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CONTENT PREPARATION OF PRE-SERVICE AGRICULTURAL EDUCATION TEACHERS AND ITS INFLUENCE ON THEIR CONTENT KNOWLEDGE

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ABSTRACT OF THESIS

CONTENT PREPARATION OF PRE-SERVICE AGRICULTURAL EDUCATION TEACHERS AND ITS INFLUENCE ON THEIR CONTENT KNOWLEDGE

Content knowledge preparation for teachers is a crucial component of the modal curriculum model for education. The purpose of this study was to determine if the amount and quality of coursework preparation of pre-service University of Kentucky agriculture teachers influences their content knowledge as defined by the Praxis II agriculture exam scores. This study concluded that there was variability in coursework preparation of pre-service agriculture teachers at the University of Kentucky. Praxis II exam scores of pre-service teachers indicated that most students are meeting an adequate content knowledge level based on the exam material. It can also be concluded that the relationship between the Praxis II agriculture exam and agricultural content preparation was moderate at best. Based on the conclusions, it is recommended that changes be considered to either the agricultural education curriculum at the University of Kentucky or the Praxis II agriculture exam so that they are a reflection of each other. It is also recommended that the profession examine other variables in play that lead to proper preparation and re-evaluate students' base knowledge upon entering college.

KEYWORDS: Agricultural Education, Content Preparation, Praxis II Exam, Content Knowledge, Pre-Service Teachers

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_____August 13, 2008_____

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University of Kentucky

2008

CONTENT PREPARATION OF PRE-SERVICE AGRICULTURAL EDUCATION TEACHERS AND ITS INFLUENCE ON THEIR CONTENT KNOWLEDGE

THESIS

A thesis submitted in partial fulfillment of the
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By

Amber M. Houck

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CHAPTER 1: INTRODUCTION

Background and Setting

The types of students pursuing careers in the agricultural industry are changing. Even by the mid 1990's, the recruiting base for agricultural colleges had changed so much that half of the students entering many universities were from the cities and suburbs as opposed to traditional rural backgrounds (Walter & Resiner, 1994). Despite the fact that the agricultural industry places high importance on the background and experiences of graduates, more and more students are entering colleges of agriculture without that desired experience (Dyer, Breja, & Wittler, 2002). Initially, the purpose of colleges of agriculture was to educate students in agriculture: now the change has led to educating students about agriculture (Dyer, et al., 2002). Currently, 73% of middle and high school FFA members are from rural non-farm, urban, or suburban areas (National FFA, 2007). If many of these students are pursuing an agricultural education major, they may be learning about aspects of agriculture for the first time in college.

As students who major in agricultural education approach teaching, their knowledge of agricultural content increases in importance. In general, teachers should understand the subject they are teaching for numerous reasons such as responding to student questions, interpreting student comments, and devising a variety of teaching methods when the first does not work with all students (Floden & Meniketti, 2005). An automatic and fluent retrieval of knowledge is important in a classroom setting where teachers must be flexible in instruction and devise various approaches to help students grasp the material. "There is a strong agreement that students learn more if teachers are quite knowledgeable of the subject. In a study done by Okpala and Ellis (2005) about

84.4% of participants agreed that knowledge of the subject by the teacher does play an important role in student achievement. However, pre-service teachers demonstrated they often did not have enough content knowledge to make lessons in both science and social studies areas (Henning & King, 2005).

The modal curriculum model is a widely accepted framework for teacher education. This modal model is divided into four main sections: general studies, content studies, professional education, and integrative studies. This four part model is supported by the National Council for Accreditation of Teacher Education (NCATE), which accredits universities that have teacher preparation programs. Content studies are the specific academic discipline the teacher plans to teach, and are considered a very important part of the modal curriculum for pre-service teachers (Cruickshank, 1996).

Floden and Meniketti (2005) discovered that while coursework preparation of teachers did have positive affects on their knowledge, it did not bring all of the teachers to a complete understanding of their subject area. A key theme in mathematics education studies was that teachers in preparation programs who had completed coursework in their subject had basic skills, but lacked a deeper understanding of the concepts they would teach (Floden & Meniketti, 2005). There is a weak link between university courses in content areas and practical transference to the classroom (Sion & Brewbaker, 2001). A majority of teacher preparation programs focus on education courses rather than subject matter courses (Floden & Meniketti, 2005). Many teacher preparation programs keep content and teaching methods separate. Content preparation is the responsibility of the liberal arts college and teaching method preparation is the responsibility of the education college. These programs fail to see that method does not exist apart from content (Beck,

1961). This same issue could exist in agricultural education as well between the college of education and the college of agriculture.

Subject knowledge in professional development, in-service training, and initial teacher perception should be improved and made a priority (Poulson, 2001). Many states are even going as far as eliminating the undergraduate education degree and requiring teachers to have majors in an academic subject area as a prerequisite for initial certification (Allen, 2000). “Why shouldn’t a university student who plans to teach English be required to take courses such as Instructional Methods in the Teaching of Writing? Or Shakespeare for Young Minds? How about American or English Literature for the High School Student?” (Sion & Brewbaker, 2001, p. 24). Teacher preparation programs need to be evaluated for their content course requirements, and adapt these courses to not only teach the pre-service teachers the content, but instruct them in how to teach it well.

Theoretical Framework

The theoretical framework for this study was based on the concept of novice to expert learning (Bransford, Brown, & Cocking, 2000). Differences exist between experts and novices and implications arise regarding experts’ knowledge of learning and instruction (Bransford et al., 2000). There are six principles of expert knowledge which are important for learning and instruction. One key principle is that experts notice patterns of information that novices do not (Bransford et al., 2000). Experts also have a substantial amount of content knowledge and a deep understanding of that subject matter (Bransford et al., 2000). Another principle of expert knowledge suggests that experts are able to apply the knowledge they have (Bransford et al., 2000). Experts not only have this

knowledge but they are able to retrieve any piece of it with little effort (Bransford et al., 2000). Another key principle is that while experts do know their subject areas, they still may not be able to pass the information along to others (Bransford et al., 2000). This supports the modal curriculum model which has both content and pedagogy included in teacher preparation. The last principle of expert knowledge is that different experts have varying degrees of flexibility with which they can approach situations (Bransford et al., 2000).

It is the researcher's intent to analyze this framework from a pre-service teacher perspective. The study focuses on expert-novice principles as they relate to the importance of subject matter knowledge on effective teaching and the preparation of pre-service teachers in agricultural education at the University of Kentucky. Upon entering college, students are regarded as novices in terms of content knowledge; they transition to experts upon graduation. The bachelor's degree in agricultural education is received to demonstrate a mastery of knowledge and signify earned expertise in content. The principles of expert knowledge establish that knowledge of the subject, the ability to apply the knowledge, and the ability to retrieve that information are all important aspects of expert knowledge (Bransford et al., 2000). These are important aspects of an effective teacher, and can be used when examining the subject matter knowledge or expertise of pre-service teachers.

Statement of the Problem

According to the 2007 State Policy Yearbook, 41 states require teaching programs to administer a basic skills test and 24 of these states delay testing until completion of the preparation program. If these programs accept teachers before they pass a basic skills

test it could result in lowering the rigor of their courses. A limitation of studying subject matter knowledge of teachers is that they have many different opportunities to learn the subject matter and their knowledge can come from a range of sources besides coursework (Floden & Meniketti, 2005).

Allen (2000) discovered that some educators believe that the kind of subject-matter knowledge teachers need is not gained in a traditional arts and science curriculum. Because agriculture is often aligned with science subjects many of the same issues could exist in agriculture as well. “The question most often asked of teachers’ math knowledge is: How far? But should we also ask: how deep? Does the successful completion of advanced coursework necessarily correlate to a profound understanding of fundamental mathematics and problem solving?” (Brover, Deagan, & Farina, 2001, p. 247). This raises the question: Does the preparation of pre-service teachers influence their content knowledge in agricultural education in Kentucky?

Purpose of the Study

The purpose of the study was to determine if the amount and quality of coursework preparation of pre-service University of Kentucky agriculture teachers influences their content knowledge as defined by the Praxis II agriculture exam scores.

Objectives

The specified objectives for this study were to describe:

1. The characteristics of the sample: sex, ACT score, and GPA
2. The agricultural course preparation of the sample by agriculture content areas

3. The agricultural content knowledge of the sample as defined by Praxis II agriculture scores
4. The relationship between course preparation by agriculture content areas and agricultural content knowledge

Definition of Terms

Terms relevant to this study were identified and defined as follows:

Agriculture Content Knowledge:

Constitutive definition- knowledge on agriculture subject matter.

Operational definition- as determined by Praxis II agriculture scores.

Coursework Preparation:

Constitutive definition- courses designed to prepare students for a future career in their major.

Operational definition- as determined by college transcript records.

Pre-service Teacher: student in a teacher preparation program who has not received certification.

Expertise: skill or knowledge in a particular area. Experts not only possess factual knowledge but are able to retrieve knowledge relevant to the task at hand and utilize that knowledge.

Limitations of the Study

1. The study cannot control for variability in course content across different professors.
2. Due to accessibility of information the study will only examine one university in the state of Kentucky.
3. The study did not control for all extraneous variables.
4. Multiple test taking of the Praxis II agriculture exam reflects only the highest score earned.
5. Due to accessibility of information the study could not obtain farm/ non-farm background records of participants.

Basic Assumptions

1. The Praxis II Agriculture exam is a true measure of agricultural content knowledge.
2. The agricultural education curriculum at the University of Kentucky was followed correctly by the students in the sample.
3. All three components of the formula used to determine the variable agricultural course preparation (grades, course level, and number of credits) are of equal importance.
4. Grades are representative of effort, course level is representative of difficulty, and number of credits is representative of course load.

Significance of the Problem

Up until recent years, the majority of students entering the agricultural education field were from an agriculture background. In 2007, National FFA reported that only 27% of members enrolled in FFA were from a farming background (National FFA, 2007). As the students in high school agriculture courses change to a more urban population, the types of teachers entering the profession are also changing. These

students may have limited agricultural experiences because they have not held an agriculture related job, grew up on a farm, or even taken agriculture courses in high school. Because subject matter knowledge of pre-service teachers may not have been a priority in the past, there is currently a lack of literature in this area for agricultural education.

This study intends to examine the coursework preparation of pre-service teachers as it relates to their overall subject matter knowledge in agriculture. If the study shows that current pre-service teachers at the University of Kentucky are not being adequately prepared to teach agriculture content, then the current curriculum at the University of Kentucky may need to be re-evaluated. If the study shows that current pre-service teachers are being adequately prepared, then this study could be repeated at other universities in Kentucky to check for similar results.

Findings of this study will benefit university teacher preparation programs and future agricultural education teachers. As stated previously, there is a deficiency in agriculture related research dealing with subject matter knowledge. Other areas such as mathematics, science, social studies, and English have all conducted studies dealing with subject matter knowledge of teachers in their fields. Little to no recent research has been conducted in the field of agriculture, making this study a necessary and valuable contribution.

CHAPTER 2: REVIEW OF LITERATURE

Purpose of the Study

The purpose of the study was to determine if the amount and quality of coursework preparation of pre-service University of Kentucky agriculture teachers influences their content knowledge as defined by the Praxis II agriculture exam scores.

The Modal Teacher Preparation Curriculum

The modal teacher preparation curriculum model for pre-service teachers has long been a subject of debate. Currently, the literature espouses four basic curricular sections: general studies, content studies, professional education, and integrative studies. General studies are defined as the overall content that is valuable to all students. These include the university required courses such as humanities, social sciences, and natural sciences. Content studies are the specific academic subject area that the teacher plans to teach. For agricultural education majors the content study would be agriculture. Professional education is the teaching methods courses. These are the classes that instruct a teacher in how to teach and are usually conducted by the education faculty. Integrative studies are the field work, lab work, and student teaching experiences (Cruickshank, 1996). This is the experiential component where the pre-service teachers apply what they have learned.

Content studies are one of the key aspects of the teacher preparation curriculum. "All who have a stake in K-12 education uphold the principles that 1) teachers must know the content they will teach and 2) they must be aware of how best to teach it" (Cruickshank, 1996, p. 11). The problem, however, is what content should be taught at the university level and how it will be taught. How the subject matter is approached by

university professors depends on their motives (Cruickshank, 1996). There are many professors whose interest is in students within the discipline, not future teachers who are taking the course to learn the content. Suggestions include placing pre-service teachers in courses that serve professional education students rather than general classes. It is also advised that the appropriate content for an area be more clearly defined and focus on the needs of both secondary and elementary school teachers. A final suggestion is that professors teaching the content need to be in contact with schools, teachers, and teacher educators to ensure they are teaching what the pre-service teacher needs to know in order to be successful (Cruickshank, 1996).

Developing Teachers' Expertise of Teaching

Expertise is an important characteristic of a quality instructor. Experts in their field are able to solve problems and provide insight, have extensive knowledge of their field, are able to reason, and notice meaningful patterns (Bransford, et al., 2000). Shulman (1987) identified seven areas of professional knowledge for quality teaching including: academic subject knowledge, knowledge of teaching strategies, knowledge of curriculum materials and programs, subject-specific knowledge for teaching special students, knowledge of students' characteristics and cultural background, knowledge of the teaching environment, and knowledge of the goals and purpose of teaching. Of these seven qualities, academic subject knowledge is a critical part of being an effective teacher.

Okpala and Ellis (2005) found that four of the most important teacher quality components identified in a study conducted by teachers included content knowledge, and 76.8% of participants agreed that this was an important teacher quality component.

Experts not only have the subject knowledge, but they are skilled at retrieving the knowledge needed for a particular problem or task at hand (Bransford, et al., 2000). This automatic and fluent retrieval of knowledge is important in a classroom setting where teachers must be flexible in their instruction and devise various ways to help students grasp the material. Teachers need to have expertise in their subject so they can respond to student comments and questions, and use various methods of teaching a lesson when the first approach does not reach all students (Floden & Meniketti, 2005).

Experts identify features and patterns which are unnoticed by novices. These expert teachers have skills such as the ability to use existing student knowledge in teaching new material, assessing student progress, and knowing difficulties that their students are likely to face related to learning (Bransford, et al., 2000). When a student has a wrong answer, it is not usually because of lack of thought but frequently it involves theoretical underpinnings that novice teachers don't appreciate (Graeber, 1999). "Novices' knowledge is much less likely to be organized around big ideas; they are more likely to approach problems by searching for correct formulas and pat answers that fit their everyday intuitions" (Bransford, et al., 2000, p. 49). These beginning teachers tend to adapt complete lessons and do not tailor them to a particular group of learners or have a very clear understanding of the end result (Turner-Bisset, 1999). The goal of teacher preparation programs is to help the novice teacher to mature through program experiences and instructional practice (Niess, 2001).

However, expertise in a particular area does not guarantee that one is able to pass that knowledge on to others (Bransford, et al., 2000). Other aspects of teacher preparation, besides subject matter knowledge, play a critical role in the overall quality of

effective teachers and their ability to transfer that knowledge to students. Expertise alone in the primary knowledge base of teachers is not enough (Collins, 2004). In addition to being experts in subject matter, teachers need to also know how students learn, have the attitude that all students can learn, and possess pedagogical content knowledge (Knobloch, 2002). Pedagogical content knowledge is having that content knowledge and being able to teach it to students. Possessing pedagogical content knowledge can be regarded as an expert teacher trait (Turner-Bisset, 1999). In order to have this pedagogical knowledge, teachers need a foundation of content (Poulson, 2001). Quality teachers both know their content and are able to transfer this knowledge to their students (Okpala & Ellis, 2005).

Developing Teachers' Subject Matter Knowledge

Subject matter knowledge is an important part of effective teaching. For teachers to engage students in a subject they must first have a complete grasp of that subject (Kennedy, 1998).

> The secondary-school teacher also needs competence in the specialized subject matter fields he plans to teach. Whether his field is biology, history, English, or foreign languages, he must be thoroughly conversant with the methods of inquiry of that field (Beck, 1961).

Competent teachers are able to demonstrate knowledge of their content to help all students learn (Knobloch, 2002). Subject matter knowledge is more important for secondary school teachers than elementary school teachers (Allen, 2000). This point is of

particular importance to agricultural education because the courses are taught at the middle and high school levels.

Numerous studies have discovered that both subject knowledge and pedagogical knowledge affect classroom practice (Turner-Bisset, 1999). Teachers need to know and understand how to teach their subject matter so they can teach it to diverse learners and assess their learning (Gardner, 2006). This knowledge of content leads to flexibility, confidence, and pedagogical effectiveness (Brover, et al., 2001). Pedagogical content knowledge, which is taking the subject matter and presenting it to students in ways which induce learning, depends on that base knowledge of the subject matter being taught (Kennedy, 1998). Teachers need to know their subject matter deeply so they can relate ideas, address problems, and connect the material to the real world (Darling-Hammond, 1998). Agriculture teachers have the opportunity to make many real world applications. If teachers do not completely know their subject matter they may not be able to make these valuable connections that provide meaning to the material presented.

Henning and King (2005) found that pre-service teachers did not have enough content knowledge in the fields of science or social studies to make meaningful lessons. The faculty members observing these teachers also noticed that the students did not have the content knowledge in science and social studies to transfer that knowledge into instructional lessons for the classroom. The quality of the curriculum that was developed in this study reflected the students' lack of content knowledge (Henning & King, 2005). Allen (2000) also discovered that some educators believe that the kind of subject matter knowledge teachers need is not gained in a traditional arts and science curriculum.

Agriculture is often considered a science subject, so many of the same issues could exist in this subject area.

Brover, Deagan, and Farina (2001) found that when American teachers were asked to create a word problem they might use in class to represent a given computation, only 43% of teachers could compute it correctly and none could invent an appropriate word problem. Teachers who did not have the content knowledge relied on textbooks, videos, and other sources to give them the necessary information and did not trust themselves to create an understanding of their subject area for the students (Irving, Dickson, & Keyser, 1999). Teachers who lack science content knowledge also lack self-confidence, and this results in poor performance in the classroom (Irving, et al., 1999). Not enough subject matter courses are included in teacher preparation (Floden & Meniketti, 2005).

There is controversy over the degree to which subject matter knowledge and pedagogical knowledge are important to successful teaching. One point of view is that teachers need training in both areas. An opposing viewpoint is that teaching skill is best acquired through on-the-job training (Allen, 2000). It has also been argued that resourceful teachers do not need to know the official curriculum because they can obtain this information from other sources of knowledge. An example used is that parents help their children with homework and often do not have content knowledge of their own. Instead they do what many teachers do before a lesson, they read over the material, learn it themselves, and then translate it for the child (Kennedy, 1998).

Compared to other parts of the world, such as Asia, American teachers did not present lessons that had the depth of material to challenge students (Brover, et al., 2001).

American teachers lacked a complete understanding of the subject area, particularly in mathematics (Brover, et al., 2001). One trend in research and government initiatives from the past decade is the importance of student teachers' subject matter knowledge for teaching (Turner-Bisset, 1999). "The need to improve teacher's content knowledge in the sciences and their ability to communicate that knowledge to the students must be moved to the forefront of the national education agenda" (Irving, et al., 1999, p. 411). Subject knowledge in professional development, in-service training, and initial teacher perception should be improved and made a priority (Poulson, 2001).

Coursework Preparation of Teachers

Teacher preparation programs are the foundation for preparing pre-service teachers in knowledge and expertise of their content areas. One key question raised in a study by Brover, Deagan, and Farina (2001) focused on how completion of mathematics coursework led to a deep understanding of the subject. Floden and Meniketti (2005) determined that despite having positive effects, coursework did not bring all students to a strong understanding of subject matter knowledge in their subject area.

A key theme that surfaced in mathematics studies was that teachers in preparation programs who had completed coursework in their subject had basic skills but lacked a deeper understanding of the concepts they would teach (Floden & Meniketti, 2005). Many teacher candidates in English subject areas had limited knowledge of the principles of grammar and often had inaccurate knowledge. The college courses they had taken left them without the subject matter knowledge needed to teach grammar on the basis of principles. In a mathematics study of similar nature, Floden and Meniketti (2005) found that completion of college mathematics courses with passing grades did not automatically

result in mastery of the subject as related to curriculum. Taking the appropriate coursework and achieving good grades does not necessarily guarantee that the pre-service teacher understands the subject matter.

According to Sion and Brewbaker (2001) education faculty need to create teacher preparation programs where both content and practice meet, and create partnerships with members of other disciplines. A strong focus on subject study in primary teacher education exists because of research (Poulson, 2001). Sion and Brewbaker (2001) state:

> Before Mark could engage his students and exercise creative pedagogy, he needed to feel secure about what he was teaching. This came to him through on the job experience. Perhaps he is better for it. I only wish that a more pragmatic approach were in place for him at the university level- it would have aided me as his cooperating teacher, the students entrusted to his care, and Mark's own self confidence. (p. 26).

This passage suggests that Mark may have been missing experience at the university level in his teacher preparation program. Better prepared teachers are twice as likely to stay in the profession (Gardner, 2006). If colleges are to be a reliable source of future teachers then they must do one of two things: recruit students who already have a background in the subject or design a curriculum to provide the needed experience at the university level. More and more students are entering colleges of agriculture without a background in the field (Dyer, et al., 2002). These students make it critical that the university provide the experience in agriculture and educate them on the subject matter.

A majority of teacher preparation programs focus on education courses rather than subject matter courses (Floden & Meniketti, 2005). Many teacher preparation programs try to keep content and method separate, deeming content preparation the responsibility of the liberal arts college and teaching method preparation the responsibility of the education college. Many teacher preparation programs often do not provide enough time to develop skills and experiences that beginning teachers need in their early years (Gardner, 2006). Irving, Dickson, and Keyser (1999) state:

> It is imperative that institutions of higher learning collaborate with school systems to establish programs that not only augment teachers' subject knowledge but also provide teachers with pedagogical skills that allow them to transfer their new knowledge into classroom environments (p. 416).

It is suggested that professors teaching content courses would be more sensitive to the needs of pre-service teachers if they interacted with K-12 teachers and teacher-educators to determine what their students need to know. Core academic classes, such as a science course, at most universities are attended by students of all different majors. Because of this, professors are unable to focus on the few future teachers in the class (Cruickshank, 1996). This could lead to these future teachers having gaps in their content knowledge and struggling to teach the content to their students.

However, there are new strategies for teacher learning. More than 300 schools in the United States are establishing programs beyond a four-year degree and integrating both education and subject matter coursework. Other places have established professional

development schools that include the collaboration of both university and school faculty in planning and teaching (Darling-Hammond, 1998). However, not all programs are this advanced to where there is a professional knowledge base (Gardner, 2006). Other countries such as Germany and Belgium require teachers to complete two to three years of graduate study on top of their undergraduate degree in the specific subject they are going to be teaching (Darling-Hammond, 1998). The many facets of a teacher preparation program such as subject matter knowledge, teaching methods knowledge, and student teaching experience make it difficult to provide adequate time to develop these skills in a traditional four-year program (Gardner, 2006).

Variability in college courses even across sections and professors of the same university creates limitations on studying the effects of coursework on subject matter knowledge (Floden & Meniketti, 2005). However, some success in the subject has been achieved, particularly in the fields of mathematics and English, proving it can be done (Floden & Meniketti, 2005).

Summary of Review of Literature

In summary, teachers need to be experts in their subject so when they are presented with problems or when one way of teaching does not work for all students they can retrieve the knowledge that is relevant to the task and apply it to the situation (Bransford, et al., 2000). One of the most important qualities of an effective teacher includes in-depth content knowledge (Okpala & Ellis, 2005). However, many educators believe that this content knowledge is not being currently gained in teacher preparation programs (Allen, 2000). In a study by Floden and Meniketti (2005) coursework, despite

having positive effects, did not bring all teachers to an understanding of the subject area. Sion and Brewbaker (2001) found that there was a definite weak link between university courses in content areas and practical transference to the classroom. Improving teachers' content knowledge needs to be made a top priority in national education in the United States (Irving, et al., 1999).

CHAPTER 3: METHODOLOGY

Purpose of the Study

The purpose of the study was to determine if the amount and quality of coursework preparation of pre-service University of Kentucky agriculture teachers influences their content knowledge as defined by the Praxis II agriculture exam scores.

Objectives

The specified objectives for this study were to describe:

1. The characteristics of the sample: sex, ACT score, and GPA
2. The agricultural course preparation of the sample by agriculture content areas
3. The agricultural content knowledge of the sample as defined by Praxis II agriculture scores
4. The relationship between course preparation by agriculture content areas and agricultural content knowledge

Research Design

The design for this study is descriptive relational research. Ary, Jacobs, and Razavieh (2002) define relational research as research that "investigates how scores on one variable or variables rise and fall as scores on other variables rise or fall" (p. 354). The two variables studied were coursework preparation and agriculture content knowledge. Coursework preparation was defined by the official transcript of courses taken at the University of Kentucky and agriculture content knowledge was defined by the Praxis II agriculture exam.

Population and Sample

The target population of this study was pre-service agricultural education majors at the University of Kentucky. A time and place sample was taken of the population. A time and place sample is used when the subjects in a given year are representative of the subjects who are followed over time (Oliver & Hinkle, 1982). The graduation years of 2002-2007 were chosen because they are the most recent teachers to complete the program. In addition, this group graduated before the implementation of new curriculum changes so the results are more consistent. A six year period is manageable to study and the data exist for all participants.

Error

Frame error results from a difference between the target population and the population from which the sample is drawn (McCracken, 1998). Frame error could be possible if a participant was missing from the frame. Frame error was avoided by comparing an up to date list from the University of Kentucky agricultural education program with that of university records. Selection error occurs when some sampling units have a greater chance of being included in the sample than other units (McCracken, 1998). Sampling error and selection error are not issues because the study is utilizing a time and place sample and therefore every pre-service agricultural education teacher within the graduation years of 2002-2007 was selected.

Instrumentation

Praxis II Agriculture Exam

The Praxis II exam will be the data source utilized to determine agriculture content knowledge. Many states across the nation consider this to be the content standard

for agricultural education teachers in order to receive their teaching certificate. The Praxis II: Subject Assessments are used to measure subject specific teaching knowledge and skills (Educational Testing Service, 2007). The test covers seven content areas: social and historical perspectives on agriculture (9-11% of the exam); plant and soil science (15-17%); animal science (15-17%); agricultural mechanization and technology (15-17%); agricultural business and economics (15-17%); natural resources and environment (9-11%); and program planning and management (15-17%) (Educational Testing Service, 2007). KRS 161.030 states that the certificate of all teachers is vested in the Educational Standards Board (Educational Testing Service, 2007). The Educational Professional Standards Board issues and reviews certificates for all Kentucky teachers, and this includes passing Praxis II specialty test scores for each area of certification.

Effective September 1, 2003 requirements for certification in the state of Kentucky to be an agricultural educator are: the Praxis II Principles of Learning and Teaching: Grades 5-9 or 7-12 exam and the Praxis II Agriculture exam (Educational Testing Service, 2007). The agriculture subject exam is a multiple choice test. The content for the test is based on surveys given to a group of teachers to determine what they need to know to perform their job well. The Praxis II test is created by an advisory committee of educators that determine content, review, and approve all questions (Educational Testing Service, 2007).

The Praxis II series is created through current research and includes analysis of the skills required of beginning teachers and surveys to confirm test validity (Educational Testing Service, 2007). Validity is defined as the ability of an instrument to measure the items it is purported to measure (Ary et al., 2002). A panel of experts through the

Educational Testing Service was utilized to determine the content validity of the exam. Content validity is the extent to which the questions in an instrument relate to and fulfill the purpose and objectives of the study. The validation process is consistent with technical guidelines in the Standards for Educational Psychology Testing (Educational Testing Service, 2007). ETS statisticians address reliability for the Praxis II test. The Praxis II is a standardized test making it easily comparable from one year to the next. Through test and re-test procedures reliability is established ensuring the test generates consistent results across test takers and versions (Educational Testing Service, 2007).

Coursework Preparation

University records maintained by the Registrar's Office were the data source for coursework preparation. The University of Kentucky has official records kept on file for every student who attends the university. These records include demographic information as well as each course that was taken at the University of Kentucky, how many credit hours it was worth, and what grade the student received in the course. Due to some flexibility in the curriculum requirements, it is important to develop a way to accurately compare the courses among participants. A formula was devised for this purpose and takes into account the level of the course, credit hours it was worth, and the grade received. This is further explained in the data analysis. The study cannot control for transfer students across universities or within majors at the University of Kentucky. The courses selected from each student were agriculture content courses, eliminating many obstacles with transferring courses from another university. Typically the types of courses transferred are university studies program courses that are required for all

students at the University of Kentucky regardless of major. Students transferring agriculture courses were removed from the sample.

University records were determined to be valid because the source is a university and this is their official record keeping system. Reliability is the extent to which the measurements of an instrument are consistent (Ary et al., 2002). Because university procedures keep course policy relatively static over time these records were deemed reliable. The study is focused on agricultural education graduates from 2002-2007 and during this time the courses required for agricultural education were consistent. After 2007, many courses were added or subtracted from the course requirements for an agricultural education degree. See Appendix A for a complete list of course requirements for an agriculture education degree from 2002-2007.

Data Collection

Data were collected using the University of Kentucky records maintained by the Registrar's Office. The records contained the demographics for the sample, Praxis II agriculture exam scores, and college transcripts for each student. Credit hours and courses, gender, ACT, and GPA were specifically obtained from the university data base. Praxis II scores were obtained from the College of Education records. Data about agricultural education students from the graduation classes of 2002-2007 were used. The courses taken by the students were examined by categories including: animal science, plant science, agricultural economics, agricultural mechanics, other social science agriculture courses, and other agricultural courses that did not fit into any other category. Information on student's backgrounds such as farm or non-farm was desired by the researcher, but this information was not available.

Data Analysis

Objective one was analyzed by identifying each characteristic of the objective: sex, ACT score, and GPA. Sex is a nominal dichotomous characteristic. Nominal measurement scales group objects into non-ordered categories according to some attribute, and are the most basic form of measurement (Glass & Hopkins, 1996). Therefore, it is appropriate to report frequencies and percentages. ACT score and GPA are interval characteristics. Interval scales have equal units of measurement, but there is not an absolute zero (Glass & Hopkins, 1996). Therefore, it is appropriate to report means and standard deviations. The demographics information in objective one was gathered in order to profile the participants.

Objective two dealt with the variable agriculture course preparation of the sample. Data for objective two was calculated by content area, using the six pre-established content areas, and a total for all six content areas was also calculated. The formula developed to represent each area was the number of credits multiplied by the level of the course over one hundred multiplied by the grade received.

Number of credits * course level/ 100 * grade received

According to the University of Kentucky Bulletin (2007) the number of credits indicates the load of work for a course and the course level indicates the difficulty or extensiveness of knowledge for a given course. The course level was divided by 100 to approximate the magnitude. The grade received was an indicator of performance,

achievement, and effort (University of Kentucky Bulletin, 2007). A formula that did not include multiplying by the grade received in the course was considered, but dismissed because grade is necessary to show variability among students. Little variability was anticipated because agricultural education uses the same circular model for courses. To a certain degree, including grades in the formula also controls for participants having different agricultural backgrounds because it assures that at the end of the course they are assessed by the same criteria, therefore taking into account any prior knowledge and experience for each class. The scale for grades followed the four point scale commonly associated with GPA, meaning A=4.0, B=3.0, C=2.0, D=1.0, and E=0. Because the result of the formula is interval, mean scores and standard deviations were calculated. The mean was used to determine the average of the agriculture course preparation of the sample. Standard deviation is defined as the square root of the variance (Glass & Hopkins, 1996). The standard deviation shows how much the scores vary from the mean.

Courses that were pass/fail were taken out of the calculations because they were not a numerical grade. Methods classes in agricultural education and the cooperative extension education course were not included in the content areas because they were teaching related and not specifically agricultural content related.

Objective three dealt with the variable agriculture content knowledge of the sample. The scores were interval therefore the mean and the standard deviation of the Praxis II agriculture exam scores were calculated. Students who had not taken the Praxis II examination or whose scores were not on record were pulled from the sample. After removing transfer students and students who had not taken the Praxis II exam, the accessible population remained. The scores obtained reflected the highest score the

participants received on the exam; regardless of how many times the exam was taken. The majority of students did not take the Praxis II exam more than once.

Objective four examined the relationship between the two variables: course preparation and agricultural content knowledge. Both course preparation and agricultural content knowledge scores are interval in scale. This data was analyzed using the Pearson Product Moment Correlation. The Pearson Product Moment Correlation shows the correlation or relationship between two variables, specifically variables that are both interval and/or ratio in scale. It also allows for a comparison of the strength and direction of association between two variables (Glass & Hopkins, 1996). To interpret the magnitudes of the correlations, Davis' conventions were utilized (Davis, 1971). Table 3.1 demonstrates his description for the correlation coefficient scale.

Table 3.1

Davis' Conventions for Correlation Coefficient

Convention	Correlation Coefficient
Perfect	1.00
Very High	.70-.99
Substantial	.50-.69
Moderate	.30-.49
Low	.10-.29
Negligible	.01-.09

CHAPTER 4: RESULTS AND FINDINGS

Purpose of the Study

The purpose of the study was to determine if the amount and quality of coursework preparation of pre-service University of Kentucky agriculture teachers influences their content knowledge as defined by the Praxis II agriculture exam scores.

Objectives

The specified objectives for this study were to describe:

1. The characteristics of the sample: sex, ACT score, and GPA
2. The agricultural course preparation of the sample by agriculture content areas
3. The agricultural content knowledge of the sample as defined by Praxis II agriculture scores
4. The relationship between course preparation by agriculture content areas and agricultural content knowledge

Objective 1

Objective one sought to describe the selected demographic characteristics (sex, ACT score, and GPA) of the participants. Data collected for the nominal characteristic sex were reported using frequencies and percentages in Table 4.1. Data collected for the interval characteristics ACT and GPA were reported using means and standard deviations in Table 4.2.

Table 4.1

Nominal Demographic Characteristics of Participants (n = 54)

Characteristic	Frequency	Percent
Sex		
Male	32	59.30
Female	22	40.70
Total	54	100.00

Table 4.2

Interval Demographic Characteristics of Participants (n = 54)

Characteristic	*M*	*SD*	Range (min-max)
ACT *(n = 52)*	23.06	2.84	17-30
GPA *(n = 54)*	3.24	0.33	2.65-3.98

Of the participants, 35 (59.30%) were male and 24 (40.70%) were female. The ACT score of the participants ranged from 17-30, a 36 being the highest possible score. Of the 52 participants for which data were available, the mean ACT score was 23.06 and the standard deviation was 2.84. The grade point average (GPA) of the participants ranged from a 2.65-3.98. Of the 54 participants, the mean GPA was a 3.24 and the standard deviation was 0.33.

Objective 2

Objective 2 sought to describe the agricultural course preparation of the participants by agricultural content areas. The formula used to derive these calculations was the number of credits * course level/ 100 * grade received. This calculation was completed for each individual agriculture course for a participant. A total was then calculated for each of the six categories and a master total calculated of all the six categories together. The findings were reported in Table 4.3 using means and standard deviations for the interval data. The data are categorized by six agricultural content areas and also includes a total score for all six areas combined.

Table 4.3

Agricultural Course Preparation of Participants by Categories (n = 54)

Category	*M*	*SD*	Range (min-max)
Animal Sciences (ASC)	61.54	53.45	12-322
Agricultural Engineering (AEN)	57.50	19.40	30-96
Agricultural Economics (AEC)	100.48	61.22	36-360
Plant and Soil Sciences (PLS)	130.91	80.89	48-588
Other	12.50	22.28	0-153
Other Agricultural Social Sciences (SS)	106.28	30.82	24-192
Total	467.35	129.35	303-864

Of the 54 participants for which data were available, the highest mean score for a content area category was PLS (*M* = 130.91; *SD* = 80.89) with a range of 48-588. The score for SS was the next highest (*M* = 106.28; *SD* = 30.82) and a range of 24-192. For the AEC content category (*M* = 100.48; *SD* = 61.22) with a range of 36-360. The ASC content category was (*M* = 61.54; *SD* = 53.45) with a range of scores from 12-322. For the AEN content category (*M* = 57.50; *SD* = 19.40) and a range of 30-96. The last content category, other, had (*M* = 12.50; *SD* = 22.28) with a wide range of scores from 0-153. The total score for all six categories was (*M* = 467.35; *SD* = 129.35) with a large range from 303-864.

Objective 3

Objective 3 sought to describe the agricultural content knowledge of the participants based on Praxis II agricultural exam scores. Data collected were reported in Table 4.4 using means and standard deviations for the interval data. For 54 participants Praxis II scores were available (*M* = 579.17; *SD* = 66.84) with a range of scores from 410-690. A 520 is the current minimum passing score for the Praxis II agricultural exam.

Table 4.4

Agricultural Content Knowledge of Participants by Praxis II Scores (n = 54)

Variable	*M*	*SD*	Range (min-max)
Praxis II	579.17	66.84	410-690

Objective 4

Objective 4 sought to determine the relationship between agricultural course preparation and agricultural content knowledge. A Pearson Product Moment Correlation was calculated. All six agricultural content areas and the total for all content areas were compared with Praxis II exam scores. Table 4.5 shows the correlation matrix for these relationships. See Appendix B for all seven correlations as scatter plots.

Table 4.5

Pearson Product Moment Correlations among Agricultural Course Preparation and Agricultural Content Knowledge (according to the Praxis II exam) of Participants (n = 59)

	Praxis	ASC	AEN	AEC	PLS	Other	Other SS	Total
Praxis	1.00	.32	.02	.31	-.01	-.16	.05	.24
ASC		1.00	.03	-.06	.21	-.20	.16	.53
AEN			1.00	.04	.07	-.08	-.22	.14
AEC				1.00	.07	-.16	.05	.48
PLS					1.00	.02	-.05	.75
Other						1.00	-.14	-.01
Other SS							1.00	.24
Total								1.00

The strongest correlation was between ASC content area and Praxis II exam scores. The correlation was positive and moderate (r = .32). The correlation between AEC content area and Praxis II exam scores was the next strongest and was also positive and moderate (r = .31). SS and the Praxis had a positive negligible relationship with one another (r = .05).AEN and the Praxis also had a positive negligible relationship (r = .02). The correlation between PLS content area and the Praxis II exam scores was a negative and negligible (r = -.01). The correlation between other and the Praxis was negative and low (r = -.16). The correlation between the total score for all six content areas and the Praxis II exam score was positive and low (r = .24).

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

Purpose of the Study

The purpose of the study was to determine if the amount and quality of coursework preparation of pre-service University of Kentucky agriculture teachers influences their content knowledge as defined by the Praxis II agriculture exam scores.

Objectives

The specified objectives for this study were to describe:

1. The characteristics of the sample: sex, ACT score, and GPA
2. The agricultural course preparation of the sample by agriculture content areas
3. The agricultural content knowledge of the sample as defined by Praxis II agriculture scores
4. The relationship between course preparation by agriculture content areas and agricultural content knowledge

Conclusions, Implications, and Recommendations

Objective 1

It can be concluded that more men than women were seeking an agricultural education degree from the University of Kentucky between the graduating years of 2002-2007. This aligns with the study by Camp (1998) who found nationwide women held only 15.8% of all agriculture teacher positions; supporting the claim that agricultural

education continues to be a male dominated field. The average GPA of a 3.24 indicates that pre-service teachers performed better than a B average in their college courses, which includes agricultural content courses. In addition, the average ACT score of a 23 also indicates that pre-service teachers performed above the minimum 21 required to be admitted into the teacher education program.

Recommendations for the profession based on the results of this objective are to compare pre-service teachers, to see if there are preferences in content areas related to gender or innate skills toward specific agricultural content areas.

Objective 2

It can be concluded that there is variability in course preparation among the agricultural content categories. This aligns with the principle of expert knowledge which states that different experts have varying degrees of flexibility in which they can approach situations (Bransford et al., 2000). Students had more plant and soil science course preparation than any other of the six agricultural content areas. The next highest amount of course preparation was in other agricultural social sciences, which includes classes such as rural sociology, agricultural leadership, and agricultural communications. Third in terms of course preparation was the agricultural economics content area. Fourth and fifth were animal science and agricultural engineering, respectively. It can be concluded that students had less course preparation in these content areas. Last in terms of course preparation was the *other* category for any other course not included in one of the other five categories. This category had a large range of scores, indicating that students are not required to take courses that fall into this category such as natural

resource conservation courses or entomology courses, but they can count as elective credit towards an undergraduate agricultural education degree.

The large variability of agricultural content preparation categories implies that each content area is not equal in the proportion of preparation required by the agricultural education curriculum at the University of Kentucky. It also implies that pre-service teachers are taking a variety of courses to fulfill agricultural education content requirements. The large standard deviation of total preparation indicates much flexibility within the established required curriculum, or a range of grades in those courses between students, or a combination of the two. The wide range of scores in some agricultural content categories may indicate some participants having double majors in another agricultural content field such as animal science or plant science. Requiring students to double major or obtain a separate undergraduate degree in a specific content area may be a solution to a content knowledge deficit.

The significant amount of plant and soil science and social science content preparation implies that students took more plant and soil science and social science courses, or students performed better in plant and soil science and social science courses, or a combination of both. The curriculum supports the notion that the students took more plant and soil science courses because this course area is the most required in the agricultural education curriculum. This may also imply that this agricultural content area is deemed more significant in teacher preparation than other agricultural content areas. Because this study does not fully control for other previous experiences, another logical explanation could be that students had a stronger knowledge base for other areas before entering the University of Kentucky. Floden and Meniketti (2005) acknowledged that

teacher's subject matter knowledge can come from a range of sources besides their coursework.

The amount of agricultural social sciences content preparation may also indicate that this content area is deemed more significant than other agricultural content areas in teacher preparation. It can be concluded from the lower mean scores of the animal sciences and agricultural engineering content areas that students are not required to have a large amount of course preparation in these areas or they are not performing as well in these content areas. This implies that these content areas could be viewed as less important than other agricultural content areas or that pre-service teachers at the University of Kentucky are expected to have prior knowledge in these content areas. It is possible that the decreasing amount of students in agricultural education with a farming background could also contribute to the lower mean scores in both areas. This is supported by Dyer, et al., (2002) who found that more students are entering colleges of agriculture without a background in the field. The lowest standard deviation for agricultural engineering may indicate that the number of courses, level of courses, and grades in the courses for this category are the most consistent across students. This could be due to the limited number of courses offered in agricultural engineering and the same professors teaching these courses from year to year.

Recommendations based on this objective are for teacher preparation programs to consider whether or not agricultural content areas should be equal or perhaps weighted in some way. It can be concluded from the study that the six agricultural content areas studied are currently not equal in the proportion of preparation required by the University of Kentucky. If the institution does believe that the agricultural content areas should be

equal then it may consider adjusting the curriculum accordingly. Professionals may also need to re-evaluate the base knowledge of their incoming students to determine what should be included in terms of agricultural content courses in the agricultural education curriculum. Improving teachers' content knowledge needs to be made a priority in national education in the United States (Irving, et al., 1999). Better prepared teachers are twice as likely to stay in the profession (Gardner, 2006).

Objective 3

There was a wide range of Praxis II agriculture exam scores across pre-service agriculture teachers at the University of Kentucky between the graduating years of 2002-2007. The mean for the Praxis II agriculture exam scores was above the current minimum requirement of 520 for teacher certification.

The range of Praxis II exam scores and the mean score being higher than required indicates that most students are meeting an adequate content knowledge level, but at differing rates due to the wide range of scores. The high mean score indicates that most students are being prepared well according to the Praxis II exam. The high mean score of the Praxis II agriculture exam aligns with the principle of expert knowledge which states that experts not only have this knowledge, but are able to retrieve any piece of it with little effort (Bransford et al., 2000). The goal of teacher preparation programs is to help the novice teacher to mature through program experiences and instructional practice (Niess, 2001).

Recommendations for the profession based on this objective include examining the different variables in play that lead to proper preparation for the Praxis II exam.

Contributing variables could include prior work experience in an agricultural field, agricultural internships, high school agricultural courses, and agricultural background.

Objective 4

In general, it can be concluded from the study that the relationships between the Praxis II agriculture exam and the agriculture content areas were moderate at best. The strongest relationship was between the animal science content area and the Praxis II exam scores of University of Kentucky pre-service agriculture teachers. This is a moderate and positive relationship that implies, to some degree, that as animal science content preparation increases Praxis II agriculture exam scores (indicating agricultural content knowledge) will increase. The next strongest relationship was between the agricultural economics content area and the Praxis II exam scores. This is also a moderate and positive relationship that implies that, to some degree, as agricultural economics content preparation increases that Praxis II scores (agricultural content knowledge) will also increase. The moderate and positive correlation between animal science and agricultural economics course preparation and Praxis II agriculture exam scores implies that more of these courses should be required to possibly increasing Praxis II scores or at least keep them at their current level. This could also imply that in these two areas students are not already coming in with a lot of previous knowledge of the content. The amount of animal science content preparation currently required by the curriculum is low in comparison with other agricultural content areas. This aligns with Floden and Meniketti (2005) who state that an inadequate type and amount of subject matter courses are included in teacher preparation. The curriculum may need to be adjusted in response to this relationship.

The other agricultural content areas- agricultural social sciences, agricultural engineering, and plant and soil sciences- all had low to negligible relationships to the Praxis II agriculture exam. This implies that there is little to no relationship between agriculture content preparation in these three areas and performance on the Praxis II exam, the indicator of agricultural content knowledge. The negligible relationship between Praxis II exam scores and plant and soil science content, in conjunction with high amount of plant and soil science currently required by the undergraduate curriculum, implies that less plant and soil science content preparation is needed because it seems to have little influence on agricultural content knowledge as determined by the Praxis II agriculture exam.

The negligible relationship between agricultural social sciences content and the Praxis II agriculture exam may be a result of a lack of questions on the exam pertaining to the social sciences area. The amount of agricultural social sciences taken by students at the University of Kentucky is high compared to other agriculture content areas. Why the difference in emphasis of agricultural social sciences between the Praxis II agriculture exam and the University of Kentucky agricultural education curriculum? If agricultural social sciences are important to teacher preparation then perhaps more questions about it should be included on the Praxis II agriculture exam. If agricultural social sciences are not important to teacher preparation, then maybe the University of Kentucky should consider requiring fewer courses in the curriculum. This lack of relationship could be addressed by either requiring pre-service teachers to take fewer social sciences courses at the undergraduate level or by influencing policy makers to include more social sciences on the Praxis II agriculture exam.

Finally, there is a positive low correlation between total scores of all six content areas and Praxis II agriculture exam scores. This implies that these six content areas are either not aligned with the tests or that these areas are underrepresented on the Praxis II exam.

Recommendations for the profession based on this objective are to reevaluate and make any necessary changes to the current agricultural education curriculum requirements, specifically agricultural content preparation requirements. The positive moderate relationship between some areas of agriculture content and the Praxis II exam should encourage teacher educators to emphasize agriculture content in their teacher preparation programs. This aligns with the principles of expert knowledge which state that experts have a substantial amount of content knowledge and a deep understanding of the subject matter and that experts notice patterns of information that novices do not (Bransford, et al., 2000). Darling- Hammond (1998) also discovered that teachers need to know their subject matter deeply in order to address problems, relate ideas, and connect the material to the real world.

Changes should be considered to either the agricultural education curriculum or to the Praxis II exam itself so that they are a reflection of each other. If the Praxis II exam is intended to measure the content knowledge of pre-service teachers then the curriculum should reflect this. If the content areas such as the agricultural social sciences don't seem to have an effect on the Praxis II exam, this studies indicator of agricultural content knowledge, then why is it emphasized in the current curriculum? However, the Praxis II exam may not be representative of the values of agricultural content at the University of

Kentucky, so teacher educators should keep this in mind. Given the high Praxis II exam scores teacher educators may choose to keep the curriculum the same.

It could also be useful to examine what courses high school agriculture programs are offering and the connection between what pre-service teachers are learning in college, what the Praxis II exam emphasizes, and what agriculture teachers need to know in order to teach the current high school curriculum. Are high school agriculture programs today teaching more social science courses and fewer animal science courses? Or are these high school programs teaching more courses such as biotechnology that the Praxis II exam doesn't fully address? The current high school curriculum should be examined and the agricultural education curriculum at the University of Kentucky possibly reevaluated based on the specific content agriculture teachers are expected to teach in the high schools.

Recommendations for Further Research

Recommendations for further research based on the results of this study include replicating the study and altering or adding different components. A future study should take into account students' prior knowledge in the forms of previous agriculturally related work experience, farm/non-farm backgrounds, and high school agriculture courses taken of pre-service teachers at the University of Kentucky. Students from the new curriculum that was established in 2007 at the University of Kentucky should be examined to see if similar findings are found or if the new teacher education curriculum changes the outcomes. Break out scores from each specific content area of the Praxis II exam could be a useful piece of data to obtain. This information would be useful in comparing each

individual agricultural content area instead of just the overall Praxis II agriculture exam score. It would also be beneficial to examine the content knowledge difference between pre-service teachers upon graduation and veteran teachers. This would provide further insight into the expert- novice theory from a practicing teacher's perspective. This would align with the principle of expert knowledge that states that experts are able to apply the knowledge that they have (Bransford et al., 2000). The study conducted was only a snapshot of four years of teacher preparation at the collegiate level, and it would be very useful to the profession to examine what happens once pre-service teachers enter the field. Finally, other colleges across the state of Kentucky and the United States that prepare agricultural educators should be examined to determine if the findings are similar and generalizable.

APPENDIX A:

University of Kentucky Agricultural Education Degree Course Requirements Sheet

University of Kentucky

Agricultural Education

College Requirements

General Agriculture

GEN 100 & GEN 200

Core Requirements

ACE 302

ACE 320

ACE 362

ACE 501

Major Requirements

AED 210

AED 580

AED 586

AED 501

EDP 203

Specialty Support Requirements (30)

6 hours in Animal Sciences

6 hours in Agricultural Economics

6 hours in Agricultural Engineering

12 hours in Plant & Soil Science (at least 3 hrs in soils)

APPENDIX B:

Scatter plots for Praxis II exam and Agricultural Content Areas

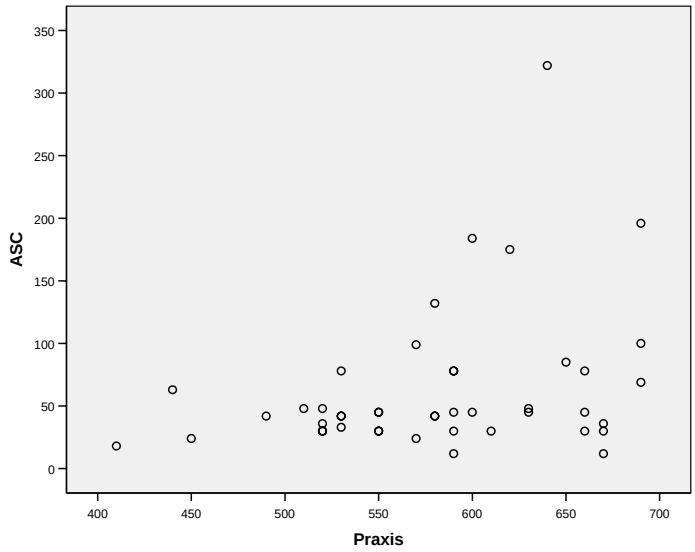

Figure B.1 Scatter plot of the relationship between animal science content preparation and Praxis II exam scores

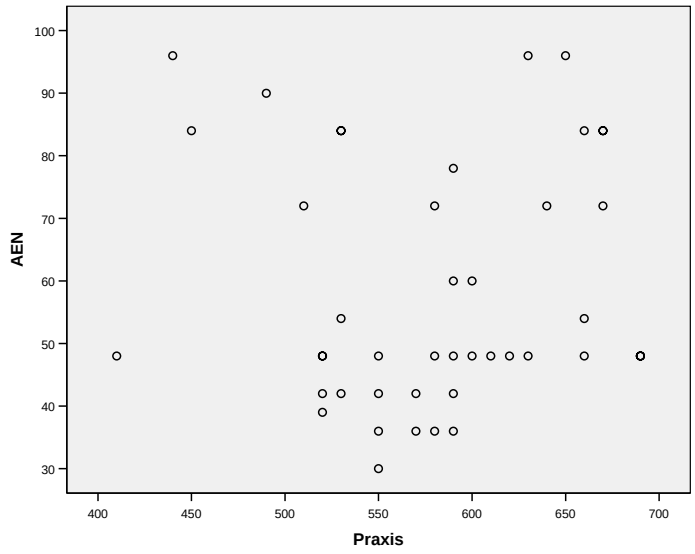

Figure B. 2 Scatter plot of the relationship between agricultural engineering content preparation and Praxis II exam scores

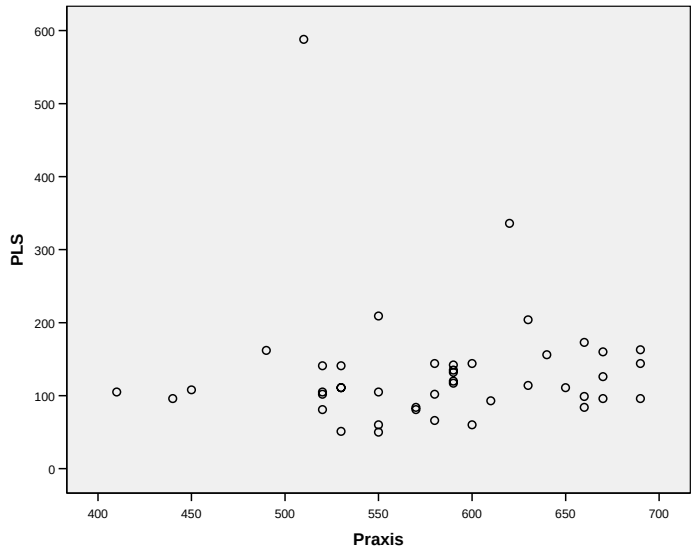

Figure B. 3 Scatter plot of the relationship between plant and soil science content preparation and Praxis II exam scores

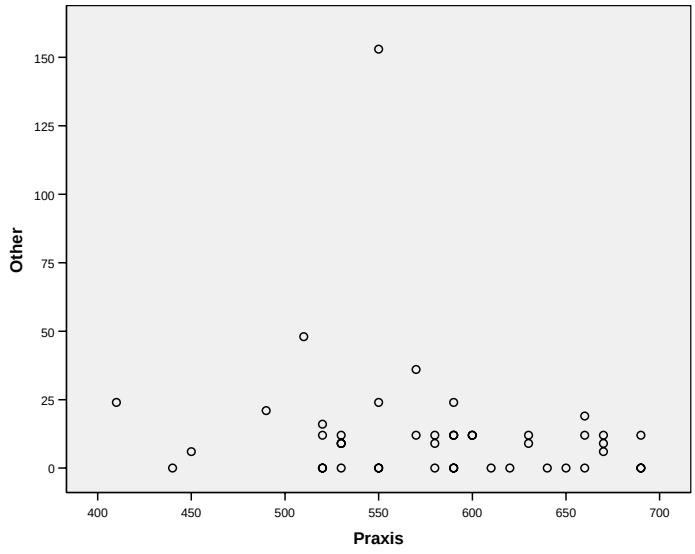

Figure B.4 Scatter plot of the relationship between *other* content preparation and Praxis II exam scores

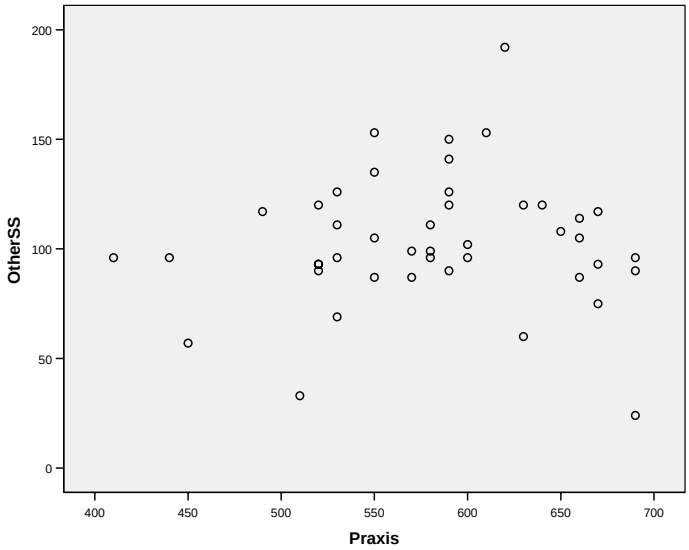

Figure B.5 Scatter plot of the relationship between other agricultural social sciences content preparation and Praxis II exam scores

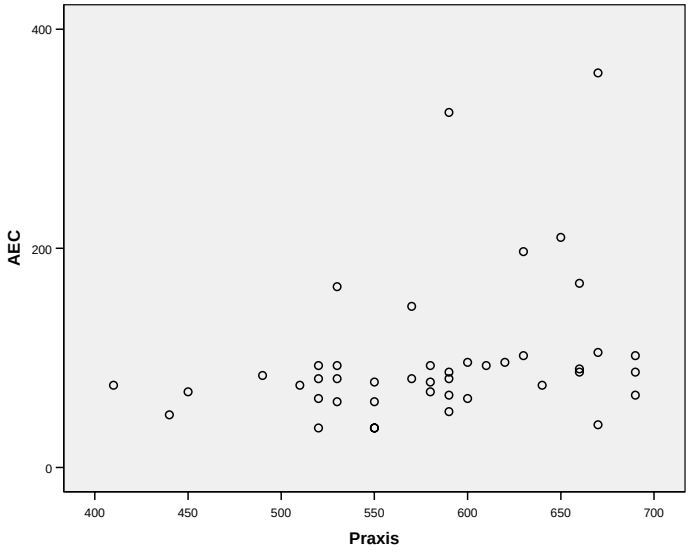

Figure B.6 Scatter plot of the relationship between agricultural economics content preparation and Praxis II exam scores

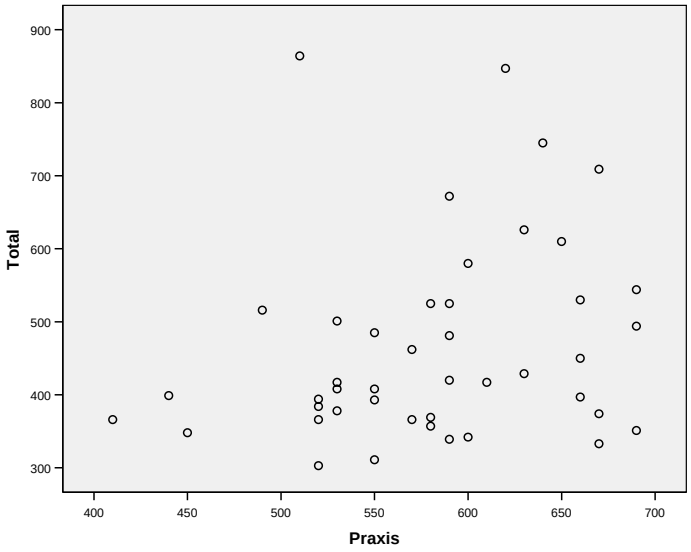

Figure B. 7 Scatter plot of the relationship between total agricultural content preparation and Praxis II exam scores

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Papers Presented

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Posters Presented

Houck, A. M., White, C. C., & Peiter Horstmeier, R. (2008). Experiences of agricultural education student teacher interns. *2008 AAAE Southern Region Research Conference.*

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