transform knowledge and gaining experience by working through problems associated with writing (Bereiter & Scardamalia, 1987; RO 2.1). Students lack confidence in their ability to write and in their position as an expert on a given topic. For students to become better writers, they must develop confidence in themselves and their abilities (RO 2.1; see Figure 8).

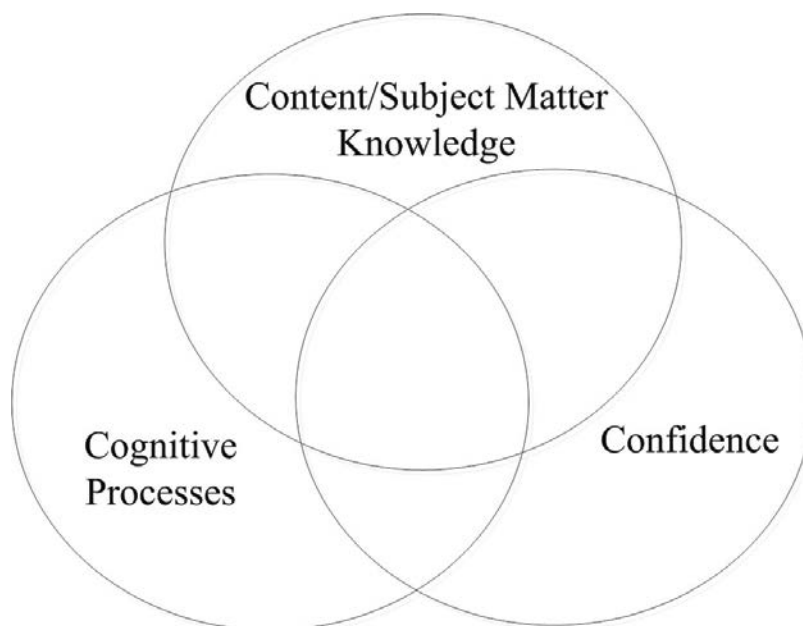


Figure 8. Content/subject matter knowledge, cognitive processes, and confidence elements of the conceptual model to augment critical thinking and create knowledge through writing in the social sciences of agriculture.

This proposed writing process is embedded in critical thinking. Critical thinking is an essential piece of the writing process because without adequate thinking the written prose is often unclear and unorganized (Fullenkamp, 2001). For students to identify an audience, identify a problem, conduct research, produce multiple drafts, revise thoroughly and critically, edit for writing mechanics, and produce a final draft, students must be able to think critically, apply old knowledge to new situations, and transform new knowledge. However, what increases students ability to think critically and create knowledge?

First, students must be able to present and defend a topic to a variety of audiences (RO 2.1, 2.2). Researching and understanding a topic to the point that students

can present and defend a topic requires thinking critically about what is important and constructing and adapting important knowledge for a specific audience. The objective of critical thinking is “to assess the truth of statements, the validity of an argument, or the soundness of a proposal, and come to a judgment” (Henderson, 1972, p. 46). This in-depth analysis of a topic provides students with the skills needed to transform information as well as develop a strong argument. Developing is researching a topic, pulling facts and statistics, applying it to an argument, making it flow, and summarizing it (RO 2.2). The skills require students to critically evaluate the information and make inferences using data (RO 2.2).

Second, writing repetition with constructive, timely feedback throughout the writing process augments critical thinking (RO 2.1). Feedback should be consistent, constant, and constructive. Constant writing does not improve students’ ability to write. It must be accompanied by quality, constructive feedback that helps students develop and grow as writers. Instructors should provide students with enough of an example to assist them but not too much to hinder their ability to think and develop as students and writers. For example, if students are missing a comma, instructors should not insert a comma for them, but instructors should guide them to the resources to learn what type of punctuation should be placed in the empty spot.

Third, developing critical thinking skills is also achieved through applying writing to real-world scenarios (RO 2.2). Students need to see the need for the assignments and its relativity to the real world before they will be motivated to complete the assignment to the best of their ability. Strong agricultural curriculum should include

opportunities for students to write, listen, and speak and to apply those skills to real-world scenarios (Walker, 2011). Making the connection to the real world helps students justify the assignment and see how it applies to their profession and their end goals.

Fourth, critical thinking skills can be developed through identifying an audience and a problem, which is the first layer of the writing process postulated here. Students must understand their topic from all points of view and see the topic through the eyes of their readers (RO 2.1). This forces students to see a side of the topic that they may not have seen before (see Figure 9).

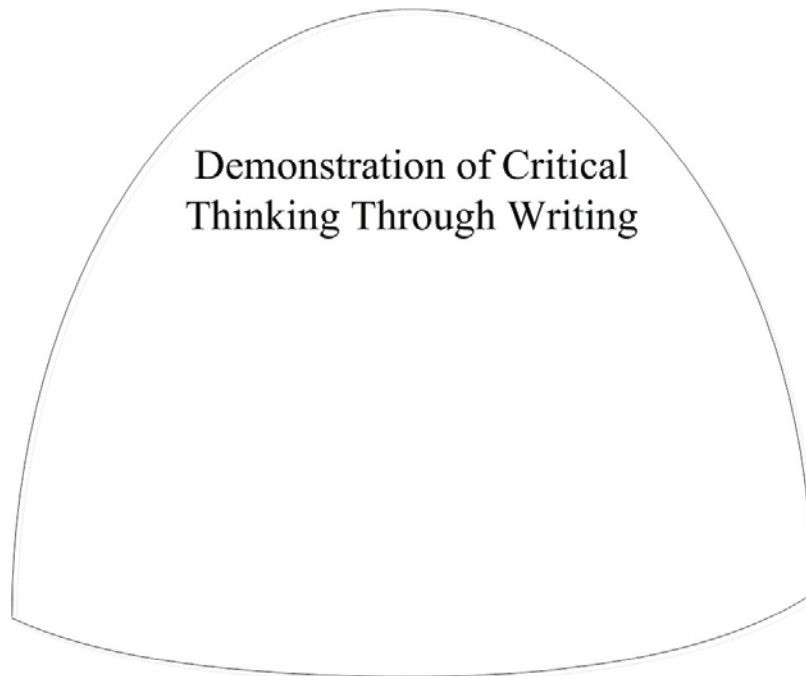


Figure 9. Demonstration of critical thinking through writing element of the conceptual model to augment critical thinking and create knowledge through writing in the social sciences of agriculture.

Students defined writing as a layering process that required them to develop and build on information as part of constructing prose (RO 2.2). The center of the *conceptual model to augment critical thinking and create knowledge through writing in the social sciences of agriculture* draws on the layering concept. The first layer situated in the middle of the model is audience and problem identification (Foster, 1983; National Council of Teachers of English, 2009). Depending on the context, situation, or audience, students may be required to analyze or define a specific audience before identifying the problem or vice versa. However, the two are situated at the base of the layering process because a well-written piece draws on students' ability to write to an audience or identify the problem (RO 2.1, 2.2).

Second, students must spend time reading about and researching their topic (RO 2.1, 2.2). For them to create and transform new knowledge, they must spend time reading and learning about the profession's style as well as about their line of inquiry (Bereiter & Scardamalia, 1987; Ryan & Campa, 2000). Within this layer is students' ability to apply relevant information to evaluate a problem, which is essentially research (RO 2.1, 2.3). Students identified their problem in the first layer of the writing process and then added the knowledge they gained as part of the second layer of the writing process to start developing the draft (Bereiter & Scardamalia, 1987; Ryan & Campa, 2000). Students need to be able to gather information from a variety of sources and disseminate the information to larger populations (Walker, 2011). Additionally, during the research layer, students begin to understand the intricate pieces of their topic and how those pieces become parts of a larger whole. Writing is understanding how things

come together and explaining that connection to the audience identified in the first layer of the writing process (Orr, 1996).

The third layer is drafting (National Council of Teachers in English, 2009). The drafting layer of this conceptual model is different from drafting in similar models because it includes a number of factors that were identified in Research Question 1 and 2. During the drafting stage, students should produce multiple drafts to gain practice writing as well as to condense and refine information for a specific audience (RO 2.1, 2.2). Alamargot and Chanquoy (2001) postulated that delimiting and adapting text are an important part of the writing process as well as developing ideas and presenting them in text form, which means “to clearly formulate a set of coherently articulated sentences, without any redundancy or, conversely, without too many thematic ruptures” (p. 1).

The fourth layer is revising, which is a layer that beginning writers often fail to work through because they do not know how to properly revise prose (Epstein, 1999; Maimon, Peritz, & Yancey, 2007; Vilardi, 1986). The prose should be revised multiple times during this process to better develop and present the material (RO 2.1). During the revision process, students should review the whole paper and its parts and add, delete, and move text as needed. Revising is more than the cosmetics of the document (Epstein, 1999; Maimon et al., 2007; Vilardi, 1986).

Fifth, editing is the final layer before finishing the writing task. The editing process is tedious because it is polishing the document (e.g., shorten sentences, delete empty words, delete extraneous material; Maimon et al., 2007; Vilardi, 1986). After completing the above layers, the final draft should be complete and present a well-

developed message.

An important piece of the model is the rich, timely feedback that guides the writing process (Hayes & Devitt, 2008; National Council of Teachers in English, 2009). Instructor feedback should be provided at each stage of the writing process because students do not become better writers by continuously writing and making the same mistakes. They become better writers by being guided through the process (RO 2.1, 2.3). Also, peer feedback is not a method of feedback that increases students' ability to think critically and create knowledge. Poor writers do not help poor writers become better writers (RO 2.3). If writers are to become better writers, they should be guided by writers who can write themselves (RO 2.1, 2.3; see Figure 10).

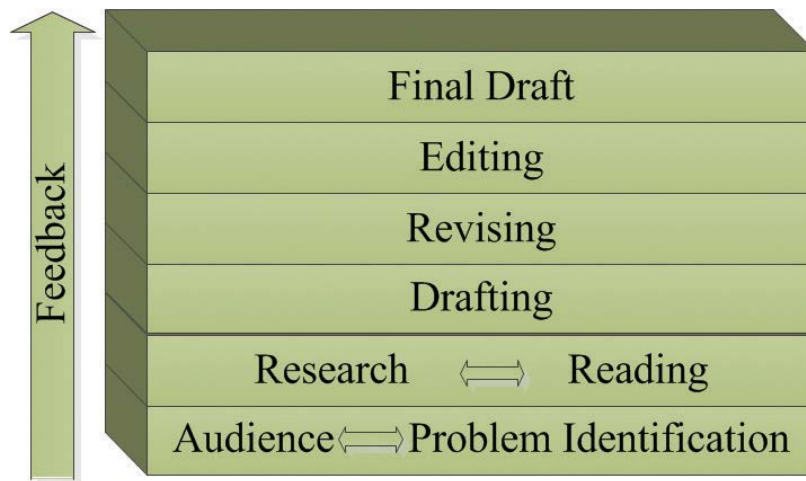


Figure 10. Layering process of writing for the conceptual model to augment critical thinking and create knowledge through writing in the social sciences of agriculture.

CHAPTER V

CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

Research Question 1: What are the Prominent Theories and Conceptual Models of Writing?

Three prominent writing theories (Flower and Hayes' (1981) cognitive process theory of writing; sociocultural theory of writing (developed from Vygotsky's work on the development of higher psychological processes); and Flower's (1994) social cognitive theory of writing) and seven conceptual writing models (Hayes & Flower's (1980a) model of the writing process; Bereiter and Scardamalia's (1987) writing development model with two writing strategies; Hayes' (1996) new model of the writing process, revision of the Hayes and Flower's 1980 model; Kellogg's (1996) model of working memory in writing; Beaufort's (1999) conceptual model of writing expertise; and Deane et al.'s (2008) writing proficiency as a complex integrated skill model) emerged in the review and evaluation of writing theories and models.

An examination of literature related to writing theories and models revealed that writing theories and models are outdated and need to be revisited to develop a model that is applicable to the 21st century and incorporates updated research. Each writing theory and model brought a unique perspective to writing research and represented writing during its respective era. Flower's (1994) social cognitive theory of writing was the most complete writing theory because it incorporated an in-depth look at writing as a product of cognitive processes situated in the society. Additionally, Deane et al.'s (2008) writing proficiency as a complex integrated skill model was an adequate representation of

writing proficiency. It addressed critical thinking, audience, and cognitive processes of writing as well as situating the intricate pieces of writing proficiency in a social context. Deane et al. (2008) is the most complete discussion and graphical representation of writing identified in this study. The writing proficiency as a complex integrated skill model includes critical thinking and social context, two important components of writing, as well as the writing process and the underlying cognitive processes that impact writing proficiency. With a few modifications and adaptations to specific contexts, the Deane et al. model has great potential in the improvement of writing instruction.

The first writing models were developed with the theoretical underpinnings of cognitive processes and did not include social context (Prior, 2006). Flower and Hayes (1980a), the forefathers of writing models (Alamargot & Chanquoy, 2001), developed the first writing model as a foundation to inform research and practice about the cognitive processes of writing. The first writing models (Hayes & Flower's (1980a) model of the writing process; Bereiter and Scardamalia's (1987) writing development model with two writing strategies; Hayes' (1996) new model of the writing process, revision of the Hayes and Flower's 1980 model; and Kellogg's (1996) model of working memory in writing) were depictions of the writing process and the cognitive processes involved in the writing process. This cognitive approach views writing as a function of what occurs in writers' minds and not as a function that is encouraged and impacted by the social contexts and situations that occur in the world where writers exist (Deane et al., 2008).

The writing theories and conceptual models (sociocultural theory of writing and Beaufort's (1999) conceptual model of writing expertise) then shifted toward a more socio-cultural view of writing, tending to the impact of audience and social context on the writing process. Prior (2006) argued that writing is situated within the social context of the writer and is impacted by communities of practice that occur as a part of the situated social context. Although each one—cognitive processes and social context—are intricate pieces of writing theories and conceptual models, they cannot alone define writing. Just as Deane et al. (2008) stated the cognitive processes of writing are important, but you cannot lose sight of the context where the writing occurs.

For many years, theories and conceptual models of writing focused on the writing process and society's role in writing as separate entities with little emphasis on the two acting in the same domain (Stein, 1986). It was not until 1994 that Flower published a theory combining the two domains. Flowers (1994) intertwined the two (cognitive processes and social context) when she introduced the social cognitive theory of writing. "Neither social nor cognitive theory makes genuine sense without the other" (Flower, 1994, p. 33). The process of constructing negotiated meaning is influenced by outside voices or knowledge, contending that writing is constructed through a set of cognitive processes guided by society and/or social context. "Writing is undeniably a social event between the writer and the audience" (McCutchen et al., 2006, p. 115).

Writing theories and conceptual models are too broad to encompass all genres of writing in every discipline. Neither the variations between genres, disciplines, and industries nor the changes in writing have been accounted for through writing theories

and conceptual models. Rose (1981), however, argued any style of writing could fit into the Hayes and Flower (1980a) model because of the recursion stage of the model. This is a misconception because of the role that context plays in the development of prose. Additionally, writing conceptual models have not, until recently (Deane et al., 2008), included critical thinking as a key contributor to the writing process. In recent years, critical thinking has become an important part of undergraduate college curriculum (Hayes & Devitt, 2008; Schmidt, Parmer, & Javenkoski, 2002; Strachan, 2008; Tapper, 2004). Therefore, models that describe writing at the college level should include critical thinking.

Too many writing theories and conceptual models focus on writing as a process and not on writing that is guided by many knowledge domains. In 1999, Beaufort proposed that the development of prose is guided by multiple knowledge domains. Stein (1986) stated that, although writing is about the interaction between knowledge domains and the writing process, research has not been conducted on the interaction. Therefore, more research needs to be done on the impact that the different knowledge domains (e.g., content, lexical, discourse) have on the writing process, how they interact, and on what level they interact. More research needs to be conducted on each individual knowledge domain to determine what each domain represents and how students can learn to incorporate each domain into their writing, which is indicative of Stein in 1986. “Future research should focus on better descriptions of the knowledge needed to complete specific writing tasks, the types of discourse structures that best convey a

writer's message, and the conditions under which knowledge pertaining to writing is acquired" (Stein, 1986, p. 226).

A literature review has shown evidence that the frameworks of writing composition lack the empirically tested and revised structure, data, and levels of abstraction that Fawcett (1989) and Jacox (1974) suggested theories must possess. The seven criteria proposed by Dudley-Brown (1997) provided a thorough, well-defined framework for evaluation.

Since the 1980s, writing researchers have modified and adapted writing theories and conceptual models to better depict the relationships that exist in the writing process. As research has evolved, researchers have realized that one model cannot represent or accurately depict writing across multiple contexts. Writing models that may fit the needs of English composition may not at all fit the needs of agriculturalists who work every day to communicate information about agriculture. Although Hayes and Flower (1980a; 1980b) addressed the cognitive factors of writing in a thoroughly developed and expanded on model for that time, it does not include society's impact and should not be used as a model of writing today.

The Dudley-Brown (1997) theory evaluation framework should be used as a method of evaluating not only writing theories and conceptual models but also other theories and conceptual models used in the social sciences of agriculture. Before students use a theory or conceptual model as a framework for their research project, they should be required to conduct a review and evaluation of that particular theory or conceptual model. Therefore, students can provide evidence of its credibility and more

accurately discuss the framework that guided their study. Dudley-Brown (1997) suggested theory evaluation to build on and further develop proposed theories; therefore, the evaluation of the writing theories and conceptual models outlined in this study can be used as a guide to the development of a conceptual model to augment critical thinking and create knowledge through writing in the social sciences of agriculture.

Fulwiler and Young (1990) stated no one model of writing could function in all college and university settings. Reviewing the writing theories and conceptual models will give educators and researchers a synopsis of what exists in the literature about writing and a better understanding of what components should be included in writing instruction. Simply stated, writing is “a mode of social action, not simply a means to communication” (Prior, 2006, p. 58). For writing research to continue to develop, vigorous, empirical research must be conducted, which was echoed by Hayes (2001). Research that investigates writing as a cognitive process guided by social context is limited.

This review of literature provides a basis for research as well as practice. Research can be conducted on different models that exist about writing. Writing instructors can use strengths and weaknesses of writing models to strengthen writing curriculum. Additionally, more defined models that are exclusive to certain social contexts can be developed to better understand writing as a cognitive process in specific social contexts. A model should be developed that is based on the strengths of each model presented in this review and evaluation. Just as Phillips said in 1996, “the only hope of salvation is to cling to the insight that models or metaphors are not all-

encompassing and they can always be criticized or assessed” (p. 1011). Because of the evidence that shows social context is an important factor in writing, a writing model for the social sciences of agriculture that includes social context should be developed.

Research Question 2: What are the Writing Factors that Augment Critical Thinking and Create Knowledge?

Research Question 2 was guided by three objectives that sought to determine the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. Each research objective was guided by different research methods to explore the question through different lenses and to establish triangulation. The data from Research Objective 2.1 guided the research protocol for Research Objective 2.2, and the data from Research Objective 2.1 and Research Objective 2.2 guided the development of the Q statements for Research Objective 2.3.

Research Objective 2.1: Determine Faculty Members’ Perspectives about the Writing Factors that Augment Critical Thinking and Create Knowledge Using Semi-structured Interviews

The semi-structured interviews with eight faculty members in the social science departments in the College of Agriculture and Life Sciences revealed six prominent themes—*importance of writing, writing factors, improving students’ writing, characteristics of strong writers, teaching writing, and writing and critical thinking*—related to writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. Faculty members reiterated that students should learn to write because employers expect new graduates to have an understanding of communications and possess communications skills. According to faculty members, strong communicators have the ability to understand the big picture of a document and

communicate the information using correct sentence structure, correct grammar, and proper punctuation. Students' first negative impression in business is often their ability to communicate with both external and internal audiences.

Students lack the confidence in themselves and their abilities to become better writers. Students are not comfortable with or confident in their abilities to write and to become the expert on a particular topic. Therefore, students' inability to write could be beyond their skill set and thought process. It could be tied to their self-esteem and self-worth. Students rush through writing tasks and do not take the time to develop, revise, rewrite, and edit it. Rather, they are quick to mark a task off of the list and move on to the next assignment, which raises more questions. Are students not understanding the writing task, or are they not willing to extend the effort to learn how to become better writers? Do they choose not to do a good job, or are they bored with the writing tasks that faculty members assign them? Should faculty members provide students with writing tasks that engage their interests?

Writing is a thought-provoking process that can be enhanced if writing factors that augment critical thinking and create knowledge are incorporated into the process. Faculty members believed that three prominent writing factors augment critical thinking and create knowledge: ability to present and defend a topic to a variety of public audiences; opportunities for writing repetition; and rich, timely feedback. The ability to present and defend a topic to a variety of public audiences is important. To sufficiently present information for retention, students must possess an adequate understanding of the information themselves. Therefore, they must be well-researched and have the ability

to determine important information and convey that information to a specific audience. Knowing an audience requires research and the ability to ask the right questions about an audience. The first step to developing effective prose is being able to understand the reader and his or her needs. However, students often fail to spend the time to develop that foundation, which is important in developing written prose.

Second, writing repetition is important. According to Vanderburg (2006), students must spend time writing, which is one of the hardest parts about writing instruction. Although spending time in the classroom writing is tedious, time consuming work, it is one of the only ways students will become better writers. Students do not become better by producing one to two writing assignments during the course of a semester and receiving inadequate feedback on the assignment. Writing should be constant. Students should have to write using all kinds of scenarios and produce multiple writing assignments (Epstein, 1999; Texas A&M University Writing Center, 2013). According to faculty members in the social sciences of agriculture, the amount of time spent writing increases students' ability to write (Orr, 1996; Walker, 2011). Writing becomes easier and students become better writers with more writing opportunities and instructor feedback.

Third, faculty members should provide students with rich, timely feedback at various points during a writing assignment. Having small assignments that build on each other provides students with feedback at various times during the course of the semester. Providing rich, timely feedback can be time consuming. If faculty members can provide feedback on the small assignments during the semester, it is likely that they will not have

to spend as much time grading large assignments at the end of the semester. Providing students the opportunity to build on a topic can help them clarify their research and understand how to take a complex project from start to finish, which provides them with a snapshot of a real-world project that they might encounter as a new professional.

Feedback should be constant because it is critical to students' ability to become better writers, which Bok also found in 2006. Repetition alone does not improve students' writing abilities; faculty believed students must also receive timely feedback. Quality feedback is not simply making a few comments on a writer's assignments—quality feedback is providing students specific ways and resources to improve their writing. Also, feedback is not correcting mistakes for students but making them aware of the mistake. For example, if a student has a misplaced modifier, the instructor should not correct the sentence for him or her. Rather, the instructor should tell the student he or she has a misplaced modifier in the specific sentence and provide a resource for the student to use as a guide. The student should be expected to research the mistake and correct it based on the information they found. Further, telling students that they will have the opportunity to correct their writing task before they turn it in could cause issues because the student may not take the assignment seriously the first time. Therefore, it is best to give students a general outline of how an assignment will be constructed and reviewed but specific details should be omitted.

Teaching strategies and techniques can also influence the development of critical thinking skills as they relate to writing. However, faculty members who do not have formal training to teach writing may be unsure how to best it. One of the first steps to

teaching writing is to teach students how to identify an audience and write for that audience. Students are confused about how to write to specific audiences and, many times, do not understand a typical audience for their field of study. Writing for a specific audience is an important part of writing, which was supported by Schneider and Andre (2005) and Zhu (2004). However, students are never taught about typical audiences and how to write for those audiences. Skipping that important step builds a rocky foundation for students throughout their college career because they never quite develop an understanding or an appreciation for writing to a specific audience.

Faculty members should require students to read discipline materials that are similar to the ones they will be required to produce. Reading a textbook with theory behind writing is not the only mechanism of helping students become better writers. Students need to read and understand the style, organization, and structure of the document. Reading helps students get started, and often times, it can help them put the first words on paper. Further, reading can help students understand the real-world application of writing and just not the abstract idea about how writing can improve thinking and understanding.

Writing is an indicator of how people think and is a method of reflection, knowledge telling, knowledge transformation, assessment, and evaluation, which was evidenced in the literature (Bereiter & Scardamalia, 1987; Hammond, 1986; National Council of Teachers of English, 2009; Strachan, 2008). Writing can help the students understand course material when embedded into a course, which was also discussed by Aaron (1996). However, students often see it as a chore or a task than as a way to learn.

Writing instructors need to spend more time linking writing to learning at the beginning of class, explaining how writing can help students learn more about their disciplines, and discuss how to transfer writing skills from one class to another. One faculty member (TT01) described writing as a “window to the brain in terms of how people think, how they make and support arguments, and how they solve problems and use resources,” which is a strong, yet, true statement that reflects the importance of students learning how to use writing to think critically.

Recommendations and implications. Students should be provided with more opportunities to write and defend their writing. If students are not expected to defend their argument to a larger group, they will never move from knowledge telling to knowledge transforming as Bereiter and Scardamalia described in 1987. Students need to reach the knowledge transforming level of writing development, but they must have opportunity to present and defend what they know to broad audiences. However, students have a difficult time understanding audiences in their disciplines. To combat the issue of understanding typical and atypical audiences within the disciplines, writing instructors should spend at least one class period during a semester discussing audience for that specific discipline and how to identify and target audiences as it relates to the discipline.

Rich, timely feedback is a highly debated topic in writing intensive courses because of faculty time and commitment. Therefore, quantitative research could be conducted on the best type of feedback to provide, at what points in a semester, and at what junctions in a particular assignment. For example, is it better to provide students

feedback on the topic and not again until the rough draft, or is it better to provide students feedback on the topic, introduction, body, conclusions, and rough draft? It is important to determine the effects of having multiple points of feedback and the level of feedback that works best in the classroom.

Often times, writing instructors assume someone taught students how to correctly structure and punctuate a sentence. However, students are still entering college without understanding basic grammar and punctuation. It may leave one to wonder if students are being exposed to the material and are choosing not to listen or if they are not being exposed to the information and they need to learn basic grammar skills. Establishing a baseline of the mechanics of writing as expected in the specific disciplines would help students further understand their discipline and instructor's expectations.

Just as Vanderburg (2006) postulated, more research needs to be conducted on the methods of helping students become more developed in their writing ability. Now that writing factors that augment critical thinking and create knowledge in the social sciences of agriculture have been proposed, more research needs to be conducted on each of the specific factors to determine to what level they impact critical thinking and knowledge creation, if in fact they do at all. Although certain themes emerged that are important in writing to enhance critical thinking, each writing factor needs to be investigated using experimental and quasi-experimental studies to determine if it helps students become critical thinkers.

Understanding what writing factors augment critical thinking and create knowledge in the social sciences of agriculture can contribute to practice and research.

Writing instructors can modify their curriculum to include specific writing factors that contribute to the development of critical thinking through writing. For example, if writing instructors know that writing repetition with multiple points of feedback improves critical thinking and students' ability to write, instructors can adapt the course schedule to include points of individual and group contact.

This study provides a research foundation to conduct more research on the different writing factors that faculty members said can augment critical thinking and create knowledge in the social sciences of agriculture. Using this information can help build and set up more quantitative type studies to inform writing instruction in the social sciences of agriculture. Understanding how students become better writers and what particular writing factors contribute to their writing development would provide administrators and faculty members with an in-depth description of how to make writing instruction more effective. Different points of view will develop a strong foundation and baseline of what writing instruction should include for retention and transfer in the social sciences of agriculture.

Similar studies should be conducted in the bench sciences of agriculture. Faculty members' perspectives of the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture might not be the same in the bench sciences of agriculture. Therefore, replicating this study in the bench sciences is important. The results of this study cannot be generalized to a larger population because the study took place at a particular time with a specific group of people. However, it can be replicated at different institutions to determine faculty members' perspectives of

writing across colleges of agriculture to begin to develop a consistent set of writing factors that can be used to enhance writing instruction in agriculture.

Research Objective 2.2: Determine Students' Perspectives about the Writing Factors that Augment Critical Thinking and Create Knowledge Using Focus Groups

Although students' is only one way to investigate a writing program, they provide a unique perspective. Sometimes students' dislike for a certain curriculum goes beyond the importance and significance of the curriculum to students' long held opinion about that field of study. Therefore, it is important to investigate their perceptions from a qualitative perspective and document their point of a view. Five prominent themes emerged as a result of the student focus groups—*definition of writing, characteristics of strong writers, writing instruction, critical thinking and learning, and writing intensive course experience.*

Writing is, essentially, documenting and creating a world that was not otherwise known. It is a skill that is not learned overnight or in one class, which was also noted by Texas A&M University Writing Center (2013) and Young and Fulwiler (1986). Students have varied definitions of writing, and anecdotal evidence shows that some students view writing as nothing more than using correct grammar or having neat handwriting, which, based on evidence from this study, is a skewed definition of what the infinitive verb “to write” means. Students in the social science departments in the College of Agriculture and Life Sciences said a specific definition of writing depends on the context of the writing task. Beyond context, students believed writing in the social sciences of agriculture is expressing thoughts, messages, or points of view in an organized, concise

manner using a layering process to build on ideas and add information to the structure of the work.

Strong writers should be able to adapt prose to a specified audience, apply writing to real-world scenarios, develop a strong argument, establish a specific voice, and understand grammar and mechanics. Writers are first obligated to their readers. Writers who can connect with their readers and understand writing from different points of view have, at least, begun to develop critical thinking skills because, as postulated by Tapper (2004), critical thinking is about having a balanced view of a situation. As Chickering and Reisser (10003) argued, students engage more with course material and have a more balanced view of a situation as they become more intellectually competent. Condensing information for the audience and knowing what your audience needs are important when learning how to write for a specific audience. Additionally, strong writers should know when to condense information and when to elaborate more. Part of being able to tailor writing prose to a specific audience is having the ability to use writing to plan, design, execute, and evaluate real-world examples and apply writing skills to specific scenarios.

Students' writing tasks should be applicable to the real world, which will help them become strong writers in their disciplines. To be strong writers, students should understand how to develop arguments, present information based on facts and not emotions, formulate ideas, and solve problems—key components of critical thinking (Henderson, 1972; Tapper, 2004). Developing an argument can include researching a

topic, pulling facts and statistics, applying it to an argument, making it flow, and summarizing it, which Tapper (2004) said were indicators of critical thinking.

Student writers, during their college careers, should develop a specific voice in writing. If used accurately, a specific voice will help elicit readers' emotions. To become better writers, students should have writing process knowledge, industry and discipline knowledge, and writing conventions and editing knowledge, which Beaufort (1999) conceptualized in her model of writing expertise. Writing expertise, as defined by Beaufort (1999), is having writing process knowledge, subject matter knowledge, rhetorical knowledge, genre knowledge, and discourse community knowledge. Sometimes grammar and mechanics of writing get lost in the shuffle because content overshadows the importance of developing a prose that is grammatically correct. However, students believed that strong writers should possess strong grammar skills.

Teaching strategies and delivery methods affect students' ability to become strong writers. Clearly articulated examples of written tasks are one teaching strategy writing instructors use to teach writing, which Rose stated in 1985. Examples, often times, hinder their ability to think creatively and excel in the classroom, which was also postulated by Davies and Birbili in 2000. Some students said they find writing and getting started with their writing easier when they have specifications to guide them, which is also a characteristic of unskilled writers (Bereiter & Scardamalia, 1987). Although examples are a guide to understanding an assignment, they do not allow students to think outside the box and develop their own work. Formatting examples are different because they help students see how to structure a document, which is more

specific and defined than is a writing task. Formatting is a set way to do something, and sometimes an example is the only way to teach someone how to structure his/her own work. However, an example of a completed paper with a strongly developed argument may cause students to confine to the walls of the sterile box because they try to develop an argument that is a mirror image of the provided example. One way for instructors to provide students with examples without confining their work is to assign students reading in their disciplines. This provides them examples of well-written prose as well as provides them opportunities to research and learn more about a topic in their field of study.

Repetitious, project building tasks are effective writing assignments, which Strachan claimed in 2008. Students learn more from writing tasks when they can develop a project during the semester and combine different writing tasks to make a complete project. Writing in intervals helps students to master writing skills and develop as strong writers. “Doing research and writing until you have a project helped me learn about my project and about writing” (T008). However, instructors must provide feedback to students at regular intervals during the semester, so students can learn from their mistakes and improve on the next assignment. Students said getting feedback at the end of the semester does not help them understand their mistakes and learn how to write. Feedback must be provided in a timely manner, which Strachan (2008) found to be true as well. Providing students with feedback after they have completed all the assignments does not help them become better writers. Instructors should communicate with their students and provide them with feedback throughout the semester.

Interacting, communicating, and building a rapport with students are important teaching strategies that encourage students to become strong writers. Although teaching assistants can be important resources for students, students reported that they prefer to interact with and get feedback from their instructors and not from their teaching assistants. “[It is] the teachers who have my attention early and that I am willing to listen to what they have to say. The ones I can pick up tricks to make [writing] better” (M003). Instructors should take the opportunity to communicate writing task requirements with their students and show them how to become better writers.

I like when the professor talks about it [the writing task], so it isn't as hard, where they don't just throw you in it. It is like at the beginning of the semester, and they say you have all of these papers to write. Then, when it comes time to write them, they give you help and examples—I like that. (T105)

Some students believed writing intensive courses did not help them think critically; whereas, other students thought writing intensive courses did help them think critically. One student (M001) said “when you write, you defend the information, and when you have to defend the information, you have to know your stuff.” Often times, students do not have the opportunities to defend their information (written or orally) because of large classes or instructor demands in other areas of the academy, which leaves students without the opportunities to develop critical thinking skills. If writing tasks do not incorporate elements that cause students to develop an argument or defend their position, it is hard for students to develop critical thinking skills. As Wilson found in 1986, students are more likely to develop critical thinking skills when writing

argumentative assignments. Some of the students in the focus group reported that they write with a stream of consciousness, which Bereiter and Scardamalia (1987) said is representative of a writer who is unskilled and would write according to the knowledge-telling strategy.

Writing intensive courses, in theory, are a way to help students become strong writers. They provide students with opportunities to immerse themselves into a writing-rich environment while learning effective ways to portray thoughts, learn the diction of the discipline, overlook the fluff, and get to the point. Writing intensive courses do not help students become better writers, which could be because they do not receive the feedback to become better writers. However, writing intensive courses do provide students with resources they can use in the future (T101).

Recommendations and implications. Because students said writing depends on context, each department, or perhaps major, should develop a writing definition beyond that of what writing means to the social sciences in agriculture. Even so, depending on the major, the definition of writing could be course specific. For example, agricultural communications students are required to take a variety of agricultural writing courses (e.g., media writing, feature writing, and technical writing), which are contextually different. Therefore, writing in agricultural journalism is conceptually different than writing in agricultural economics.

Writing instructors should incorporate specific writing tasks that help students learn how to adapt prose to a specified audience, apply writing to real-world scenarios, develop a strong argument, establish a specific voice, and understand grammar and

mechanics. More time should be spent teaching students about their audience and how to write to a specified audience. Additionally, faculty members should spend time understanding their audience, the students. Developing courses and writing assignments that target students and using them as examples of targeting and audience may help students better understand the concept of audience and how to write to a specific audience. Often times, adapting prose to a specific audience is one component of writing that instructors skim across assuming that students know how to write for an audience. Although defining and targeting an audience is one of the first steps to becoming a strong writer, many times students fail to do so, which leaves them with a weak start to their writing task.

Instructors should also spend time teaching students how to develop an argument. All too often instructors blame the last instructor for not providing students with the tools they need to be successful. However, the academy should help students develop as strong communicators and thinkers who can make valuable contributions to society. Last, instructors cannot forget that using correct grammar and mechanics is as important in students' eyes as developing an argument and adapting prose to a specific audience. Grammar and mechanics are important and should be just as much a part of the curriculum as developing and creating content.

However, improving students' writing abilities is more than just stating criteria and implementing the criteria in the course. Improving students' writing abilities is also about conducting research studies on the use of different types of writing tasks that intensify students' ability to think critically. This study sought to determine the writing

factors that augment critical thinking and create knowledge on the social sciences of agriculture, but now instruments need to be developed and tests need to be conducted using quasi-experimental and experimental design methods to make decisions about the best type of writing tasks to use in writing courses. Additionally, instructors should do an evaluation at the end of each course to determine if students' ability to think critically improved, and instructors should revise their teaching methods according to the outcome of the evaluation.

Foundational studies such as this one need to be conducted so instruments can be developed that measure educational effectiveness of methods to teach writing. Because writing is subjective and ways to assess writing are still not fully developed, writing instructors and researchers tend to avoid facing the writing crisis head on. However, if students, especially students in social sciences of agriculture, are to become communicators of and advocates for agriculture, then writing instructors and researchers need to develop robust ways to teach writing and to measure educational effectiveness.

Further, similar studies should be conducted in the bench sciences of agriculture. Just as Fulwiler and Young (1990) stated that writing instruction is not the same at all institutions, writing is not the same in all disciplines or for all disciplines within an industry. The same writing factors that augment critical thinking and create knowledge in the social sciences of agriculture might not be the same writing factors that augment critical thinking and create knowledge in the bench sciences of agriculture. Therefore, replicating this study in the bench sciences is important. The results of this study cannot be generalized to a larger population because the study took place at a particular time

with a specific group of people. However, it can be replicated at different institutions to determine students' perspectives of writing across colleges of agriculture and to begin to develop a consistent set of writing factors that can be used to enhance writing instruction in agriculture.

Research Objective 2.3: Determine Faculty Members', Students', and Administrators' Perspectives about the Writing Factors that Augment Critical Thinking and Create Knowledge Using Q-sort Interviews

For Research Objective 2.3, I interpreted the three extracted factors as *writing as a process*, *writing as an application and a development of thought*, and *writing as an advanced skill guided by complex reasoning*. Each of the three perspectives represents a perspective held by stakeholders in the College of Agriculture and Life Sciences. Each factor was not highly correlated; therefore, they uniquely described three perspectives.

Factor 1. The first extracted factor was writing as a process. The two participants who loaded on Factor 1 described writing as a process that was guided by society. The two most important writing factors that augment critical thinking and create knowledge in the social sciences of agriculture are “using writing to apply relevant information to evaluate a problem promotes critical thinking” and “societal knowledge is a key component of the writing process.” These were followed by “lots of writing practice is what students need throughout the four years of their college education,” “grammar is critically important,” and “content is critically important.”

To augment critical thinking and create knowledge, students must apply relevant information to evaluate a problem, but they must have knowledge about society to be able to complete the process. Having content knowledge, understanding grammar and

mechanics, and getting writing experience are all part of the writing process. However, if students only evaluate a problem, have content knowledge, understand writing mechanics, and write consistently but do not have knowledge of society, they cannot increase their ability to think critically, which Beaufort (1999) also described in her writing expertise model.

According to an expert who loaded on Factor 1, writing intensive courses are not important. Writing should be integrated throughout college courses instead of being confined to one or two courses on a degree plan. However, the instructors who believe strongly in writing education will implement writing into their courses, and others may not, which could mean an even larger gap between students' actual level of expertise and the level of expertise they are expected to have. Research was not an important component of his factor, but without research, students will not be able to obtain the relevant information to evaluate a problem. The participants who loaded on this factor may not be aware that research is an important part of the writing process and one that should not be overlooked if writing to increase critical thinking is about applying relevant information.

Factor 2. The second factor was writing as an application and a development of thought. The two participants who loaded on Factor 2 described writing as a technique to apply information and thought and to transform thought into information. The two most important writing factors that augment critical thinking and create knowledge in the social sciences of agriculture, according to the participants who loaded on Factor 2, are “using writing to apply relevant information to evaluate a problem promotes critical

thinking” and “lots of writing practice is what students need throughout the four years of their college education.” These were followed by “writing is the development of clear thoughts and the window to the brain,” “writing is about understanding how things fit together,” and “strong writers should know when to write a lot and when to condense information.”

To augment critical thinking and create knowledge, students must apply relevant information to evaluate a problem, but they must engage in writing throughout their college career. Writing should not be confined to just one or two courses during a student’s junior or senior year. Writing practice should be incorporated into the course curriculum throughout student’s undergraduate education. Students should not only engage in many writing opportunities but should also use real-world scenarios to apply relevant information, solve problems, develop an understanding of systems, and target specific audiences. Real-world scenarios increase students’ ability to think critically because they have to apply and defend the information to a larger population, which Irani and Telg (2005) found that real-world projects were one way of integrating critical thinking into course curriculum. Writing, when viewed as the window to the brain, is a unique perspective because a student’s written material is a direct reflection of what the student is thinking. In 1983, Foster stated writing is connected to the thought process. Essentially, writing is one of the only ways to understand and view what is going on inside a student’s mind; therefore, it is unique because not many methods exist with this capability.

Knowing when to write a lot and when to condense is important because many audiences want a synopsis of the project and not an extended version. Students must put themselves in the shoes of others and think about what an outside reader would want to know before condensing the information. Additionally, writing is about understanding how concepts are connected and connecting additional concepts using writing. As Bereiter and Scardamalia (1987) said, the ability to connect information and transform that information is a trait of an expert writer who falls into the knowledge transformation strategy of the writing development model. An interesting contrast from Factor 1 is that the participants in Factor 2 loaded “grammar is critically important” as a statement most unlike how they think, and content also fell on the most unlike how they think side of the array. Therefore, the participants of Factor 2 believed that writing is more about critical thinking and thought than about using correct grammar and developing content. Essentially, if students can apply and develop thought, they can think critically.

Factor 3. The third factor was writing as an advanced skill guided by complex reasoning. The three participants who loaded on Factor 3 described writing as an advanced skill that includes a consideration of audience to guide the research process and content development. Writing is developed through research and is one way of understanding complex information, which was also discussed in Research Objective 2.1. The two most important writing factors that augment critical thinking and create knowledge in the social sciences of agriculture, according to the participants who loaded on Factor 3, are “strong writers should tailor what is written to their audience” and “writing intensive courses should be 400-level courses.” These were followed by

“writing is important, but writing intensive courses are not,” “content is critically important,” and “research increases challenge in a writing intensive course.”

To augment critical thinking and create knowledge, students must understand their audiences and tailor what they write to a specific audience, which was also an important factor of Research Objective 2.1 and 2.2. Participants think students should be exposed to writing intensive courses their final year of college because, by this time, they have learned the content and subject matter required for their program and they can apply the information. Additionally, this lends well to the idea that the participants think content is critically important. They think that students should master content before they take two writing intensive courses. However, participants also think that writing is important but writing intensive courses are not important. Research as part of a writing course does increase the rigor and challenge because students are required to sift through information and materials, determine what is relevant, and apply it to writing assignments as a way to transform knowledge (Bereiter & Scardamalia, 1987).

Recommendations and implications. First, this study should be replicated in the bench sciences to see if consistencies exist between the two. Although social science and bench science are on opposite ends of the research spectrum, several similarities may exist because certain factors may remain consistent. The difference is that in certain situations and under certain conditions some factors will be more influential than in others. However, it is important to create consistent statements that will guide writing education. The statements identified as part of this Q sort could be used to develop guides to assess students’ writing in the social sciences of agriculture because these

statements have been condensed through research to be the most important writing factors that augment critical thinking and create knowledge.

Additionally, students could use these statements as guides in developing written assignments and serving as peer reviewers in writing intensive courses. If writing instructors in the social sciences of agriculture adopt these statements in the classroom, they can begin to send a consistent message about the writing factors that should be incorporated into writing instruction. The issue with most writing instruction is that it lacks a consistent message. For example, one faculty member teaches writing this way because that is how he or she learned, and another faculty member teaches writing another way because that is how he or she learned. Neither one may not know how to write nor may know how to correctly punctuate a sentence. Therefore, students are completing four years of college without completely understanding what writing is and how writing can be used to augment critical thinking and create knowledge.

This study provides a research base for more studies to build on. For example, some statements included in the Q-sort are vague and need further explanation of what they mean. “Strong writers should tailor what is written to their audience” is a somewhat vague statement that could mean a multitude of things. What does tailoring to an audience mean, and how is that done? I would recommend that more research be done on how to best tailor something to an audience and how to target a certain audience. What are the best methods to reach an audience, and what should written documents include that better reaches the specific audience? Certain steps and methods of targeting audiences need to be identified, so students have a better understanding of targeting

audiences. Essentially, each statement within the Q-sort could be broken down, and a Q-sort could be conducted on the statements to determine what it means to, for example, tailor written work to an audience.

Research Question 3: What are the Writing Factors Identified in the Literature and Through Stakeholder Interviews that Contribute to a Model to Augment Critical Thinking and Create Knowledge Through Writing in the Social Sciences of Agriculture?

Writing is not only a way to learn and understand information, but it is also a valuable tool that students use often in the workforce, which Kastman and Booker also stated in 1998. The need for students to become efficient writers has not gone away, and it will probably not go away anytime soon. Yes, the methods of communication have changed, but the need to send a clear, consistent message that is targeted at a specific audience will never go away. The need for written communication is here to stay. Therefore, to produce students who can communicate in this ever-changing society, institutions and their administrators must continue to give writing the respect it deserves in the classroom.

One of the biggest flaws with not only writing education at Texas A&M University but also with writing across the curriculum is that a consistent message does not exist. From the beginning of the writing across the curriculum movement, a variety of ideas have existed about important writing factors and the best way to teach writing. Now more than 30 years later, the same questions exist. It is no longer useful, if it ever was, to have one model of writing education because the model should be directed at and developed with a specific discipline or program in mind (Fulwiler & Young, 1990).

Although one set of models and methods will not work for all writing across the

curriculum programs (Fulwiler & Young, 1990), a set of necessary factors and components that augment critical thinking and create knowledge must be established. However, the writing course program criteria that do exist at Texas A&M University is vague and lacks the factors that augment critical thinking and create knowledge. The faculty members are left to interpret the criteria without having an understanding of criteria that augment critical thinking. Perhaps soliciting feedback from faculty members and students about the writing factors that are important for the augmentation of critical thinking skills and the creation of knowledge could writing course program criteria. Investigating the needs of the University as a whole is an unmanageable project, so the needs of different colleges and programs at the University should be investigated individually.

Writing context, requirements, and expectations vary across disciplines and across industries. The agricultural industry is unique in that it has two very distinct groups—bench scientists and social scientists—who are expected to write and communicate to both novice and expert audiences. Often times, these two groups operate independently, not realizing their benefit to each other. Ultimately, the consumers of agricultural products are the individuals who are impacted daily by agriculturalists' ability to communicate their message. The social scientists are the bridge between the bench scientists of agriculture and the food and consumer and have the obligation to convey the technical information to a larger, non-technical audience.

Although social scientists and bench scientists are both respected scientists in the agricultural industry, they have obligations to fulfill. Social scientists study people and

their behaviors, so they should have an underlying understanding of how to communicate with people. However, bench scientists may not have as much interaction with people and may not understand how to communicate as effectively with them. Agricultural communications exist as a separate program that trains students in communications media to better educate and communicate with agriculturalists and non-agriculturalists. Every agriculturalist—from bench scientist to social scientist—has the obligation to communicate agriculture and advocate for a stronger, more sufficient food and fiber supply. However, some would argue students are not receiving the training they need to communicate this message. Administrators who have been active in the planning, development, implementation, management, and evaluation stages of the program have clear goals of what the program should be, but the expectations are either not being communicated to the faculty members or the faculty members are not able to meet the expectations.

The results of Research Objective 2.3 show that administrators and faculty members have different expectations of the writing intensive course than what faculty members are doing and what students perceive writing intensive courses are intended to achieve. Therefore, a disconnect in communication between students, faculty members, and administrators about what the writing intensive course program was designed to do and what the program does. As a part of this study, Research Objective 2.1, 2.2, and 2.3 generated a list of writing factors that augment critical thinking and create knowledge in the social sciences of agriculture .

- Applying writing to real-world scenarios,

- Developing a strong argument,
- Having content knowledge,
- Having knowledge of society,
- Presenting and defending a topic to a variety of public audiences,
- Reading industry-related material,
- Receiving rich, timely feedback,
- Researching and understanding how ideas and concepts are connected,
- Understanding grammar and mechanics,
- Understanding when to write a lot and when to condense information,
- Using writing to apply relevant information to evaluate problems, and
- Writing repetition.

Additionally, the results of this study as a whole portray writing more as a system than as a process. The writing process is situated within the demonstration of critical thinking through writing element, but it acts more as a part of the writing system instead of as a separate process. The social context, discourse knowledge, content/subject matter knowledge, cognitive processes, and confidence elements are contributors to critical thinking and writing, and critical thinking is demonstrated through the layers of the writing process. Each part of the writing will differ based on the context, situation, and audience. Therefore, the model, at this time, is illustrative. More research (e.g., structural equation modeling and/or discriminate function analysis) is necessary to better understand the relationships between and among factors.

Agriculture is a discourse community with its own beliefs, values, and opinions (Beaufort, 1999; Flower, 1994). Often times, institutions teach students one way of writing instead of providing them with a set of skills and tools that they can transfer between courses and writing tasks (Beaufort, 1999). Understanding writing as a system and what writing factors augment critical thinking and create knowledge in the social sciences of agriculture will establish a baseline of how writing can be taught. The writing factors are not specific to a certain course but are skills that can transfer between courses, across writing tasks, and into the workforce and provide students a sound, quality writing education.

Based on the writing factors identified in this study, I recommended that a set of experimental or quasi-experimental design studies be conducted to determine if research shows the above writing factors do contribute to students' increased ability to think critically and if they are contributing factors to augmenting critical thinking and creating knowledge in the social sciences of agriculture. Also, a similar three-phase study should be conducted to determine the writing factors that augment critical thinking and create knowledge in the bench sciences of agriculture. Once both lists of writing factors have been developed, they can be compared, refined, and investigated.

Interviews and a Q sort should be conducted with employers to gain their perspective on the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture because they are a key stakeholder of the University. If employers are not satisfied with new graduates, then universities have defeated their purpose of preparing students for a 21st century workforce. Essentially, employers'

perspectives of an institution's students are the most important perspectives that exist because they are the ones who employ the graduates. If graduates' education does not meet employers' satisfaction, then many graduates are without a job and the degree is basically null. The perspectives could be compared to the perspectives of this study, and a consensus can be reached about the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture.

Administrators' perspectives could also be explored using qualitative interviews to understand their rationale behind writing intensive courses. This would include administrators beyond the College of Agriculture and Life Sciences to include administrators in the University Writing Center. By conducting these interviews, an understanding of where the communication gap between administrators, faculty members, and students exists. Additionally, each factor needs to be analyzed and refined using Q methodology. For example, what is writing to a specific audience mean? To determine what that means, that statement could serve as the condition of instruction, and participants could perform Q sort on that factor to identify all the perspectives. This should be conducted on the writing factors identified in this study, so instructors can effectively incorporate the writing factors into course curriculum.

More research needs to be conducted on the relationships among and between the elements and concepts of the model to determine how and to what degree they impact the writing system. Additionally, the overlapping areas of the model need to be investigated to determine if the area of overlap are illustrative or interpretative. Each element or concept of the model would serve in difference capacities depending on

context, situation or audience, so the area of overlap could depend on the way the model was applied. The layers of the model are universal and widely applied, but one layer could be more important than another layer in some situations.

As for the writing classroom, writing instructors should adapt their curriculum to include the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture. Developing course curricula around these factors could help students enhance their critical thinking skills while they write. These factors should be used as a baseline for modification of the writing intensive course program in the social sciences of agriculture. After reviewing the conceptual model of the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture, each program/discipline should develop a sub process model based on the general model.

It is important to remember that this is just a small study that examined the social sciences of agriculture in one of the largest colleges of agriculture around the world. Therefore, what was found here cannot be inferred across colleges of agriculture. However, it will help the Texas A&M University College of Agriculture and Life Sciences better understand the writing factors that augment critical thinking and create knowledge. Using this study as a basis for course modification will help students get the most out of their writing education and help them write to learn and understand and not just write to write.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

TEXAS A&M UNIVERSITY
DIVISION OF RESEARCH - OFFICE OF RESEARCH COMPLIANCE AND BIOSAFETY

1186 TAMU, General Services Complex
College Station, TX 77843-1186
750 Agronomy Road, #3501

979.458.1467
FAX 979.862.3176
<http://researchcompliance.tamu.edu>

Human Subjects Protection Program

Institutional Review Board

APPROVAL DATE: 29-Mar-2012

MEMORANDUM

TO: LEGGETTE, HOLLI
77843-2116

FROM: Office of Research Compliance
Institutional Review Board

SUBJECT: Initial Review

Protocol Number: 2012-0121

Title: Exploring and Assessing Student Writing in the College of Agriculture and Life Sciences

Review Category: Expedited

Approval Period: 29-Mar-2012 To 28-Mar-2013

Approval determination was based on the following Code of Federal Regulations:

Eligible for Expedite Approval (45 CFR 46.110): Identification of the subjects or their responses (or the remaining procedures involving identification of subjects or their responses) will NOT reasonably place them at risk of criminal or civil liability or be damaging to the their financial standing, employability, insurability, reputation, or be stigmatizing, unless reasonable and appropriate protections will be implemented so that risks related to invasion of privacy and breach of confidentiality are no greater than minimal.

Criteria for Approval has been met (45 CFR 46.111) - The criteria for approval listed in 45 CFR 46.111 have been met (or if previously met, have not changed).

(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation or quality assurance methodologies.

(Note: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b) (3). This listing refers only to research that is not exempt.)

DIVISION OF RESEARCH

Office of Research Compliance and Biosafety



APPROVAL DATE: 04/02/2013
MEMORANDUM
TO: Holli Leggette
ALRSRCH - Agrilife Research - Ag Leadership, Education & Communication
FROM: Dr. James Fluckey
Chair
Institutional Review Board
SUBJECT: Continuing Review for Human Subjects Research Approval

Protocol Number: IRB2012-0121
Title: Exploring and Assessing Student Writing in the College of Agriculture and Life Sciences
Review Type: Expedite
Approved: 03/29/2012
Continuing Review Due: 02/28/2014
Expiration Date: 03/31/2014
Review Categories and Regulatory Determinations: Category 7: Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies
Document of Consent: Written consent in accordance with 45 CF 46.116/ 21 CFR 50.27

Provisions:
Comments: Data analyses only on 33 subjects. No AEs or UPs.

This research project has been approved. As principal investigator, you assume the following responsibilities

1. **Continuing Review:** The protocol must be renewed by the expiration date in order to continue with the research project. A Continuing Review application along with required documents must be submitted by the continuing review deadline. Failure to do so may result in processing delays, study termination, and/or loss of funding.
2. **Completion Report:** Upon completion of the research project (including data analysis and final written papers), a Completion Report must be submitted to the IRB.
3. **Unanticipated Problems and Adverse Events:** Unanticipated problems and adverse events must be reported to the IRB immediately.
4. **Reports of Potential Non-compliance:** Potential non-compliance, including deviations from protocol and violations, must be reported to the IRB office immediately.

750 Agronomy Road, Suite 2701
1186 TAMU
College Station, TX 77843-1186

Tel. 979.458.1467 Fax. 979.862.3176
<http://rcb.tamu.edu>

5. **Amendments:** Changes to the protocol must be requested by submitting an Amendment to the IRB for review. The Amendment must be approved by the IRB before being implemented.
6. **Consent Forms:** When using a consent form or information sheet, you must use the IRB stamped approved version. Please log into iRIS to download your stamped approved version of the consenting instruments. If you are unable to locate the stamped version in iRIS, please contact the office.
7. **Audit:** Your protocol may be subject to audit by the Human Subjects Post Approval Monitor. During the life of the study please review and document study progress using the PI self-assessment found on the RCB website as a method of preparation for the potential audit. Investigators are responsible for maintaining complete and accurate study records and making them available for inspection. Investigators are encouraged to request a pre-initiation site visit with the Post Approval Monitor. These visits are designed to help ensure that all necessary documents are approved and in order prior to initiating the study and to help investigators maintain compliance.
8. **Recruitment:** All approved recruitment materials will be stamped electronically by the HSPP staff and available for download from iRIS. These IRB-stamped approved documents from iRIS must be used for recruitment. For materials that are distributed to potential participants electronically and for which you can only feasibly use the approved text rather than the stamped document, the study's IRB Protocol number, approval date, and expiration dates must be included in the following format: TAMU IRB#20XX-XXXX Approved: XX/XX/XXXX Expiration Date: XX/XX/XXXX.

This electronic document provides notification of the review results by the Institutional Review Board.

APPENDIX B

RECRUITMENT EMAIL/SCRIPT FOR RESEARCH OBJECTIVE 2.1

Dear [faculty member]:

A study is being conducted at Texas A&M University to develop a model to augment critical thinking and create knowledge through writing in social science departments in the College of Agriculture and Life Sciences. The goal of this study is to better understand the writing intensive course requirement at Texas A&M University and your experience as a writing intensive course instructor.

You are receiving this correspondence because you have been randomly chosen from a larger population of faculty members who taught a writing intensive course during the fall 2011 and spring 2012 semesters.

I hope you will agree to participate in the study because your responses could help you with teaching writing intensive courses. This study is strictly voluntary, and the information you provide will remain confidential. Prior to beginning the interview, you will be asked to sign a consent form. The interview should take between 45 minutes and one hour to complete. If you agree to participate in this study, please respond to this email (holli.leggette@agnet.tamu.edu). Once I receive your response, we can schedule a time and place to conduct the study.

Should you have any questions or concerns about this project, please email me at holli.leggette@agnet.tamu.edu or call me at 316-253-3369.

Thank you in advance for your assistance and participation in this study.

Sincerely,
Holli Leggette
Doctoral Candidate
Department of Agricultural Leadership, Education, and Communications
Texas A&M University

APPENDIX C

INFORMED CONSENT FOR RESEARCH OBJECTIVE 2.1

TEXAS A&M UNIVERSITY HUMAN SUBJECTS PROTECTION PROGRAM

CONSENT FORM

Project Title: EXPLORING AND ASSESSING STUDENT WRITING IN THE COLLEGE OF AGRICULTURE AND LIFE SCIENCES

You are being invited to take part in a research study being conducted by Texas A&M University. You are being asked to read this form so that you know about this research study. The information in this form is provided to help you decide whether or not to take part in the research. If you decide to take part in the study, you will be asked to sign this consent form. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefit you normally would have.

WHY IS THIS STUDY BEING DONE?

The purpose of this study is to develop a model to augment critical thinking and create knowledge through writing in the social science departments in the College of Agriculture and Life Sciences.

WHY AM I BEING ASKED TO BE IN THIS STUDY?

You were chosen because of your direct involvement with teaching writing intensive courses.

HOW MANY PEOPLE WILL BE ASKED TO BE IN THIS STUDY?

Eight people (participants) will be enrolled in this study locally. Overall, a total of 33 people will be enrolled.

WHAT ARE THE ALTERNATIVES TO BEING IN THIS STUDY?

The alternative is not to participate.

WHAT WILL I BE ASKED TO DO IN THIS STUDY?

Your participation in this study will last up to one hour and includes one visit. The procedures you will be asked to perform are described below.

Interview 1

This interview will last about one hour, and during this interview, you will be asked questions about the writing factors that augment critical thinking and create knowledge in the social sciences of agriculture.

ARE THERE ANY RISKS TO ME?

The things that you will be doing have no more risk than you would come across in everyday life. Although the researchers have tried to avoid risks, you may feel that some questions/procedures that are asked of you will be stressful or upsetting. You do not have to answer anything you do not want to.

ARE THERE ANY BENEFITS TO ME?

There may be no direct benefit to you by being in this study. What the researcher finds out from this study may help to improve the writing intensive course program in the College of Agriculture and Life Sciences.

WILL THERE BE ANY COSTS TO ME?

Aside from your time, there are no costs for taking part in the study.

WILL I BE PAID TO BE IN THIS STUDY?

You will not be paid for being in this study.

WILL INFORMATION FROM THIS STUDY BE KEPT PRIVATE?

The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely, and only Holli Leggette and Dr. Tracy Rutherford will have access to the records.

Information about you will be stored in computer files protected with a password.

Information about you will be kept confidential to the extent permitted or required by law. People who have access to your information include the Principal Investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly.

WHOM CAN I CONTACT FOR MORE INFORMATION?

You can call the Principal Investigator to tell her about a concern or complaint about this research study. The Principal Investigator Holli Leggette, M.S., can be called at 979-862-3015 or emailed at holli.leggette@agnet.tamu.edu. You may also contact the Protocol Director, Dr. Tracy Rutherford at 979-458-2744 or rutherford@tamu.edu.

For questions about your rights as a research participant; or if you have questions, complaints, or concerns about the research and cannot reach the Principal Investigator or

want to talk to someone other than the Investigator, you may call the Texas A&M Human Subjects Protection Program office.

- Phone number: (979) 458-4067
- Email: irb@tamu.edu

MAY I CHANGE MY MIND ABOUT PARTICIPATING?

You have the choice whether or not to be in this research study. You may decide not to participate or stop participating at any time. If you choose not to be in this study, there will be no effect on your employment at Texas A&M University. You can stop being in this study at any time with no effect on your employment at Texas A&M University. Any new information discovered about the research will be provided to you. This information could affect your willingness to continue your participation.

STATEMENT OF CONSENT

I agree to be in this study and know that I am not giving up any legal rights by signing this form. The procedures, risks, and benefits have been explained to me, and my questions have been answered. I know that new information about this research study will be provided to me as it becomes available and that the researcher will tell me if I must be removed from the study. I can ask more questions if I want. A copy of this entire, signed consent form will be given to me.

Participant's Signature

Date

Printed Name

Date

INVESTIGATOR'S AFFIDAVIT:

Either I have or my agent has carefully explained to the participant the nature of the above project. I hereby certify that to the best of my knowledge the person who signed this consent form was informed of the nature, demands, benefits, and risks involved in his/her participation.

Signature of Presenter

Date

Printed Name

Date

APPENDIX D

INTERVIEW PROTOCOL FOR RESEARCH OBJECTIVE 2.1

Faculty Interview Questions

1. Describe your background in writing and teaching writing.
2. Define writing intensive courses.
3. Describe the experiences that most prepared you to teach writing intensive courses.
4. What is your goal as a writing intensive course instructor?
5. Explain the writing assignments in your writing intensive course. What is your favorite assignment?
6. If you could design a writing intensive course, what would you include?
7. Does the classroom environment impact how you teach writing?
8. How important do you believe writing intensive courses are to the success of students?
9. Compare the interaction between you and your students in your writing intensive course to the interaction between you and your students in a course that is not writing intensive.
10. For students to be strong writers, what should they possess?
11. If you were the University Writing Center director, what methods would you use to improve students' writing abilities?
12. On a scale of one to five, how well do your students write about specialized topics in your discipline?
13. Do your students' behaviors and attitudes toward writing change as they progress through your writing course?
14. Does the amount of time spent writing increase students' ability to write well?
15. Do you have anything you would like to add?

APPENDIX E

RECRUITMENT EMAIL/SCRIPT FOR RESEARCH OBJECTIVE 2.2

Dear [student]:

A study is being conducted at Texas A&M University to develop a model to augment critical thinking and create knowledge through writing in social science departments in the College of Agriculture and Life Sciences. The goal of this study is to better understand the writing intensive course requirement at Texas A&M University and your experience as a student in a writing intensive course.

You are receiving this correspondence because you have been randomly chosen from a larger population of students in agricultural leadership and development who will graduate in May or December 2013.

I hope you will agree to participate in the study because your responses will help the faculty members, administrators, and employers better understand the writing intensive course requirement and your experience. This study is strictly voluntary, and the information you provide will remain confidential. Prior to beginning the focus group, you will be asked to sign a consent form. The focus group should take approximately 90 minutes to complete. Each participant of the study will receive a \$10 Starbucks gift card. You can choose to participate on **either** January 14 at 6 p.m. **or** January 15 at 6 p.m. If you agree to participate in this study, please respond to this email (holli.leggette@agnet.tamu.edu) and specify your choice of participation date.

Should you have any questions or concerns about this project, please email me at holli.leggette@agnet.tamu.edu or call me at 316-253-3369.

Thank you in advance for your assistance and participation in this study.

Sincerely,
Holli Leggette
Doctoral Candidate
Department of Agricultural Leadership, Education, and Communications
Texas A&M University

APPENDIX F

INFORMED CONSENT FOR RESEARCH OBJECTIVE 2.2

TEXAS A&M UNIVERSITY HUMAN SUBJECTS PROTECTION PROGRAM

CONSENT FORM

Project Title: EXPLORING AND ASSESSING STUDENT WRITING IN THE COLLEGE OF AGRICULTURE AND LIFE SCIENCES

You are being invited to take part in a research study being conducted by Texas A&M University. You are being asked to read this form so that you know about this research study. The information in this form is provided to help you decide whether or not to take part in the research. If you decide to take part in the study, you will be asked to sign this consent form. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefit you normally would have.

WHY IS THIS STUDY BEING DONE?

The purpose of this study is to develop a model to augment critical thinking and create knowledge through writing in the social science departments in the College of Agriculture and Life Sciences.

WHY AM I BEING ASKED TO BE IN THIS STUDY?

You were chosen because you have taken two writing intensive courses in the College of Agriculture and Life Sciences, and you will graduate between May 2012 and May 2014.

HOW MANY PEOPLE WILL BE ASKED TO BE IN THIS STUDY?

Fifteen people (participants) will be enrolled in this study locally. Overall, a total of 33 people will be enrolled.

WHAT ARE THE ALTERNATIVES TO BEING IN THIS STUDY?

The alternative is not to participate.

WHAT WILL I BE ASKED TO DO IN THIS STUDY?

Your participation in this study will last up to one hour and includes one visit. The procedures you will be asked to perform are described below.

Focus Group 1

This focus group will last about 90 minutes, and during this interview, you will be asked questions about your experience in the writing intensive courses you have taken.

ARE THERE ANY RISKS TO ME?

The things that you will be doing have no more risk than you would come across in everyday life. Although the researchers have tried to avoid risks, you may feel that some questions/procedures that are asked of you will be stressful or upsetting. You do not have to answer anything you do not want to.

ARE THERE ANY BENEFITS TO ME?

There may be no direct benefit to you by being in this study. What the researcher finds out from this study may help to improve the writing intensive course program in the College of Agriculture and Life Sciences.

WILL THERE BE ANY COSTS TO ME?

Aside from your time, there are no costs for taking part in the study.

WILL I BE PAID TO BE IN THIS STUDY?

You will not be paid for being in this study.

WILL INFORMATION FROM THIS STUDY BE KEPT PRIVATE?

The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely, and only Holli Leggette and Dr. Tracy Rutherford will have access to the records.

Information about you will be stored in computer files protected with a password.

Information about you will be kept confidential to the extent permitted or required by law. People who have access to your information include the Principal Investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly.

WHOM CAN I CONTACT FOR MORE INFORMATION?

You can call the Principal Investigator to tell her about a concern or complaint about this research study. The Principal Investigator Holli Leggette, M.S., can be called at 979-862-3015 or emailed at holli.leggette@agnet.tamu.edu. You may also contact the Protocol Director, Dr. Tracy Rutherford at 979-458-2744 or rutherford@tamu.edu.

For questions about your rights as a research participant; or if you have questions, complaints, or concerns about the research and cannot reach the Principal Investigator or want to talk to someone other than the Investigator, you may call the Texas A&M Human Subjects Protection Program office.

- Phone number: (979) 458-4067
- Email: irb@tamu.edu

MAY I CHANGE MY MIND ABOUT PARTICIPATING?

You have the choice whether or not to be in this research study. You may decide not to participate or stop participating at any time. If you choose not to be in this study, there will be no effect on your student status at Texas A&M University. You can stop being in this study at any time with no effect on your student status at Texas A&M University. Any new information discovered about the research will be provided to you. This information could affect your willingness to continue your participation.

STATEMENT OF CONSENT

I agree to be in this study and know that I am not giving up any legal rights by signing this form. The procedures, risks, and benefits have been explained to me, and my questions have been answered. I know that new information about this research study will be provided to me as it becomes available and that the researcher will tell me if I must be removed from the study. I can ask more questions if I want. A copy of this entire, signed consent form will be given to me.

Participant's Signature

Date

Printed Name

Date

INVESTIGATOR'S AFFIDAVIT:

Either I have or my agent has carefully explained to the participant the nature of the above project. I hereby certify that to the best of my knowledge the person who signed this consent form was informed of the nature, demands, benefits, and risks involved in his/her participation.

Signature of Presenter

Date

Printed Name

Date

APPENDIX G

INTERVIEW PROTOCOL FOR RESEARCH OBJECTIVE 2.2

Student Focus Group Script

Hello! My name is Damian Dominguez, and I will serve as the moderator of this focus group. This is Holli Leggette, and she is a Ph.D. candidate in the Department of Agricultural Leadership, Education, and Communications working on her dissertation project. She will be the assistant moderator of the focus group and take notes about our discussion.

You were invited here today because Holli is interested in your experience as a student taking writing intensive courses. However, don't worry because your name will not be used in the research project and no one outside the group will know what you said. We ask that you respect the privacy of the other group members and not discuss the information presented here. So, do we all agree that our conversation will remain confidential?

What we are discussing here is how you feel about your writing intensive course experience, and everyone in this room may have a different opinion. Everyone's opinion is right. We are not here to change your mind about writing intensive courses; we are here to hear what you have to say about your experience as a student, which only you can provide us.

You may find at times throughout this focus group that you share opinions with others in this room or that you may be the only one with that opinion. Every opinion counts; therefore, even if you are the only one with that opinion, please share because your opinion might also represent the opinion of many other Texas A&M University students. Please feel free to share your thoughts.

Holli will be taking notes during the focus group about our discussion and our interaction. Please speak up during our discussion so she can ensure accuracy.

If you need to leave at any time during the focus group, feel free to do so, but I ask that you return as quickly as possible. Sit back and relax; you should find the next 60 minutes interesting and enjoyable.

If you would still like to participate in this research study, I ask that you sign the consent form. [*Sign consent form*]

You will notice a number in front of you. From this point forward, that will be your unique number for this focus group, and your name will not be tied to the research

project. At this time, we would like for you to fill out a questionnaire as well. The information will only be used as demographic information.

[Fill out questionnaire]

Questions

1. Describe your writing experience before you came to college.
2. Define writing.
3. Define writing intensive course.
4. What are the characteristics you believe strong writers possess?
5. Describe the interaction between you and your professor in the writing intensive courses you have taken.
6. Do you think your professors provided enough concrete examples of the type of writing they expected?
7. Do differing teaching methods affect what you learn?
8. What exercises in/out of class helped you become a better writer?
9. What kind of assignments did you do in your courses? What writing assignments helped you better understand the course material?
10. In your writing intensive courses did you use writing to plan, design, execute, or evaluate situations?
11. What type of feedback did you receive in your writing intensive courses? What was the most useful?
12. Did writing intensive courses improve your writing?
13. Did writing intensive courses improve your confidence in writing?
14. Did writing intensive courses improve your ability to think critically?
15. How comfortable are you with writing information accurately and effectively?
16. Do you believe you can develop a strong argument with writing?
17. What resources do you use to develop an argument?
18. What are your common mistakes in writing?
19. How much time per week do you devote to writing in your major? Does the amount of time you spend writing affect how you learn?
20. Did your attitude toward writing change as a result of being in a writing intensive course?
21. How do you believe your experience in writing intensive courses will help you in your career?
22. On a scale of one to five with five being the best, how well do you write about topics about your field?
23. Do you have anything you would like to add?

APPENDIX H

RECRUITMENT EMAIL/SCRIPT FOR RESEARCH OBJECTIVE 2.3

Faculty members

Dear [Texas A&M University faculty member]:

Good morning. For my dissertation project, I am conducting a study at Texas A&M University to develop a model to augment critical thinking and create knowledge through writing in social science departments in the College of Agriculture and Life Sciences. The goal of this study is to identify writing factors that faculty members, based on their experiences as a writing intensive course instructor, believe augment critical thinking and create knowledge.

There are three phases to this study: 1) Review and evaluation of writing theories and models; 2) faculty interviews and student focus groups; and 3) a Q sort of writing factors that augment critical thinking and create knowledge. Using the information gathered from the three phases, I will develop a writing model. A Q sort is a unique research method not often used in broad agricultural sciences. Q participants are selected based on the different perspectives that exist about the topic under study. During the Q sort, Q participants are given a set of Q statements to place on a form board from “least like how I think” to “most like how I think.”

You were chosen for this study because you represent a key stakeholder group: Texas A&M University faculty member in the College of Agriculture and Life Sciences who has taught or teaches a writing intensive course. I am interested in your different, well-formed opinion about writing factors that augment critical thinking. I think you will find this research method informing, engaging, enlightening, and interesting. I hope you will agree to participate in the study because your Q sort will help me better understand the writing factors that augment critical thinking. This study is strictly voluntary, and the information you provide will remain confidential. Prior to beginning the interview, you will be asked to sign a consent form. The interview should take between 45 minutes and one hour to complete. If you agree to participate in this study, please respond to this email (holti.leggette@agnet.tamu.edu). Once I receive your response, we can schedule a time and place to conduct the study.

Should you have any questions or concerns about this project, please email me at holti.leggette@agnet.tamu.edu or call me at 316-253-3369. Thank you in advance for your assistance and participation in this study.

Sincerely,
Holti Leggette, Doctoral Candidate

Students

Dear [student]:

A study is being conducted at Texas A&M University to develop a model to augment critical thinking and create knowledge through writing in social science departments in the College of Agriculture and Life Sciences. The goal of this study is to identify writing factors that students, based on their experiences taking writing intensive courses, believe augment critical thinking and create knowledge.

You are receiving this correspondence because you have been randomly chosen from a larger population of students who completed both of your writing intensive course requirements at Texas A&M University and will graduate in May or December 2013.

I hope you will agree to participate in the study because your responses will help the faculty members, administrators, and employers better understand the writing intensive course requirement. This study is strictly voluntary, and the information you provide will remain confidential. Prior to beginning the interview, you will be asked to sign a consent form. The interview should take between 45 minutes and one hour to complete. If you agree to participate in this study, please respond to this email (holli.leggette@agnet.tamu.edu). Once I receive your response, we can schedule a time and place to conduct the study.

Should you have any questions or concerns about this project, please email me at holli.leggette@agnet.tamu.edu or call me at 316-253-3369.

Thank you in advance for your assistance and participation in this study.

Sincerely,

Holli Leggette

Doctoral Candidate

Department of Agricultural Leadership, Education, and Communications

Texas A&M University

Administrators

Dear [Texas A&M University administrator]:

Good morning. For my dissertation project, I am conducting a study at Texas A&M University to develop a model to augment critical thinking and create knowledge through writing in social science departments in the College of Agriculture and Life Sciences. The goal of this study is to identify writing factors that Texas A&M University administrators—based on their experiences planning, developing, implementing, managing, and evaluating the writing intensive course program—believe augment critical thinking and create knowledge.

There are three phases to this study: 1) Review and evaluation of writing theories and models; 2) faculty interviews and student focus groups; and 3) a Q sort of writing factors that augment critical thinking and create knowledge. Using the information gathered from the three phases, I will develop a writing model. A Q sort is a unique research method not often used in broad agricultural sciences. Q participants are selected based on the different perspectives that exist about the topic under study. During the Q sort, Q participants are given a set of Q statements to place on a form board from “least like how I think” to “most like how I think.”

You were chosen for this study because you represent a key stakeholder group: Texas A&M University administration. I am interested in your different, well-formed opinion about writing factors that augment critical thinking. I think you will find this research method informing, engaging, enlightening, and interesting. I hope you will agree to participate in the study because your Q sort will help me better understand the writing factors that augment critical thinking. This study is strictly voluntary, and the information you provide will remain confidential. Prior to beginning the interview, you will be asked to sign a consent form. The interview should take between 45 minutes and one hour to complete. If you agree to participate in this study, please respond to this email (holli.leggette@agnet.tamu.edu). Once I receive your response, we can schedule a time and place to conduct the study.

Should you have any questions or concerns about this project, please email me at holli.leggette@agnet.tamu.edu or call me at 316-253-3369.

Thank you in advance for your assistance and participation in this study.

Sincerely,

Holli Leggette

Doctoral Candidate

Department of Agricultural Leadership, Education, and Communications

Texas A&M University

APPENDIX I

INFORMED CONSENT FOR RESEARCH OBJECTIVE 2.3

TEXAS A&M UNIVERSITY HUMAN SUBJECTS PROTECTION PROGRAM

CONSENT FORM

Project Title: EXPLORING AND ASSESSING STUDENT WRITING IN THE COLLEGE OF AGRICULTURE AND LIFE SCIENCES

You are being invited to take part in a research study being conducted by Texas A&M University. You are being asked to read this form so that you know about this research study. The information in this form is provided to help you decide whether or not to take part in the research. If you decide to take part in the study, you will be asked to sign this consent form. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefit you normally would have.

WHY IS THIS STUDY BEING DONE?

The purpose of this study is to develop a model to augment critical thinking and create knowledge through writing in the social science departments in the College of Agriculture and Life Sciences.

WHY AM I BEING ASKED TO BE IN THIS STUDY?

[Insert reason for recruiting key stakeholder group].

HOW MANY PEOPLE WILL BE ASKED TO BE IN THIS STUDY?

Ten people (participants) will be enrolled in this study locally. Overall, a total of 33 people will be enrolled.

WHAT ARE THE ALTERNATIVES TO BEING IN THIS STUDY?

The alternative is not to participate.

WHAT WILL I BE ASKED TO DO IN THIS STUDY?

Your participation in this study will last up to one hour and includes one visit. The procedures you will be asked to perform are described below.

Interview 1

This interview will last about one hour, and during this interview, you will be asked to identify writing factors that [insert information here that states key stakeholder group] believe augment critical thinking and create knowledge.

ARE THERE ANY RISKS TO ME?

The things that you will be doing have no more risk than you would come across in everyday life. Although the researchers have tried to avoid risks, you may feel that some questions/procedures that are asked of you will be stressful or upsetting. You do not have to answer anything you do not want to.

ARE THERE ANY BENEFITS TO ME?

There may be no direct benefit to you by being in this study. What the researcher finds out from this study may help to improve the writing intensive course program in the College of Agriculture and Life Sciences.

WILL THERE BE ANY COSTS TO ME?

Aside from your time, there are no costs for taking part in the study.

WILL I BE PAID TO BE IN THIS STUDY?

You will not be paid for being in this study.

WILL INFORMATION FROM THIS STUDY BE KEPT PRIVATE?

The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely, and only Holli Leggette and Dr. Tracy Rutherford will have access to the records.

Information about you will be stored in computer files protected with a password.

Information about you will be kept confidential to the extent permitted or required by law. People who have access to your information include the Principal Investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly.

WHOM CAN I CONTACT FOR MORE INFORMATION?

You can call the Principal Investigator to tell her about a concern or complaint about this research study. The Principal Investigator Holli Leggette, M.S., can be called at 979-862-3015 or emailed at holli.leggette@agnet.tamu.edu. You may also contact the Protocol Director, Dr. Tracy Rutherford at 979-458-2744 or rutherford@tamu.edu.

For questions about your rights as a research participant; or if you have questions, complaints, or concerns about the research and cannot reach the Principal Investigator or want to talk to someone other than the Investigator, you may call the Texas A&M Human Subjects Protection Program office.

- Phone number: (979) 458-4067
- Email: irb@tamu.edu

MAY I CHANGE MY MIND ABOUT PARTICIPATING?

You have the choice whether or not to be in this research study. You may decide not to participate or stop participating at any time. If you choose not to be in this study, there will be no effect on your student status at Texas A&M University. You can stop being in this study at any time with no effect on your student status at Texas A&M University. Any new information discovered about the research will be provided to you. This information could affect your willingness to continue your participation.

STATEMENT OF CONSENT

I agree to be in this study and know that I am not giving up any legal rights by signing this form. The procedures, risks, and benefits have been explained to me, and my questions have been answered. I know that new information about this research study will be provided to me as it becomes available and that the researcher will tell me if I must be removed from the study. I can ask more questions if I want. A copy of this entire, signed consent form will be given to me.

Participant's Signature

Date

Printed Name

Date

INVESTIGATOR'S AFFIDAVIT:

Either I have or my agent has carefully explained to the participant the nature of the above project. I hereby certify that to the best of my knowledge the person who signed this consent form was informed of the nature, demands, benefits, and risks involved in his/her participation.

Signature of Presenter

Date

Printed Name

Date

APPENDIX J

Q-SORT CONDITION OF INSTRUCTION AND DIRECTIONS

Condition of instruction: **What writing factors do you believe augment critical thinking and create knowledge in the social sciences in the College of Agriculture and Life Sciences?**

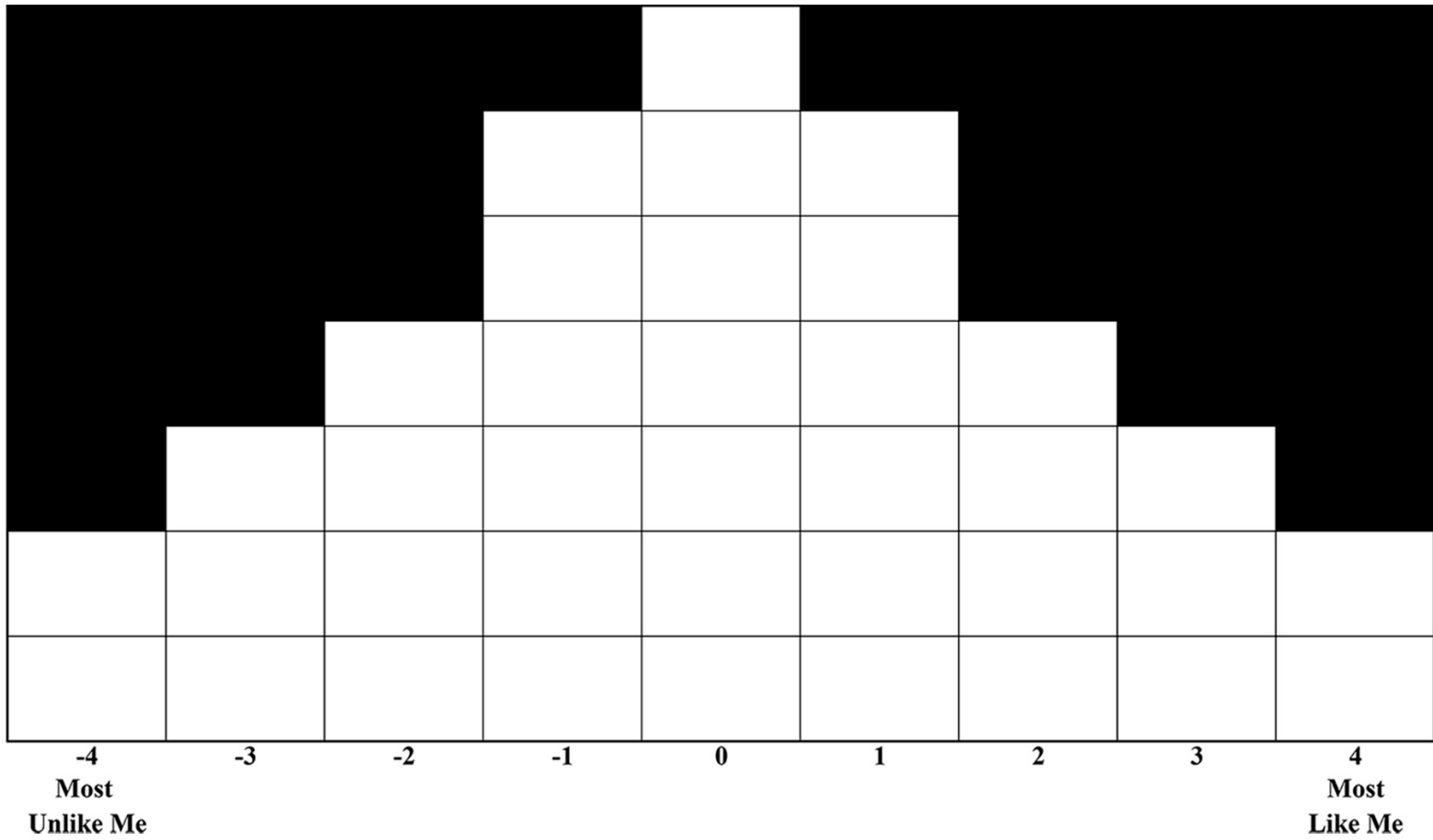
This is the last of three phases for my dissertation study, which is a Q sort of writing factors that augment critical thinking and create knowledge. Using the information gathered from the three phases, I will develop a writing model. A Q sort is a unique research method not often used in broad agricultural sciences. Q participants are selected based on the different perspectives that exist about the topic under study. During the Q sort, Q participants are given a set of Q statements to place on a form board from “least like how I think” to “most like how I think.”

You are encouraged to think aloud because I will take notes throughout the Q sort interview. You represent a key stakeholder group: [insert stakeholder group here]. I am interested in your different, well-formed opinion about writing factors that augment critical thinking. I think you will find this research method informing, engaging, enlightening, and interesting.

To get started,

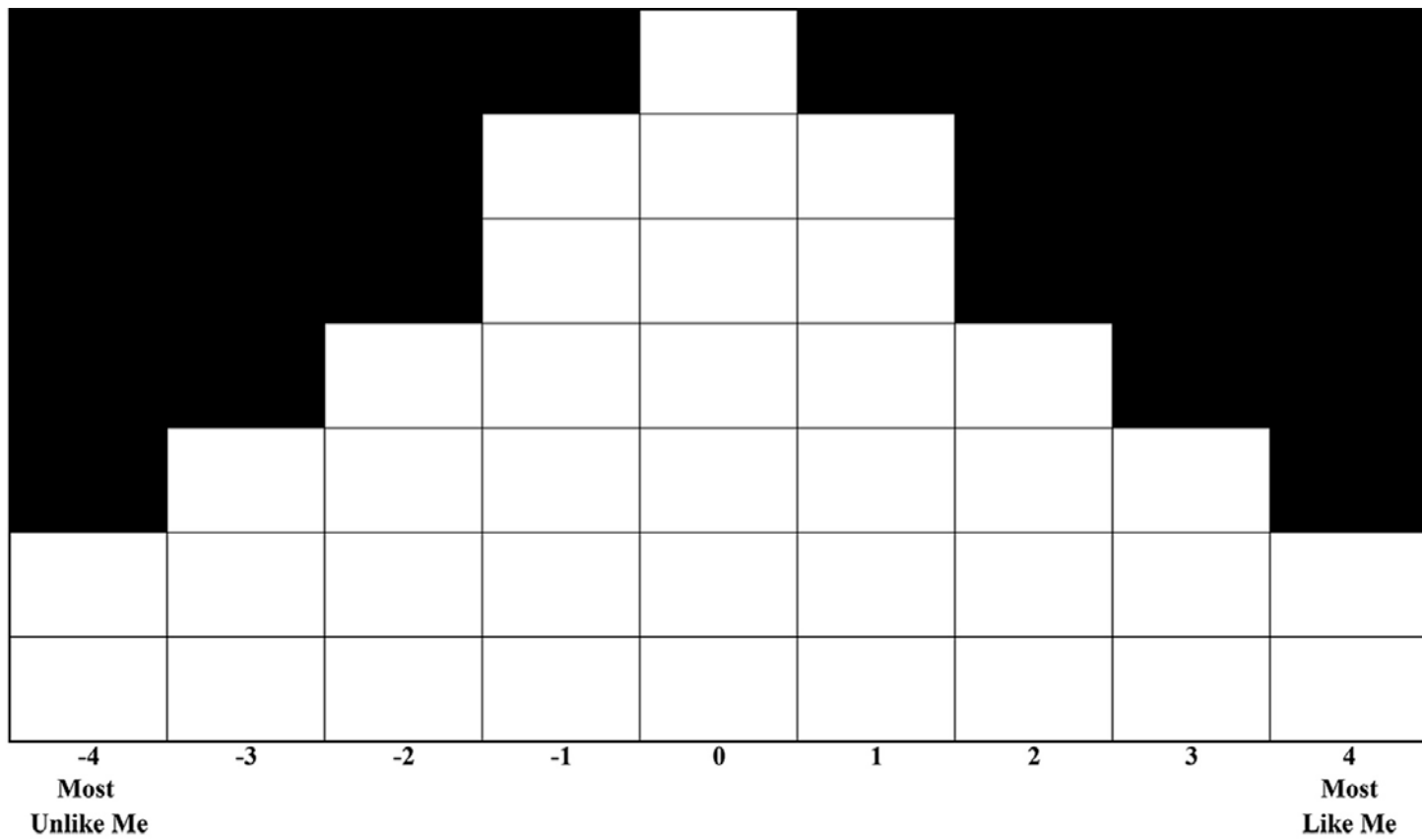
1. Read every statement.
2. Sort the statements into three distinct piles: statements you agree with on the right, statements you disagree with on the left, and statements you neither agree nor disagree with but that you feel neutral about in the middle.
3. Distribute the cards onto the form board. Place the cards that are most important to you on the extreme right, and the cards least important to you on the extreme left.
4. Move back and forth from right to left until the distribution is complete (The statements in the middle are not viewed as irrelevant or unimportant).

APPENDIX K
Q-SORT FORM BOARD



APPENDIX L
Q-SORT RESPONSE SHEET

Unique No. _____



APPENDIX M

STUDENT DEMOGRAPHICS QUESTIONNAIRE

Student Demographics Questionnaire

Number: _____

Major: _____

Gender: _____

GPA: _____

Ethnicity: _____

Expected graduation: _____

Writing intensive courses taken: _____

APPENDIX N

COORELATION MATRIX BETWEEN SORTS

Correlation Matrix Between Sorts

Sorts	Factors									
	1	2	3	4	5	6	7	8	9	10
1 S01	100	11	15	6	9	-12	-2	24	27	-2
2 S02	11	100	27	41	28	38	41	31	48	46
3 S03	15	27	100	23	59	1	22	6	27	22
4 F01	6	41	23	100	44	30	31	36	9	39
5 F02	9	28	59	44	100	14	8	28	24	18
6 A01	-12	38	1	30	14	100	27	25	34	31
7 A02	-2	41	22	31	8	27	100	30	30	53
8 F03	24	31	6	36	28	25	30	100	24	11
9 S04	27	48	27	9	24	34	30	24	100	23
10 A03	-2	46	22	39	18	31	53	11	23	100

APPENDIX O

UNROTATED FACTOR MATRIX

Unrotated Factor Matrix

Sorts	Factors							
	1	2	3	4	5	6	7	8
1 S01	0.1886	0.5615	0.6067	-0.0393	-0.3177	-0.3196	-0.2363	-0.0618
2 S02	0.7610	-0.1213	0.1244	-0.1226	0.0661	-0.1907	0.5033	-0.0968
3 S03	0.5084	0.5560	-0.4003	-0.3303	0.0100	0.1631	-0.1251	-0.1647
4 F01	0.6549	-0.0131	-0.2653	0.4857	-0.1399	-0.3143	0.0252	-0.2363
5 F02	0.5744	0.5450	-0.3926	0.1667	0.2248	0.0613	-0.0097	0.2085
6 A01	0.5301	-0.4481	0.1102	0.1251	0.5446	-0.1023	-0.3795	-0.0953
7 A02	0.6314	-0.3724	0.0020	-0.1822	-0.4094	0.3961	-0.1090	-0.2196
8 F03	0.5295	0.0891	0.3905	0.5763	-0.0891	0.3851	0.0473	0.1821
9 S04	0.5938	0.1025	0.4410	-0.4233	0.3301	0.0764	0.0686	0.0631
10 A03	0.6402	-0.3689	-0.2105	-0.2347	-0.3312	-0.2375	-0.1274	0.4049
Eigenvalues	3.3544	1.4303	1.1718	1.0045	0.8662	0.6456	0.5045	0.3980

APPENDIX P

FACTOR ARRAYS FOR FACTOR 1

				12					
			23	14	1				
			25	28	13				
		9	22	31	37	30			
	6	24	10	29	33	17	26		
18	16	35	5	34	4	36	7	21	
32	15	19	2	11	3	20	8	27	
-4	-3	-2	-1	0	1	2	3	4	

APPENDIX Q

FACTOR ARRAYS FOR FACTOR 2

				18				
			37	2	34			
			17	13	19			
		8	5	1	14	10		
	12	30	9	35	28	33	29	
15	20	16	32	36	22	3	31	21
7	11	25	6	23	24	27	4	26
-4	-3	-2	-1	0	1	2	3	4

APPENDIX R

FACTOR ARRAYS FOR FACTOR 3

				21					
			30	13	5				
			37	29	24				
		32	25	26	4	10			
	19	2	22	33	36	1	31		
16	18	6	28	17	9	34	7	3	
11	35	12	23	27	14	30	8	15	
-4	-3	-2	-1	0	1	2	3	4	